Department of Energy
Washington, DC 20585
December 6, 1995

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Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
Suite 700
625 Indiana Ave., N.W.
Washington, D.C. 20004

Dear Mr. Chairman:

The November 1995 deliverables called for in the Department's Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 94-4 are enclosed. A list of the deliverables is provided as enclosure 1 to this letter. Included in the Enclosures are the assessment reports covering Criticality Safety Approvals (CSAs)/Operational Safety Requirements (OSRs) (Task 2) and Conduct of Operations (Task 4). Both of these assessments correctly point out that change in the safety culture at Y-12 is incomplete; however, this should not be unexpected given the experience at Rocky Flats, Pantex, and other sites within the complex. Both assessments also correctly point out that operations in the "resumed facilities" are being conducted safely. This has been the result of effective improvements and implementation of CSAs, OSRs, and conduct of operations coupled with effective mentoring and compensatory measures.

The Commitment 5.1, Office of Environment, Safety and Health (EH) training evaluation plan, and the Commitment 5.2 report evaluating EH personnel have been forwarded separately.

If you have any questions, please contact me or have your staff contact Phil Aiken of my staff at (301) 903-4513.

Sincerely,

Thomas P. Seitz
Acting Deputy Assistant Secretary for
Military Applications and
Stockpile Support
Defense Programs

5 Enclosures

cc w/enclosures:
M. Whitaker, EH-9
D. Leclaire, DP-30

Enclosure 1:

This list of deliverables.

Enclosure 2:

Commitment 2.2, the Department's assessment report on the adequacy of Lockheed Martin Energy Services, Inc. (LMES) Criticality Safety Approvals (CSA) and Operational Safety Requirements (OSR) associated with nuclear operations at the Y-12 Plant.

Enclosure 3:

Commitment 3.2, the LMES evaluation of its criticality safety program.

Enclosure 4:

Commitment 4.2, the conduct of operations assessment reports for separate evaluations of LMES conduct of operations implementation and the Department's conduct of operations oversight and support.

Enclosure 5:

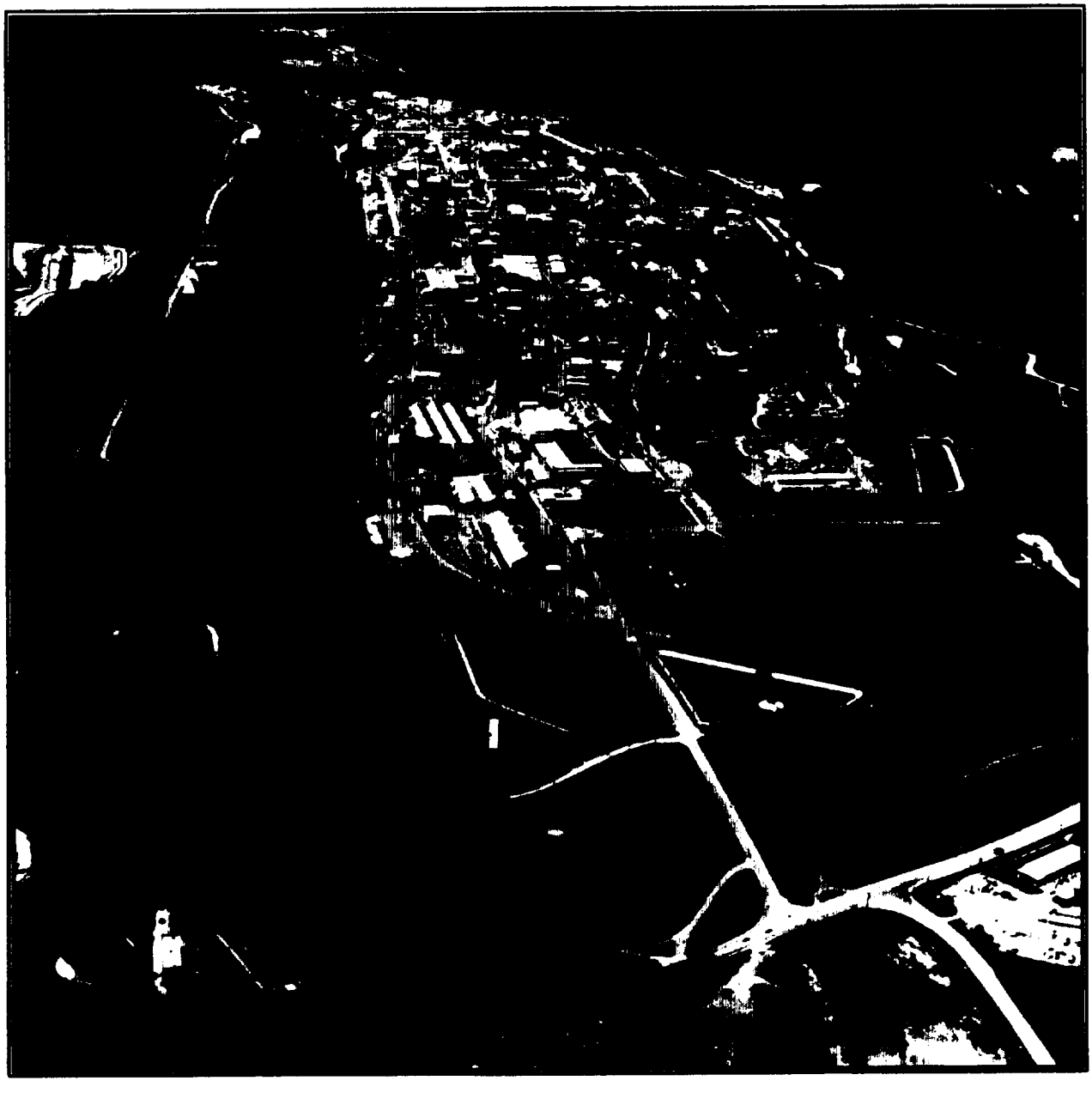
The final deliverable of Commitment N.4.2 for the Receipt, Storage, and Shipment (RSS) mission area, the LMES closure validation report associated with the restart of RSS.

DOE-DP/EH-OR-01

TASK 2 ASSESSMENT

OAK RIDGE Y-12 FACILITY

DNFSB 94-4



November 29, 1995

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The temporary cover over pit 6A on tank 241-BY-106 required a modification for a power cable. A small notch in the edge of the plate was necessary to clear the existing cable entering the pit. An Engineering Change Notice (ECN) was prepared for the addition of the notch. The notch was added and the plate installed in the field on October 12, 1994, enabling the exhauster to be connected for field sampling support.

Further examination and evaluation of the first designated riser, #12B, scheduled for rotary sampling in tank 241-BY-106, revealed a probable cutoff and abandoned thermocouple tree inside the riser. The presence of this old equipment will necessitate going to another tank riser to obtain the first sample.

On October 10, 1994, during a training session, the platform on rotary truck #2 was extended which resulted in stretching a hydraulic hose until it was pulled from the fittings. Approximately one to two liters of fluid was spilled and cleaned up. The hydraulic hose break was a result of being misrouted in August 1994 when an upgraded hydraulic pump and fittings were installed in a maintenance activity. Neither the hose nor the fittings were faulty. Replacement hose and fittings were located and installed and functional testing of the replacements parts were performed. The work package to install the replacement parts provided direction for the correct route which was overlooked in the August pump installation work package. Operations will be conducting a critique for lessons learned on this event.

The RCMS truck and equipment was readied for transport into BY farm on October 11, 1994. The RMCS System ownership has been officially transferred to Operations. Documentation closing out Operational Readiness Review items and Westinghouse Hanford Company (WHC) Engineering structural analysis will follow. There are some minor post startup repair items that remain, and they will continue to be scheduled for corrective work. The area in BY farm around tank 241-BY-106 that will be dedicated for the rotary truck and system equipment setup had been radiologically surveyed and cleaned on October 16, 1994, to meet requirement for "clean" status for easier daily personnel access during the planned rotary sampling activity. The rotary truck has been located over the riser on tank 241-BY-106 in preparation for scheduled sampling. Two corrective items requiring attention have been scheduled. Both items are considered post startup for the RMCS system and will not interfere with truck deployment or sampling in tank 241-BY-106:

1) One of the two propane heaters for the nitrogen purge gas supply has not been firing at times. This has been determined to be acceptable and a Procedure Change Authorization (PCA) to the procedure was issued to permit either one or both heaters to operate during normal operation.
2) Trouble shooting of the Breathing Air Filter (BAC) revealed a problem with the controller. The equipment is under

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carbatrol filter will be removed from the riser over the weekend of October 22, 1994, and the push truck located over the riser on tank 241-C-103 in preparation for sampling.

ANALYTICAL INTEGRATION (WBS 1.1.1.4.3)

A study has been initiated that will evaluate the effects of sample extrusion, homogenization, subsampling, and storage on moisture (percent water) determinations by Thermogravimetric Analyses (TGA). Samples of various core material simulants will be analyzed for water content at each stage of typical hot cell and storage operations. As one of the safety screening analyses, the TGA analysis method has been receiving much attention. Questions have arisen about the degree of error in this analysis due to the sample drying while in the hot cell and in storage. The accuracy of TGA testing will be explored further.

The 222-S Laboratory completed analysis on the liquid grab samples from tank 241-U-106 on October 17, 1994, 28 days ahead of schedule.

Two 20" auger samples from tank 241-BX-105 were received and extruded in 222-S Laboratory hot cells. Recovery on the second auger sample was much improved over the first auger sample -- approximately 319 grams were recovered. This is a 40-50% recovery depending on the sample density.

A draft Tank Characterization Plan (TCP) revision for tank 241-C-108 was received for review and comment. Tank 241-C-108 was sampled by push mode in June 1994. About 20 grams of sample were available to the 222-S Laboratory for analysis. The new sample event will be based on the auger technique, which should improve sample recoveries. To process the data most efficiently, results from the previous push mode sampling event in June 1994 will be incorporated into the auger data analysis package.

The DOE Independent Review Assessment of the 325 Laboratory was initiated on October 18, 1994, and completed the initial phase of the assessment on October 21, 1994. The schedule of the DOE Independent Review Team called for completing the field work by October 24, 1994, after the team members observes the Yttrium-90 activities. The DOE Independent Review Team aligned the completion of their review with the completion of the demonstration project. Daily close out meetings provided a mechanism to facilitate communications and allow 325 Laboratory management an opportunity to address items of concern.

The 222-S Laboratory completed extrusion of the auger sample from tank 241-B-102 (riser #1), received on October 18, 1994, on October 19, 1994. This was the second of two planned 10" auger samples from this tank. Recovery was 45 grams out of a possible approximate 345 grams, depending on the sample density. The auger sampling attempt of tank 241-B-102 was

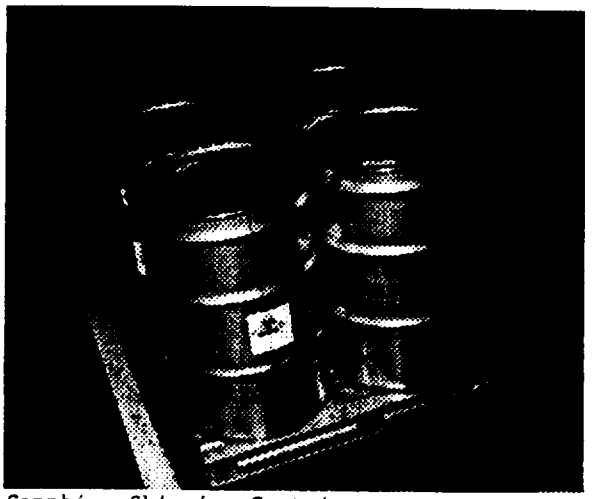
1.0 BACKGROUND

On September 22, 1994, while observing operations at the Oak Ridge Y-12 Plant, the Defense Nuclear Facilities Safety Board (DNFSB) noted a condition where fissile material was being stored in an array without the required criticality safety approval documentation. The Department of Energy (DOE) and contractor staff failed to take the corrective actions mandated by the contractors procedures. Subsequently, the DNFSB issued Recommendation 94-4, Deficiencies in the Criticality Safety at the Oak Ridge Y-12 Plant. That Recommendation cited weaknesses in operator discipline, criticality safety programs including procedures, and the adequacy of DOE and contractor experience, training and performance. In February 1995 the Department issued *The Department of Energy Implementation Plan for Defense Nuclear Facility Safety Board Recommendation 94-4, Deficiencies in the Criticality Safety at the Oak Ridge Y-12 Plant.* The plan contained eight tasks that the DOE and the operating contractor would perform to correct the noted safety deficiencies. Once completed, these eight actions were to be validated through a formal DOE 5480.31 restart process.

The following tasks were identified as part of the Implementation Plan:

- Task 1—Organization
- **Task 2—CSA/OSRs**
- Task 3—Criticality Safety
- Task 4—Conduct of Operations
- Task 5—Technical Competence
- Task 6—Corrective Actions
- Task 7—Reporting Requirements
- Task 8—Change Control

This assessment (Task 2) was an independent review by DOE to determine if Lockheed Martin Energy Systems, the management and operating contractor for Y-12, effectively implemented the corrective actions from prior evaluations regarding CSAs and OSRs to prevent criticality accidents.



Sapphire Shipping Containers

2.0 INTRODUCTION

The Office of Defense Programs (DP) and the Office of Environment, Safety and Health (EH) performed an assessment of the Oak Ridge Y-12 Plant October 16–25, 1995, according to the "Criticality Safety Assessment Program for Defense Nuclear Facilities Safety Board Recommendation 94-4, Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant," Revision 1, October 1995. The assessment team was comprised of DOE technical experts, senior Management and Operations (M&O) contractors and highly-qualified consultants, experts in criticality safety, operational safety requirements, and operations. The team's biographies are included as Appendix A. Two members of the DNFSB staff observed the team's activities. The assessment focused on the site's implementation of Criticality Safety Approvals (CSAs) and Operational Safety Requirements (OSRs) as well as safety significant procedures.

A formal assessment plan and protocol was developed, The Criticality Safety Assessment Program for Defense Nuclear Facilities Safety Board Recommendation 94-4, by a team of criticality safety engineers and subjected to a formal peer review. The assessment program plan set out the performance objectives, review criteria, approaches and expectations that were used. Upon finalization, the plan was forwarded to the DNFSB in advance of

the assessment. The major areas to be assessed were OSRs, CSAs, root cause analysis programs, and lessons learned programs.

3.0 CONDUCT OF THE ASSESSMENT

The assessment team performed walkdowns, observed evolutions in the facilities, interviewed a cross section of DOE and contractor personnel, and reviewed pertinent documentation. The team requested that the site perform a criticality safety evacuation drill, and the drill was observed. The team also observed other major evolutions including preparation for shipping of "Sapphire" material and a mockup intra-plant movement of fissile material. The team did not observe the actual intra-plant shipment because it was delayed due to a lack of readiness. Minor evolutions (such as surveillances) all involved CSAs. The assessment team members evaluated their assigned performance objectives by pursuing suggested lines of inquiry at a representative sample of the facilities at Y-12. The sample included:

MISSION	BUILDINGS
Receipt, Shipment, and Storage (RSS) of Uranium	9204-4 9720-5 9998 9204-2E
Y-12 Disassembly and Assembly Operations	9204-2E 9204-2
Y-12 Quality Evaluation Operations	9204-4
Y-12 Enriched Uranium (EU) Operations	9720-32 9720-33 9723-25 9212 9995 9215 9206

Team members documented their activities daily and presented their issues and the basis for their issues on Form 2s' (included in the report as Appendix B). These issues formed the basis for this report.

During the assessment, the team gathered each evening to discuss the day's events, raise and discuss issues, and prepare for the subsequent meeting with site personnel. That meeting was used to bring the issues into the open and to validate them, as well as to present team requests and to discuss the following day's logistics. The team leaders held a morning meeting with both DOE Site Office and contractor senior management to address significant daily issues.

At the conclusion of the assessment, the team provided the site with a copy of all Form 2s' and requested site personnel to comment upon or unconditionally accept the Form 2s' and return them to the team leaders. Form 1's—which document the individual team members' daily activities and were used to develop the issues, conclusions, and recommendations—are not included in the report. They are available to those wishing to trace any specific issue to its source.

4.0 SUMMARY OF RESULTS

The assessment team categorized issues using a consensus approach and the following definitions.

Finding—A statement of fact documenting a deviation from an applicable Federal law, DOE Order, standard, safety requirement, or approved procedure. An issue can also be categorized as a *finding* if the assessment criteria as set forth in the Assessment Program has not been met.

Concern—Any situation while not in violation of any written procedure, in the judgment of the assessment team member indicates less than optimal performance and could be the indicator of more serious problems.

Observation—Any situation while not in violation of any written procedure or requirement, in the judgment of the assessment team member is worthy of raising to the attention of site management in order to enhance overall performance.

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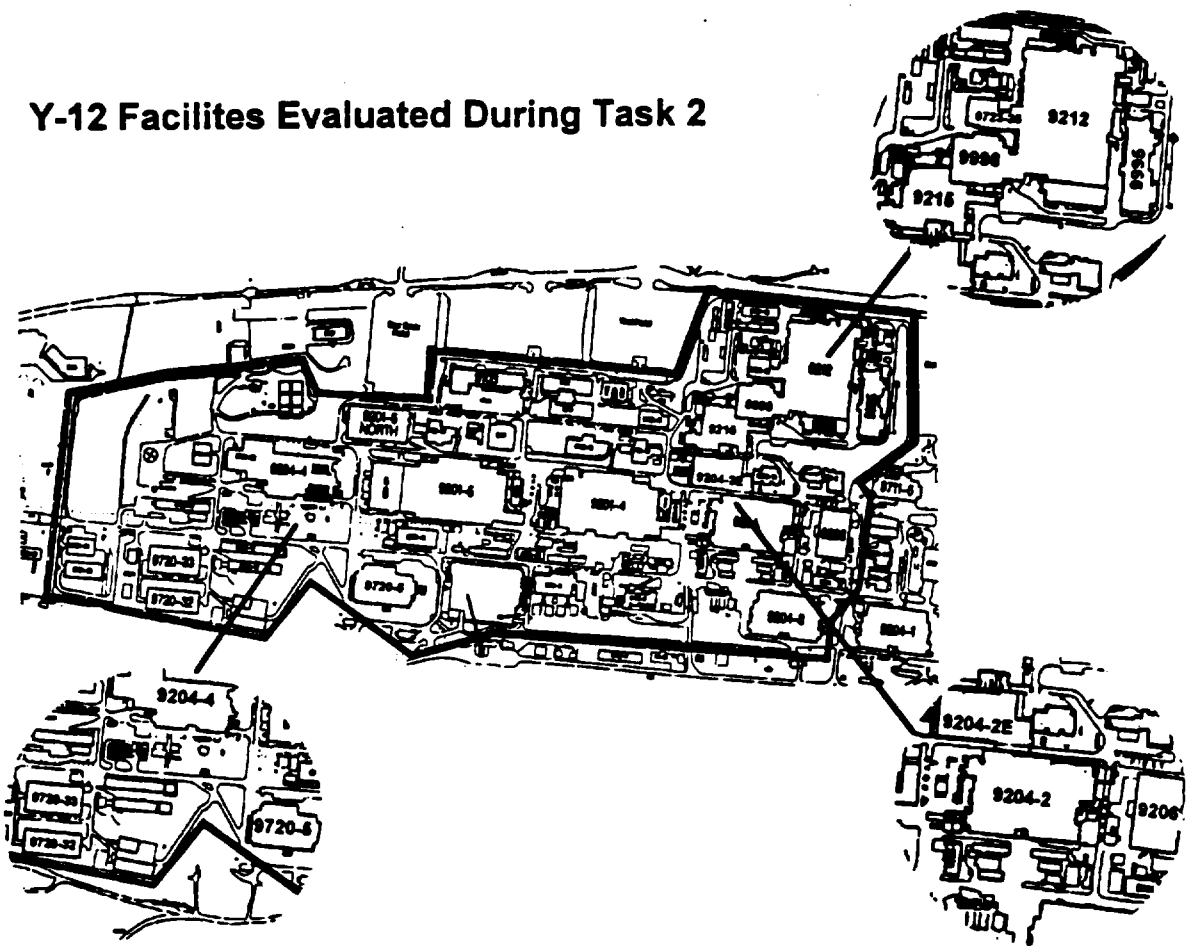
Y-12 Facilites Evaluated During Task 2



Noteworthy Practice—Practices that are notable and will have general application to other DOE facilities for the improvement of overall safety or performance.

The assessment team reviewed the results of previous readiness assessments, contractor evaluations, corrective action plans, and closure documentation. It also interviewed various DOE Site Office and contractor employees. Based on those reviews and interviews and their relationship to the criteria and expectations of this performance objective, the assessment team established the following twelve Findings, three Concerns, and seven Observations:

Findings

- Deficiencies were observed with (1) safety analysis and authorization bases to support safety and other important programs throughout Y-12, (2) the clarity of safety basis for newly approved OSRs, (3) the quality of OSRs for EU Operations, and (4) the implementation of OSRs with respect to criticality safety. (F-09)

- OSRs or Technical Safety Requirements (TSRs) have not been approved for Buildings 9720-33 and 9995. (F-06)

- Lockheed Martin Energy Systems (LMES) has not performed a CSA requirement for the Building 9215 machine shop coolant system nor has LMES properly authorized the deviation. (F-20)

- LMES has not explicitly identified associated limits for controlled parameters in criticality safety analyses. (F-14)

- Thirty-two identified areas requiring CSAs in EU Operations do not have CSAs. (F-13)

- LMES has moderation control areas not identified in Pre-Fire Plans, CSAs, nor Nuclear Criticality Safety Approvals (NCSAs). (F-07)

- Operations for Special Nuclear Material (SNM) Vehicle Transport requiring CSAs are not covered by Class 1 or Class 2 procedures. (F-16)

- Postings do not specify limits on control parameters or explicitly identify allowed materials. (F-11)

- Maintenance, radiation control, technical support, and others who may direct or instruct operators do not receive sufficient training on the new and revised CSAs for unattended work in key areas. (F-17)

- LMES's lessons learned program is deficient in measuring operational performance improvement and program effectiveness and in integrating the program throughout the management chain and across functional areas for nuclear criticality safety. (F-08)

- LMES has not fully addressed examples of lessons learned from other sites. (F-15)

- LMES is not performing a formalized root cause analysis for repetitive nuclear criticality safety (NCS) deficiencies. (F-02)

Concerns

- OSRs for Buildings 9212 and 9206 should be updated to current DOE requirements prior to resumption of operation in those nuclear facilities. (C-04)

- LMES has nuclear facilities (e.g., Buildings 9995, 9202/9203, 9805) that do not have an approved authorization basis. (C-05)

- Current training has not yet produced a safety culture among workers consistent with DOE 5480.19 to prevent criticality safety deficiencies and ensures proper response if deficiencies occur. (C-18)

Observations

- OSRs do not meet the format and content of DOE 5480.22. (O-03)

- Contaminated combustible waste storage in nuclear facilities presents a housekeeping problem and potential safety issues. (O-10)

- Job-specific criticality safety training programs are compartmentalized, which reduces effectiveness. (O-19)

- The Plan of the Day meeting does not include representation from all required support organizations. (O-01)

- The Occurrence Reporting and Processing System (ORPS) reports emphasize detection of problems instead of the analysis of the causes and chronology of problems. (O-21)

- The root cause identified by LMES in Y/DD-679 is too broad in scope to allow for effective implementation of corrective actions. (O-12)

- Final ORPS reports are not always submitted within the 45 day requirement. (O-22)

5.0 DETAILED RESULTS

In each of the following sections (5.XX), the bold introductory statement describes the performance objective which was assessed.

- LMES has not explicitly identified associated limits for controlled parameters in criticality safety analyses. (F-14)
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5.0 DETAILED RESULTS

In each of the following sections (5.XX), the bold introductory statement describes the performance objective which was assessed.

Commitment 2.4 The near-term strategy to take advantage of immediately available opportunities was issued in January 1994. When this commitment was established, it was anticipated that the early retirement initiatives would be immediately approved and a large number of open positions would be available by the end of the year. The buyout bill was subsequently approved in March 1994, and is being reviewed for Department applicability and use. The Assistant Secretary for Environmental Management has been given approval to hire additional employees during the remainder of FY 1994. The current strategy is designed to support Environmental Management near-term recruitment.

4.3 Functional Area 3: Succession Planning and Career Path Development

Commitment 3.3 A list of interim milestones has been developed for this Commitment. Additional actions will be reported upon in future quarterly reports.

4.4 Functional Area 4: Education Programs

Commitment 3.1 An initial task team has been formed to expand the current graduate technical education programs. Interim milestones have been established and further updates will be covered in the upcoming quarterly reports for the next two quarters.

Commitment 3.2 Performance indicators for individual educational achievements are being developed by Human Resources. These indicators will be included in the next Technical Personnel Performance Indicator Report covering the second quarter ending June 30, 1994. (See Commitment 4.8)

The specific performance elements for appraisal plans of supervisory and non-supervisory personnel technical personnel will be completed in conjunction with Commitment 4.7.

ensure that such actions are sufficient to deal with the root causes.

LMES should propose and submit to DOE appropriate cost-effective solutions for providing authorization bases for nuclear facilities.

LMES should update OSRs to current requirements prior to resumption of operations. OSRs should be revised to ensure that the associated limiting condition of operations (LCOs) are clear, concise and comprehensive.

5.2 Performance Objective CO-1.2

Facility operations governed by OSRs have a process to ensure all surveillance procedures and administrative controls are adhered to in order to confirm facility safety system operability.

Discussion

Team members reviewed procedures, interviewed site personnel, and observed several OSR surveillances in assessing this performance objective. This review included representative OSRs for the resumed facilities and active OSRs for non-resumed facilities.

This review found that procedural controls are in place to ensure compliance with OSRs. The statements in the new and revised OSRs are clear and concise. The compliance methodology is clearly defined. Discussions and reviews of records indicated that OSR noncompliances have been reported promptly.

For those LMES facilities with approved OSRs, LMES has implemented a process to ensure LCO-required surveillance requirements (SRs) are performed. In general, two parallel work organizations track scheduled SR due dates. In all cases, LMES operations personnel track—via plan-of-the-day notes and centralized bulletin boards, required surveillances—when the last one was done and when the next is due. LMES support organizations also provide a second cross check to ensure SRs are performed. The depth of detail related to cross checking depends on the scope of the specific SR and its associated LCO. In some instances, support organizations reconfirm surveillances, while in others, SR schedules are tracked independently.

Two groups perform the criticality-related OSR surveillances. Operations department personnel perform annual surveys for each facility CSA. In addition, Nuclear Criticality Safety Department (NCSD) personnel walkdown facility CSA areas annually and independently survey CSA mandated limits and controls. NCSD personnel conduct assessments and log review summaries into a department control system. If CSA deficiencies are identified, NCSD personnel contact operations personnel and develop and perform corrective actions. The assessment team observed a NCSD CSA facility walkdown surveillance and found it satisfactory. Operations personnel were present and personnel assisted the criticality safety engineer performing the surveillance. Facility operations personnel in Building 9204-2E also enhance criticality safety program implementation by performing an annual audit of NCSD files to ensure file copies of facility CSAs are identical to those in the field.

Issues

No findings, concerns, or observations were associated with this performance objective.

Conclusions

The review criteria for this performance objective have been met. The OSR surveillances observed were conducted properly and by approved procedure. The document control process for final OSR documents was acceptable. Surveillance procedures are completed within the frequency requirements and confirm facility system operability. Performance Objective CO-2.6 discusses problems LMES has in establishing a culture that encourages site personnel to immediately report noncompliances.

Efforts are now underway to approve revisions of DOE Order 5480.18A and to revise TAP manuals.

Commitment 5.4 DOE Order 5480.20 is being revised (5480.20A) to incorporate lessons learned and to update the responsibilities section.

Commitment 5.6 The actions necessary to review and strengthen contractor organizations responsible for training and qualification are being planned. Additional updates and progress will be discussed in upcoming quarterly reports.

Commitment 5.7 The guidance for contracting officers is being planned. Additional updates and progress will be discussed in upcoming quarterly reports.

4.6 Functional Area 6: Oversight of Training and Qualification Programs

Commitment 1.4 An interim policy and guidance document was issued (2/28/94) addressing the roles and responsibilities within the Department to evaluate technical training and qualification programs at defense nuclear facilities. This item has a target date for implementation in the fourth quarter 1994. Implementation will be tracked and followed in the Technical Personnel Performance Indicator Report.

Commitment 4.1.1 A peer group has been established to develop and issue guidance to operations and program offices regarding the evaluation of contractor training and qualification programs. The document is due in June 1994, and will be discussed in the next quarterly report.

Commitment 4.1.2 The effort to develop selection, training and qualification requirements will be started in July 1994.

4.7 Functional Area 7: Training Organization, Administration and Infrastructure

Commitment 1.5 A draft Federal Employee Training Standard has been developed with stakeholder involvement. The draft will be issued for formal comments and resolution by May 1994, with the approved standard to be issued by June 1994.

Recommendations

No recommendations are associated with this performance objective.

5.3 Performance Objective CO-1.3

Surveillance procedures are in place that test and/or calibrate OSR required facility safety systems, facility safety instrumentation, and other instrumentation monitoring conditions for operation.

Surveillance, inspection, and testing activities should provide assurance that the equipment needed for safe and reliable facility operation performs within required limits and that preventive maintenance, defined as including periodic and planned maintenance, is utilized to maintain a piece of equipment within design operating conditions and to realize its maximum reasonable useful life.

Discussion

Team members interviewed site personnel, reviewed procedures and records, and observed a CSA surveillance in assessing this performance objective.

LMES ensures OSR LCO compliance through the use of controlled procedures and surveillance monitoring. These generic surveillances of system operability are applicable to other areas of the Y-12 Plant. For example, operations support personnel (Site Services and the Y-12 Fire Department, respectively) perform Criticality Accident Alarm System (CAAS) and Fire Protection system tests and operability inspections using controlled procedures. When CSA mandated instrumentation is required to ensure compliance(s) with limits and conditions, annual surveillance requirements by personnel using a controlled procedure ensure operability.

LMES has developed a summary of requirements and implementing procedures associated with the OSR. The "OSR Requirements to Procedures Matrix" was used to close RSS Individual Resumption Closure Criteria No. 1.13 and should continue to be used to ensure surveillance operations are performed by the current procedure. The matrix reviewed related OSR requirements and procedures for Material Access Areas (MAAs) in Buildings 9204-2/9204-2E, 9204-4, and 9720-5.

For facility operations that do not have updated OSRs, LMES develops and uses OSR surveillance requirement procedures for complex surveillance requirements. OSR surveillance requirements are not used for simple inspections. Building 9212 EU Operations management used an "OSR Surveillance Matrix" that identifies the specific applicable OSR requirements, when the surveillance requirement was last completed and due next, and the appropriate applicable procedure.

The assessment team interviewed maintenance management personnel and performed a high level review of the preventative maintenance program as it relates to OSR defined facility safety systems. The team did not review nor verify the details of calibration and preventative maintenance procedures. This will be the focus of Task 3, Performance Objective CS-2.

Issues

No findings, concerns or observations were associated with this performance objective.

Conclusions

The review criteria for this performance objective have been met. Surveillance procedures are in place that ensure safe and reliable operation. Performance Objective CO-2.6 discusses problems observed with personnel stopping work and reporting deficiencies to a higher authority.

Recommendations

Areas of the Y-12 Plant that do not maintain an "OSR Requirements to Procedures Matrix" for MAA facility operations should consider

Commitment 4.7 Policy and guidance is due by December 1994, to upgrade the language in performance appraisals standards for various technical positions. This effort is still minimal and is scheduled to increase in the next quarter.

4.9 Functional Area 9: Technical Training Programs and Processes

Commitment 4.2.2 A list of training courses will be identified and documented in the DOE Technical Training Course Catalog by April 1994. The list will identify currently available and new potential sources of training both inside and outside the Department. This effort is in progress and an updated catalog will be issued by April 1994.

Commitment 4.3 A DOE training standard is due by September 1994, that encompasses the principles of a systematic approach to training and establishes firm requirements for the training process required for Federal technical employees. This guidance will be contained in a Federal Employee Training Standard currently in draft form.

Commitment 4.5 The updated version of the DOE Technical Training Course Catalog, which is due in December 1994, will indicate Department-wide courses that meet the Technical Qualification Standard requirements. This item will increase activity in June 1994, and be updated in future quarterly reports.

Commitment 4.6 A Department Order institutionalizing the Technical Training and Qualification Program is due by December 1994. This item is scheduled to increase activity in the third quarter calendar year 1994.

4.10 Functional Area 10: Management Information System

Commitment 4.8 A management report is required by April 1994, to monitor and assess the effectiveness of both Federal and contractor training and qualification initiatives. This report will be called the Technical Personnel Performance Indicator Report. The first report will be a text report outlining the concept for selecting and tracking performance indicators. This report will be used primarily to monitor the implementation of

Operations Office and Program Office activities required to meet target date initiatives specified in the Recommendation 93-3 Implementation Plan.

The first two indicators will track the completion and approval of Training Implementation Matrices (TIMs) and the development and updating of the Individual Development Plans. This data will be summarized and reported at the Technical Excellence Executive Committee meeting tentatively scheduled for May 18, 1994.

Commitment 7.1

The Interim Report was issued on January 31, 1994. The Interim Report contained an update of all activities occurring between the issuance of the Implementation Plan and the end of the calendar year. The format of the Interim Report is being adopted for future quarterly reports.

The first Quarterly Report to the Board is due by April 1994. At the end of the reporting period, information was being compiled for this report.

Commitment 8

The provision of Commitment 8.1 or 8.2 are presently <u>not</u> being invoked. There are currently three areas where the Department is taking action or evaluating the impact of potential changes to eliminate or mitigate the need to use Commitment 8.1 or 8.2.

1. Commitment 5.8

DOE Order 5480.20 - The Order is currently being made into a rule. A concern is meeting the Commitment due date of September 1994. The current strategy is to process all new rule (s) at the same time to save overall cost and expense. This may impact the present due date.

2. Commitment 5.3

DOE Order 5480.18A - The list of applicable facilities has 24 facilities that are under review as exceptions to the Order. The Department is in the process of determining the proper applicability, funding and direction for the Order.

The implementation of LCOs on CSA requirements is not recommended for the long term due to the expected implementation problems and the creation of another Y-12 unique system.

Issues

The following findings and concern were identified during the assessment of this performance objective.

F-06—OSRs or TSRs have not been approved for Buildings 9720-33 and 9995.

F-09—Deficiencies were observed with (1) safety analyses and authorization bases to support safety and other important programs throughout Y-12, (2) the clarity of the safety bases for newly approved OSRs, (3) the quality of OSRs for EU Operations, and (4) the implementation of OSRs with respect to criticality safety.

The absence of systematic analysis and hazards review result in a poorly defined safety envelope. The current system may lead to violations of OSRs and DOE requirements, even if facility safety is not significantly threatened.

C-05—LMES has nuclear facilities that do not have an approved authorization basis.

Conclusions

The review criteria for this performance objective have not been met. Although the team did not identify any unsafe operations and non-criticality hazards are generally low, the failure to develop proper systematic analyses and hazards reviews results in an insufficient safety envelope for several facilities. Overall, the current system results in an unnecessarily high probability of violations of OSRs and DOE requirements, even though facility safety may not now be significantly threatened.

Explicit and clearly defined limits and controls delineated within the accepted format used throughout the complex should be a high priority. This would improve the plant's safety envelope and ensure its continued integrity using a uniform and understood system.

Recommendations

LMES should update bases for present OSRs and should prepare and submit to DOE as part of the new authorization basis (i.e., BIO) a solution to eliminate inconsistencies in safety classification. The need for safety documentation (e.g., SARs) should be evaluated for each facility and completed in a systematic manner.

LMES should reevaluate the priorities of both short and long term commitments to raise the level of concern and attention. The creation or updating of facility SARs should be a high priority and BIOs should be developed, if needed in the interim.

LMES should review contingency analyses, identify important contingencies and post them at corresponding locations. The USQD Program should be rapidly implemented to ensure its timely and effective integration throughout the facility to enhance the current safety basis.

LMES should eliminate the use of CSAs in OSRs or at least clearly specify the necessary criticality controls in the OSRs. OSRs for EU Operations should be upgraded to the requirements of DOE 5480.23.

LMES should carefully evaluate the root causes of existing weaknesses which point to an inadequate analyses or documentation in several areas that support the safety related activities. Appropriate cost-effective solutions should be proposed by LMES and submitted to DOE for approval before implementation.

5.5 Performance Objective CO-1.5

All OSRs and Class 1 and Class 2 procedures are consistent with each other.

Discussion

Team members interviewed site personnel, reviewed facility OSRs and procedures and

observed an evolution in assessing this performance objective.

Team members observed the validation of an operating procedure related to CSAs and OSRs in Building 9720-3. After reviewing the OSRs and a random sample of Class 1 and 2 procedures, the team concluded that these procedures were consistent with the corresponding OSRs.

The team reviewed a number of documents that show configuration management for OSR/CSA requirements in procedures. LMES personnel provided documentation in the form of a matrix that links the OSR and procedures that are used to perform these surveillances. The team reviewed the matrix for Buildings 9704-2, 9704-2E, 9720-5 and 9204-4. The Nuclear Criticality Safety Program document, Y70-150, requires that the operating organization perform an annual surveillance to ensure that CSA requirements are implemented by procedures or other implementing documents. The team's review of documentation for an RSS facility showed that LMES completed this surveillance activity and addressed identified issues.

Issues

No findings, concerns or observations were associated with this performance objective.

Conclusions

The review criteria for this performance objective have been met. OSRs and Class 1 and 2 procedures are consistent with each other.

Recommendations

No specific recommendations are associated with this performance objective. However, a related finding is discussed in Appendix B, Form 2, Finding 16 and in Performance Objective CO-2.3. A Class 3 procedure was used for fissile material movement involving CSAs. Although no Class 3 procedures containing OSR requirements were found, efforts should continue to ensure that OSR requirements are contained in Class 1 and Class 2 procedures.

5.6 Performance Objective CO-1.6

OSRs are controlled documents. Operations involving OSRs are controlled and activities are performed within the approved safety basis.

Discussion

Team members interviewed site personnel and reviewed the OSRs for Buildings 9219 and 9206 in assessing this performance objective.

The Facility Safety Department coordinates the control and distribution of OSR documents. Team interviews with the department manager and senior staff personnel established the process of a working LMES document control methodology. LMES performs fissile material operations in accordance with the stated limitations in the applicable CSA. Safety basis documentation provides the basis for the CSA limitations. LMES has formal controls for operating procedures to ensure that facility operations are performed using the proper and most current version of a procedure. However, during the assessment, LMES mistakenly provided the team with a canceled procedure (Section 5.12 of this report) that was used for an evolution.

Independent CSA compliance walkdowns of operating areas by NCSD criticality safety engineers and of NCSD CSA central files by operations personnel helped demonstrate LMES's two-way facility safety commitment.

Issues

No findings, concerns or observations were associated with this performance objective.

Conclusions

The review criteria for this performance objective have been met. Team members verified that appropriate configuration

observed an evolution in assessing this performance objective.

Team members observed the validation of an operating procedure related to CSAs and OSRs in Building 9720-3. After reviewing the OSRs and a random sample of Class 1 and 2 procedures, the team concluded that these procedures were consistent with the corresponding OSRs.

The team reviewed a number of documents that show configuration management for OSR/CSA requirements in procedures. LMES personnel provided documentation in the form of a matrix that links the OSR and procedures that are used to perform these surveillances. The team reviewed the matrix for Buildings 9704-2, 9704-2E, 9720-5 and 9204-4. The Nuclear Criticality Safety Program document, Y70-150, requires that the operating organization perform an annual surveillance to ensure that CSA requirements are implemented by procedures or other implementing documents. The team's review of documentation for an RSS facility showed that LMES completed this surveillance activity and addressed identified issues.

Issues

No findings, concerns or observations were associated with this performance objective.

Conclusions

The review criteria for this performance objective have been met. OSRs and Class 1 and 2 procedures are consistent with each other.

Recommendations

No specific recommendations are associated with this performance objective. However, a related finding is discussed in Appendix B, Form 2, *Finding 16* and in Performance Objective CO-2.3. A Class 3 procedure was used for fissile material movement involving CSAs. Although no Class 3 procedures containing OSR requirements were found, efforts should continue to ensure that OSR requirements are contained in Class 1 and Class 2 procedures.

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Discussion

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Independent CSA compliance walkdowns of operating areas by NCSD criticality safety engineers and of NCSD CSA central files by operations personnel helped demonstrate LMES's two-way facility safety commitment.

Issues

No findings, concerns or observations were associated with this performance objective.

Conclusions

The review criteria for this performance objective have been met. Team members verified that appropriate configuration

management program elements are in place that establish control of OSRs. Performance Objective CO-1.1 discusses problems associated with the OSRs complying with current TSRs in accordance with DOE 5480.22.

Recommendations

No recommendations were associated with this performance objective.

5.7 Performance Objective CO-1.7

Workers have a clear demonstrated understanding of the compliance requirements of OSRs. Personnel responsible for supervising and/or performing facility operations, surveillance testing, and maintenance understand the OSR and the facility safety systems controlled by the OSR.

Discussion

Team members interviewed site personnel using the new and revised CSAs and reviewed those facility OSRs in assessing this performance objective.

Operators, supervisors, and facility support personnel have a clear demonstrated understanding of OSR compliance requirements for new and revised OSRs. Their level of knowledge on OSRs has advanced significantly over the last year. In general, the set of OSR controls includes compliance with CSA requirements, assured operation of a criticality accident alarm system, and establishing operable readiness for the fire protection sprinkler systems.

OSR surveillance requirements identify the actions and, if appropriate, required results and the specified surveillance frequencies for tests and verification activities. Site operations personnel perform CAAS surveillances. Personnel understand criticality safety requirements and ensure system operability.

Issues

No findings, concerns, or observations were associated with this performance objective. There are, however, issues raised in Performance Objectives CO-2.2 and CO-2.6 that relate to this performance objective.

Conclusions

The review criteria for this performance objective have been met. In resumption facilities, workers have a clear, demonstrated understanding of the compliance requirements of the new and revised OSRs. The assessment team also observed a culture that encourages compliance with OSRs and procedures.

Recommendations

No recommendations were associated with this performance objective.

5.8 Performance Objective CO-1.8

All personnel have been trained on the new and revised OSRs.

Discussion

Team members interviewed site personnel, reviewed various documents, records and databases, and observed two evolutions in assessing this performance objective. Only a few of the facilities at Y-12 have new OSR documents. In these facilities, the responsible organizations have instituted OSR training for personnel with routine access to the MAA work areas. This practice ensures that OSR training is provided to the appropriate staff. New hires and visitors are escorted.

The team used the training database to spot-check the training records and found the employees' training was up to date. The lesson plans for the training were documented.

The review of the training programs and discussions with LMES personnel did indicate that LMES emphasizes compliance with the

OSRs and associated procedures in all work activities. Training is given to floor workers on each revision to OSRs, CSAs or procedures, which would include major changes in hardware or facility systems. The newly instituted training programs have not been in place long enough to verify that continuing training is provided. Plans and tracking systems for retraining are in place, however.

Training on lessons learned from other industrial operating experience or other CSA incidents onsite is less formal. LMES provides limited amounts of lessons-learned type information in annual refresher courses, in shift and pre-job briefings, and as required reading (see also Performance Objective CO-4.0). The overall level of training on the safety fundamentals concerning the new and revised OSRs is limited.

The training promotes a culture that encourages workers to stop work and inform supervision when a procedural noncompliance exists, but the training has not been in place long enough for the team to verify the practical effects of this message. That safety culture, however, is not yet pervasive enough to end easily preventable deficiencies and ensure that workers always stop work and inform supervision immediately when a deficiency is detected. This issue is discussed further in Concern C-18 under Performance Objective CO-2.6.

Issues

No findings, concerns or observations were associated with this performance objective.

Conclusions

The review criteria for this objective have been met. Workers receive continuing training in significant facility system and component changes, applicable procedure changes, applicable industry operating experience, and selected fundamentals with emphasis on seldom used knowledge and skills necessary to ensure safety. They also receive other training as needed to correct identified performance problems. Performance Objective CO-2.6 discusses problems in establishing a culture that encourages workers to stop work and inform supervision when a procedural noncompliance exists.

Recommendations

No recommendations were associated with this performance objective.

5.9 Performance Objective CO-2.1

LMES has evaluated the adequacy of and compliance with CSAs, has established corresponding corrective actions, and is actively addressing those corrective actions.

Discussion

Team members interviewed site personnel and reviewed LMES documentation evaluating the adequacy of and compliance with CSAs and the corrective actions, including Y/DD-679 (N.1.1), which provides a preliminary evaluation of the Y-12 Nuclear Criticality Safety Program, and Y/NO-00002 (N.1.2), which provides the corrective action plan. The team also reviewed Y/NO-00008 (N.1.3), which is a closure report for improvement actions related to RSS facilities, and Y/DD-676 (N.1.4) which details a revision to the criticality safety approval process. (The effectiveness of the actions in those documents is discussed below and on subsequent performance objectives related to CSAs.)

Interviews with NCSD personnel indicated that the active CSAs were walked down following the September 1994 incident, and the findings and associated corrective actions were closed out. A spot check of the corrective action notebook maintained by the NCSD did not identify any open corrective actions. The Nuclear Criticality Safety Program procedure Y70-150 requires that NCSD personnel perform at least annual reviews of fissile material operations and that operating organizations perform documented surveillance reviews of fissile material activities at least annually that relate to CSA

OSRs and associated procedures in all work activities. Training is given to floor workers on each revision to OSRs, CSAs or procedures, which would include major changes in hardware or facility systems. The newly instituted training programs have not been in place long enough to verify that continuing training is provided. Plans and tracking systems for retraining are in place, however.

Training on lessons learned from other industrial operating experience or other CSA incidents onsite is less formal. LMES provides limited amounts of lessons-learned type information in annual refresher courses, in shift and pre-job briefings, and as required reading (see also Performance Objective CO-4.0). The overall level of training on the safety fundamentals concerning the new and revised OSRs is limited.

The training promotes a culture that encourages workers to stop work and inform supervision when a procedural noncompliance exists, but the training has not been in place long enough for the team to verify the practical effects of this message. That safety culture, however, is not yet pervasive enough to end easily preventable deficiencies and ensure that workers always stop work and inform supervision immediately when a deficiency is detected. This issue is discussed further in Concern C-18 under Performance Objective CO-2.6.

Issues

No findings, concerns or observations were associated with this performance objective.

Conclusions

The review criteria for this objective have been met. Workers receive continuing training in significant facility system and component changes, applicable procedure changes, applicable industry operating experience, and selected fundamentals with emphasis on seldom used knowledge and skills necessary to ensure safety. They also receive other training as needed to correct identified performance problems. Performance Objective CO-2.6 discusses problems in establishing a culture that encourages workers to stop work and inform supervision when a procedural noncompliance exists.

Recommendations

No recommendations were associated with this performance objective.

5.9 Performance Objective CO-2.1

LMES has evaluated the adequacy of and compliance with CSAs, has established corresponding corrective actions, and is actively addressing those corrective actions.

Discussion

Team members interviewed site personnel and reviewed LMES documentation evaluating the adequacy of and compliance with CSAs and the corrective actions, including Y/DD-679 (N.1.1), which provides a preliminary evaluation of the Y-12 Nuclear Criticality Safety Program, and Y/NO-00002 (N.1.2), which provides the corrective action plan. The team also reviewed Y/NO-00008 (N.1.3), which is a closure report for improvement actions related to RSS facilities, and Y/DD-676 (N.1.4) which details a revision to the criticality safety approval process. (The effectiveness of the actions in those documents is discussed below and on subsequent performance objectives related to CSAs.)

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compliance. The team accompanied a NCSD engineer on a surveillance and reviewed documentation of a surveillance performed by a Disassembly and Storage Operations (DSO) organization.

The team reviewed proposed corrective actions from the Type C investigation, the evaluation of criticality safety discrepancy data, and lessons learned from resumption activities at the Pantex Plant, TA-55, and the Sequoyah Fuels Corporation as summarized in the Y/DD-679 report. Form 2, Finding 15 indicates that LMES has not fully addressed all of the examples of lessons learned from other sites. Y/NO-00008 provides an LMES review of closure for the corrective action plans for the RSS facilities. Y/DD-699 provides a Y-12 Plant Nuclear Criticality Safety Improvement Action Plan for program deficiencies.

Some findings relative to ANSI 8.19 are developed in subsequent performance objectives. Specifically, Form 2, Finding 14 speaks to paragraph 7.2, which requires procedures to include controls and limits significant to nuclear criticality safety. Form 2, Finding 11 relates to ANSI 8.19, paragraph 9.2 which requires appropriate area postings.

Interviews with the DOE Criticality Safety Program manager indicated that walkdowns of CSAs for the resumption areas were performed by DOE personnel. A copy of the DOE Y-12 Site Office Monthly Assessment Report, YSO-95-09, was also reviewed and showed evidence of CSA review during reviews of facility operations.

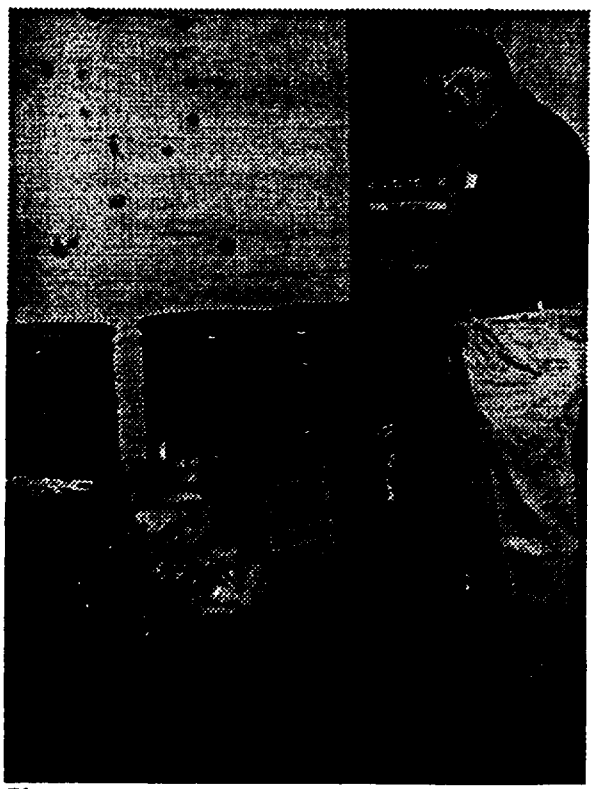
The team reviewed the DOE Readiness Assessment conducted for RSS facilities and noted two findings related to CSAs: (1) criticality safety related documents require clarification and corrections; and (2) review of safety-related RSS documents require clarification and corrections. Related findings from this assessment are discussed in subsequent performance objectives.

Issues

No findings, concerns, or observations were specific to this performance objective. However, Appendix B, Form 2, Findings No. 7, 13, 14, 16, and 20 document findings related to similar objectives.

Conclusions

The performance objective for this criteria has been met in that LMES personnel have shown that they evaluated the adequacy of and compliance with CSAs, have established corrective actions, and are addressing corrective actions. However, as detailed in findings contained in other objectives, difficulties with CSAs remain. LMES has taken many steps to improve CSAs and has made progress. Although LMES is fulfilling resumption oriented commitments, and many of the long-term actions are consistent with Recommendation 94-4, improvement is still needed. Appendix B, Form 2, Finding 14, provides several examples of the cumbersome process for identifying and incorporating limits into procedures. The



Floor Storage Array

criticality safety analysis often did not identify the requirements to implement the controls necessary to maintain criticality safety, and the CSA did not always identify them either. Identifying the requirements is the only way the operating organization has to receive the required information to be included in their procedures. At present, the operating organization is tasked with incorporating controls as limits in their procedures without knowing what those controls are. Addressing the lessons learned and causes summarized in Y/DD-679 will go a long way in achieving success. The assessment team recommends that this improvement program be reviewed again during the Task 3 Assessment. At this time, some causal factors may not have been remedied because the improvement program has not yet matured.

Recommendations

No recommendations were associated with this performance objective.

5.10 Performance Objective CO-2.2

Safety related facility operations are governed by CSAs. The handling of CSA compliance and CSA noncompliances are governed by procedures.

Discussion

Team members interviewed site personnel, reviewed several documents and observed evolutions in assessing this performance objective. Documents reviewed included Criticality Safety Analyses, CSAs, and procedures. Team members conducted interviews with the criticality safety staff and operations personnel.

LMES does not explicitly identify limits for controlled parameters in criticality safety analyses. The sample of analyses reviewed contained a discussion of the parameters affecting criticality safety. However, LMES does not bring forward to the appropriate CSAs as requirements the necessary limits and assumptions fundamental to the criticality safety analyses. Furthermore, in order to understand the total set of controls and requirements on a particular operation, the burden is placed solely on the criticality safety engineer to review applicable documents. The documents may include multiple criticality safety analyses and approvals where limits are incorporated by reference to other CSAs and general procedures.

The team observed that fire fighting personnel have limited knowledge of criticality safety and specific MAA requirements and moderation control areas are not identified in Pre-Fire Plans, CSAs, nor NCSAs. The Y-12 Fire Department requires that its personnel be given basic training and familiarization with nuclear systems prior in performing duties in MAAs. Further, a generic appendix note on "Nuclear Criticality Safety Guidelines for Fire Fighting in MAAs" is attached to building specific Y-12 Pre-Fire Plan Packages.

During interviews with the EU Operations staff, the team identified several areas that require but are not covered by CSAs. NCSD personnel was provided a list that identifies the criticality safety analyses that provides the safety basis for the equipment not covered by explicit CSAs, but this does not meet the strict interpretation of ANSI 8.1.

At least half of the postings observed during facility tours contained only a list of CSAs. Hence, the value of those postings as an operator are limited and the postings do not conform to the mandatory ANSI/ANS standards.

Issues

The issues identified for this performance objective are documented as findings:

F-07—LMES has moderation control areas not identified in Pre-Fire Plans, CSAs, nor NCSAs.

F-11—Postings do not specify limits on control parameters or explicitly identify allowed materials.

F-13—Thirty-two identified areas requiring CSAs in EU Operations do not have CSAs.

criticality safety analysis often did not identify the requirements to implement the controls necessary to maintain criticality safety, and the CSA did not always identify them either. Identifying the requirements is the only way the operating organization has to receive the required information to be included in their procedures. At present, the operating organization is tasked with incorporating controls as limits in their procedures without knowing what those controls are. Addressing the lessons learned and causes summarized in Y/DD-679 will go a long way in achieving success. The assessment team recommends that this improvement program be reviewed again during the Task 3 Assessment. At this time, some causal factors may not have been remedied because the improvement program has not yet matured.

Recommendations

No recommendations were associated with this performance objective.

5.10 Performance Objective CO-2.2

Safety related facility operations are governed by CSAs. The handling of CSA compliance and CSA noncompliances are governed by procedures.

Discussion

Team members interviewed site personnel, reviewed several documents and observed evolutions in assessing this performance objective. Documents reviewed included Criticality Safety Analyses, CSAs, and procedures. Team members conducted interviews with the criticality safety staff and operations personnel.

LMES does not explicitly identify limits for controlled parameters in criticality safety analyses. The sample of analyses reviewed contained a discussion of the parameters affecting criticality safety. However, LMES does not bring forward to the appropriate CSAs as requirements the necessary limits and assumptions fundamental to the criticality safety analyses. Furthermore, in order to understand the total set of controls and requirements on a particular operation, the burden is placed solely on the criticality safety engineer to review applicable documents. The documents may include multiple criticality safety analyses and approvals where limits are incorporated by reference to other CSAs and general procedures.

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At least half of the postings observed during facility tours contained only a list of CSAs. Hence, the value of those postings as an operator are limited and the postings do not conform to the mandatory ANSI/ANS standards.

Issues

The issues identified for this performance objective are documented as findings:

F-07—LMES has moderation control areas not identified in Pre-Fire Plans, CSAs, nor NCSAs.

F-11—*Postings do not specify limits on control* parameters or explicitly identify allowed materials.

F-13—Thirty-two identified areas requiring CSAs in EU Operations do not have CSAs.

F-14—LMES has not explicitly identified associated limits for controlled parameters in criticality safety analyses.

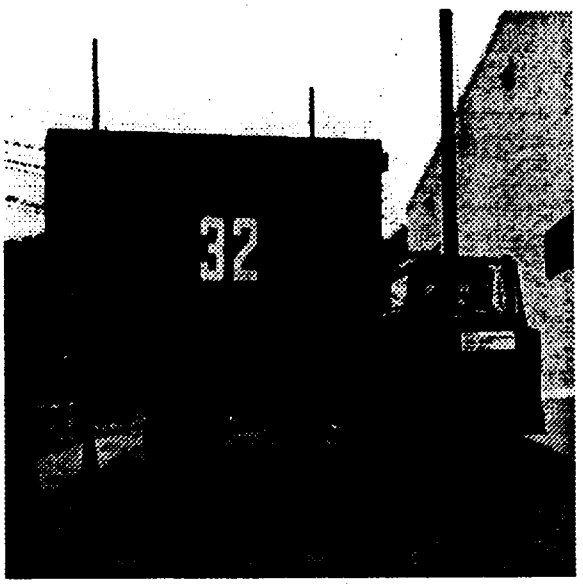
Conclusions

The review criteria for this performance objective have not been met. Safety related facility operations for RSS, Quality Evaluations, and Disassembly and Assembly are governed by CSAs. EU Operations has activities that are not governed by CSAs and an operation that deviates from the CSA requirement that has not been properly authorized (see Finding F-20 and Concern C-2.4). As a result, these safety related facility operations are not governed by CSA requirements.

Procedures are in place to ensure that the latest version of CSAs are available in the workplace. LMES is developing matrices cross referencing procedures with CSAs. Procedures to incorporate CSA requirements are new and not fully implemented at all facilities. LMES personnel recognize many old procedures as inadequate for proper implementation of CSA requirements. Work is continuing on consolidating and updating CSAs and updating procedures for non-resumed operations. Nevertheless, LMES has not responded properly to CSA noncompliances in all operations. The team has identified deficiencies in Pre-Fire Plans and criticality safety postings. Performance Objective CO-2.6 discusses concerns associated with the immediate reporting of CSA noncompliances.

Recommendations

LMES should consider expanding the depth of fire fighting training to include criticality safety (especially for moderator controlled criticality safety contingencies). In addition, LMES should, with the support of operations and NCSD personnel, modify building-specific Pre-Fire Plan Packages to identify areas where CSA initiators are based on moderator control. These areas should then be protected from fire fighting equipment using moderators. The assessment team recommends that the Y-12



"Blue Goose" - SNM Intraplant Transportation Vehicle

Fire Department implement at least annual firefighter MAA facility walkdowns to increase facility familiarity.

The Y-12 criticality safety staff should rely on senior criticality safety engineers (until less senior engineers are trained) to ensure necessary limits and conditions are included in operating procedures and understood by the personnel using these procedures. Review of criticality safety analysis should include specific limits and conditions identified in and supported by the analysis that must be met to ensure criticality safety at the Y-12 Plant. These limits and conditions should be included in applicable CSAs to ensure the system (including analyses, CSAs, and procedures) is properly implemented.

To ensure that all safety related facility operations are governed by CSAs, LMES should identify all fissile material containing equipment that is not covered by a specific CSA, formally document which analysis provides the safety basis for this equipment including the appropriate review, and then issue CSAs on a prioritized risk basis.

5.11 Performance Objective CO-2.3

All CSAs and Class 1 and Class 2 procedures are consistent with each other.

Discussion

Team members interviewed site personnel, reviewed documents, and observed evolutions in assessing this performance objective. Documents reviewed include Criticality Safety Analyses, CSAs, and operating procedures. The team conducted interviews with the criticality safety staff and operations personnel. A sample of CSAs was reviewed to verify that the necessary controls and limits were incorporated from the supporting analyses into the CSAs and into operating procedures. The CSAs are a part of a controlled document system. The team members determined that the issuance of controlled copies of CSAs from NCSD to controlled document holders in the facilities was adequate.

Procedure Y70-160 defines the Criticality Safety Approval System and the reviews that are conducted for CSAs including a field validation by operations of the draft CSA limits and conditions prior to issuance. Team members reviewed a procedure/CSA matrix that links CSAs to procedures. This tool ensures that CSA changes are implemented in appropriate procedures, but it is not yet available for all facilities.

The CSA and procedure used by LMES for SNM intra-plant shipments are not consistent with the criteria of this objective. The procedure used for the movement of simulated material on October 19, 1995 from Building 9720-5 to Building 9204-4 is currently Class 3 (Reference Y20-NM-01-09-002). This procedure required "All fissile material activities" to be performed "in accordance with the requirements specified in the CSA" (see section VI of Y20-NM-01-09-002). However, this "reference-only" procedure is not required to be at the job site. It is the judgment of the assessment team that the general LMES procedure, Y10-102, requires intra-plant shipping operations involving SNM to be governed by either Class 1 or Class 2 procedures.

Issues

The following finding was identified specific to this performance objective.

F-16—Operations for SNM Vehicle Transport requiring CSAs are not covered by Class 1 or Class 2 procedures.

Conclusions

The review criteria for this performance objective have not been met. The assessment team identified instances where CSAs and procedures are not consistent. Identified issues and recommendations are documented in Appendix B, Form 2, Number 16.

Recommendations

The assessment team recommends that LMES criticality safety personnel continue to work with operations personnel to ensure the necessary limits and conditions are in place in CSAs and operating procedures.

The LMES criticality safety staff should review the criticality safety analyses, CSAs, and associated procedures for ongoing operations to ensure limits are incorporated.

5.12 Performance Objective CO-2.4

CSAs are controlled documents. Operations involving CSAs are controlled and activities are performed within the approved safety basis.

Discussion

Team members randomly selected and reviewed several CSAs for compliance with procedural requirements. They analyzed revisions, reviews, validations, verifications, approvals, and supporting analyses. Team members reviewed the facility index for several facilities to ensure that all active CSAs are in fact included. OSR documents for several facilities were reviewed to determine the approved safety basis. An overview of the entire CSA process was performed to verify

Discussion

Team members interviewed site personnel, reviewed documents, and observed evolutions in assessing this performance objective. Documents reviewed include Criticality Safety Analyses, CSAs, and operating procedures. The team conducted interviews with the criticality safety staff and operations personnel. A sample of CSAs was reviewed to verify that the necessary controls and limits were incorporated from the supporting analyses into the CSAs and into operating procedures. The CSAs are a part of a controlled document system. The team members determined that the issuance of controlled copies of CSAs from NCSD to controlled document holders in the facilities was adequate.

Procedure Y70-160 defines the Criticality Safety Approval System and the reviews that are conducted for CSAs including a field validation by operations of the draft CSA limits and conditions prior to issuance. Team members reviewed a procedure/CSA matrix that links CSAs to procedures. This tool ensures that CSA changes are implemented in appropriate procedures, but it is not yet available for all facilities.

The CSA and procedure used by LMES for SNM intra-plant shipments are not consistent with the criteria of this objective. The procedure used for the movement of simulated material on October 19, 1995 from Building 9720-5 to Building 9204-4 is currently Class 3 (Reference Y20-NM-01-09-002). This procedure required "All fissile material activities" to be performed "in accordance with the requirements specified in the CSA" (see section VI of Y20-NM-01-09-002). However, this "reference-only" procedure is not required to be at the job site. It is the judgment of the assessment team that the general LMES procedure, Y10-102, requires intra-plant shipping operations involving SNM to be governed by either Class 1 or Class 2 procedures.

Issues

The following finding was identified specific to this performance objective.

F-16—Operations for SNM Vehicle Transport requiring CSAs are not covered by Class 1 or Class 2 procedures.

Conclusions

The review criteria for this performance objective have not been met. The assessment team identified instances where CSAs and procedures are not consistent. Identified issues and recommendations are documented in Appendix B, Form 2, Number 16.

Recommendations

The assessment team recommends that LMES criticality safety personnel continue to work with operations personnel to ensure the necessary limits and conditions are in place in CSAs and operating procedures.

The LMES criticality safety staff should review the criticality safety analyses, CSAs, and associated procedures for ongoing operations to ensure limits are incorporated.

5.12 Performance Objective CO-2.4

CSAs are controlled documents. Operations involving CSAs are controlled and activities are performed within the approved safety basis.

Discussion

Team members randomly selected and reviewed several CSAs for compliance with procedural requirements. They analyzed revisions, reviews, validations, verifications, approvals, and supporting analyses. Team members reviewed the facility index for several facilities to ensure that all active CSAs are in fact included. OSR documents for several facilities were reviewed to determine the approved safety basis. An overview of the entire CSA process was performed to verify

review, approval, and validation of CSAs. Team members observed a CSA surveillance conducted by NCSD and operations staff, reviewed sample DOE surveillances, and conducted interviews.

LMES maintains CSAs as controlled documents. In each facility visited, as well as NCSD, controlled copies of all CSAs were maintained in controlled notebooks with a detailed index indicating the status of each CSA. This system reduces the probability of mistaking an inactive CSA for the latest active version. However, during the assessment, the assessment team was provided with a canceled procedure. The team reviewed a copy of the procedure being used on the floor on October 19, 1995, for a mock intra-plant movement of enriched uranium. The team was provided with procedure number Y70-NM-01-09-002. After completion of the assessment, team members were informed that this procedure had been canceled and replaced with procedure number Y50-37-19-122 effective October 12, 1995, one week earlier. The facility was unaware of the new procedure.

DOE 5480.24, Section 6f, defines the specific responsibilities pertaining to criticality safety of the DOE/OR field office. These responsibilities are consistent with "providing an overview of criticality safety" unless directed to assume line management responsibility by the Cognizant Secretarial Officer. The DOE/OR staff interviewed were familiar with the general purpose, content, format and requirements pertaining to CSAs. One staff member showed extensive knowledge of specific operations as well as their associated procedures and CSAs. Several staff members stated that they routinely review CSAs and observe evolutions. Further, the Y-12 site office issues formal monthly assessment reports that indicate participation in walk-throughs, evolutions, surveillances, and review of operating procedures and CSAs. However, DOE personnel are not part of the CSA preparation, review and approval processes.

The approved safety basis (e.g., OSRs) is defined in controlled documents. The facilities toured have controlled documents defining OSRs pertaining to criticality safety that specify double contingency protection consistent with DOE 5480.24, Section 7a(2)(a); and CAAS coverage in accordance with DOE 5480.24, Section 7b(1). The specific controls upon which double contingency protection depends were not specified in the OSR. These controls must be extracted from overlapping CSAs and procedures. Deficiencies in this system are documented in Appendix B, Form 2, Finding 14.

Two major deficiencies in CAAS coverage have been recognized by LMES management in Y/DD-673: (1) no rigorous assessment of the minimum accident of concern has been performed in accordance with the mandatory requirements of ANSI/ANS-8.3, Section 5.6, and (2) the location and spacing of detectors have not adequately considered the shielding effect of process equipment and other materials in accordance with the mandatory requirements of ANSI/ANS-8.3, Section 5.8. These issues indicate deficiencies in analyses that will be pursued as part of the DOE Criticality Assessment of Task 3, Performance Objective CS-2. This deficiency is also discussed in Section 5.4 of this report.

An undocumented agreement between the Building 9215 operation manager and NCSD allowed continued operation of a machine shop coolant system without the required inspections and cleanings specified in the CSA. Operations based upon verbal agreements do not satisfy the criticality safety program requirement of DOE 5480.24, Section 1a, which states

> "Criticality safety is comprehensively addressed and received an objective review, with all identifiable risks reduced to acceptably low levels and management authorization of the operations is documented."

This deficiency is documented in Appendix B, Form 2, Finding 20 and does not satisfy the review criteria of this performance objective.

NCSD staff reviews CSAs with the same level of rigor as they review NCSAs. Hence, the NCSD review consists of two parts: technical review by a knowledgeable peer, and independent review by the Internal Technical Review Board (ITRB). The technical review is performed to ensure that the proposed operation receives a detailed, comprehensive, review by a knowledgeable peer. The ITRB review ensures that the program requirements are implemented uniformly throughout Y-12 and ensures that the review is independent. The reviewers are selected on the basis of their broad experience.

Y70-160 requires the operations staff to perform field validation checks of the draft CSA limits and conditions prior to issuance of any new CSA. Operations staff performs this validation in conformance to a CSA field validation checklist. Operations personnel may request the support of NCSD staff as needed. NCSD staff are also required to perform an independent NCSD field validation after completion of the validation checks conducted by operations personnel. They are also required to complete USQD screening to determine if new CSAs conflict with other safety documentation.

Finding No. 14 determined that several recent CSAs do not identify requirements pertaining to necessary criticality safety controls due to ambiguity or unstated assumptions in the NCSAs. Hence, the validations performed by NCSD and operations personnel are necessary but not sufficient.

Procedure Y70-160, requires that CSAs shall be verified and validated by operations personnel to ensure the ability to comply prior to final approval. Section VI.A.13 further requires operations personnel to authorize CSA implementation for the effective date given on the CSA. These requirements are also consistent with the responsibility for nuclear criticality safety as noted in Y70-160.

The index of CSAs for each facility had been updated to reflect the latest revisions as required by Y70-160. Team members determined this practice was adequate.

The CSAs required for resumption have been rewritten or are in the process of review. The NCSD superintendent has stated that no operations will commence without a thorough review and rewriting of CSAs. The principal concern, however, is that too much emphasis is placed upon reformatting CSAs, while failure to identify necessary controls in NCSAs causes them to be omitted as requirements in CSAs (refer to Appendix B, Form 2, Finding 14).

Issues

The following finding was identified specific to this performance objective.

F-20—LMES has not performed a CSA requirement for the Building 9215 machine shop coolant system nor has LMES properly authorized the deviation.

Conclusions

The review criteria for this performance objective have not been met.

CSAs are controlled documents with adequate configuration management controls as required by Y70-160. However, some CSAs are ambiguous and include unstated assumptions. Several NCSAs do not clearly define limits for controlled parameters that are then not clearly defined as requirements in CSAs and operating procedures.

A CSA requirement for the Building 9215 machine shop coolant system was modified without written approval documentation.

The priority for remediation of CAAS deficiencies is unclear. It is based on the handwritten statement by the Y-12 Plant Manager which appears in Y/DD-673, "allocation of resources for this effort must be integrated, and consistent with the overall set of priorities established for support of resumption activities."

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Recommendations

The failure to perform a CSA requirement for the Building 9215 machine shop coolant system may be an indication of similar problems in other EU Operations facilities. The assessment team recommends review of continuing operations to assure that all CSA surveillances and other requirements are met. Review of CSAs for resumption should include review of NCSAs for adequacy. NCSAs may have to be revised to identify the controls and associated limits upon which double contingency depends.

Necessary limits on parameters that are subjected to procedural control should appear as requirements in the NCSA.

5.13 Performance Objective CO-2.5

Workers have a clear demonstrated understanding of the compliance requirements of CSAs. Personnel responsible for supervising and/or performing facility operations understand the CSA and the facility safety systems controlled by the CSAs. The utility of the CSAs has been evaluated for clarity and user friendliness.

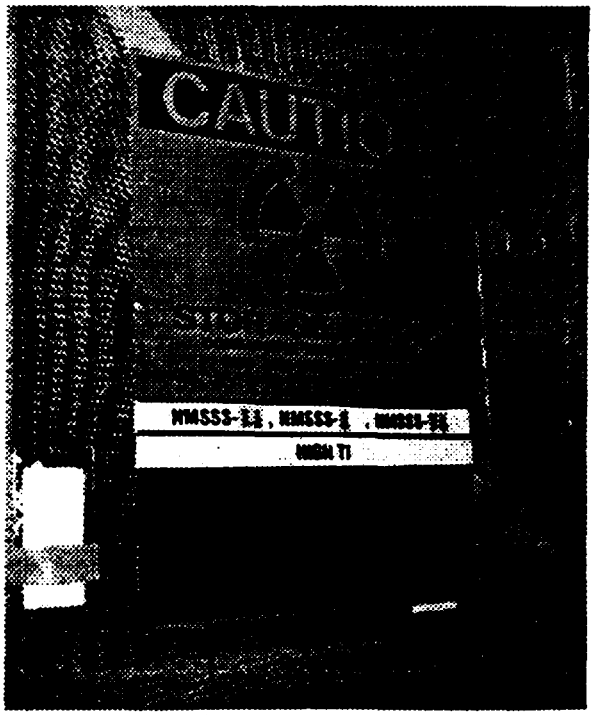
Discussion

The team members interviewed workers and supervisory personnel in assessing this performance objective. Workers interviewed demonstrated an acceptable understanding of the compliance requirements with the new and revised CSAs, despite often confusing and superfluous requirements. Team members considered some CSAs cumbersome, but they should improve as CSAs are revised to promote clarity and effectiveness.

The team concluded that site personnel demonstrate an understanding of procedural compliance and safety requirements. Although still maturing, a culture exists that encourages CSA and procedural compliance. LMES personnel have done a lot of work to improve the clarity of the new and revised CSAs and understanding of CSAs. Inexperienced personnel found one complex CSA difficult to understand. Efforts should continue to develop a list of requirements in CSAs that are clear to workers. Review of documentation, observation of evolutions, and interviews with personnel indicate that this objective has been met. (Performance Objective CO-2.6 discusses training deficiencies related to CSAs.)

Issues

No findings, concerns, or observations were associated with this performance objective. However, an issue related to this objective is developed in Appendix B, Form 2, Finding 20. In this finding LMES modified a CSA requirement without written approval documentation. This raises concern about LMES's understanding of the need for formality in modifying compliance requirements. Performance Objective CO-2.2 also addresses clarity issues for NCSAs that could adversely affect continued progress of improving CSAs.



Criticality Safety Posting

Conclusions

The review criteria for this performance objective have been met.

Recommendations

LMES should continue efforts to achieve clarity in CSAs with particular emphasis on complex CSAs that describe complex processes.

5.14 Performance Objective CO-2.6

All personnel have been trained on the new and revised CSAs.

Discussion

Team members interviewed a cross section of site personnel, reviewed numerous documents, and observed several evolutions in assessing this performance objective.

The review of the training programs and discussions with LMES personnel among the various LMES departments indicated that the worker training programs emphasize procedural compliance with regard to CSAs. The programs give training to floor workers on each revision to either CSAs or procedures, which would include major changes in hardware or facility systems. Training on lessons learned from other industrial operating experience or other CSA incidents onsite is less formal. Limited amounts of lessons-learned type information is provided in annual refresher courses, during shift and pre-job briefings, and as required reading (see also Section 5.16). Overall the team members viewed as adequate the level of fundamental training on criticality safety fundamentals and the CSAs to the workers that received the training.

LMES has made much progress in CSA awareness and training. Facility operators and direct supervisory personnel receive substantial training in CSAs including classroom instruction, job specific training, facility walkdowns, and drills. The overall level of CSA awareness is high. The assessment team observed good CSA training programs.

The operators' opinions on recent changes in CSA training were varied. While some saw no significant change, one operator with more than 15 years of Y-12 work experience summarized the improvement:

> The average worker is more informed now than before. The emphasis is on safety and radiation control. Back then, there were not really any controls on it. Big change. It's come a long way. If you'd asked me then what a CSA was, I'd have said, "I don't have any idea." I didn't have a clue. You [weren't] really informed. Now you can read it for yourself. It's a lot better than it was. If it doesn't look right, you can stop right there and go check.

The improvement in training was so dramatic that this operator could not think of any way to improve it further.

However, most people estimated that it would be at least "a couple of years" before the training is sufficiently universal, comprehensive, and internalized to be effective. The team believes several deficiencies in CSA training should be addressed promptly. To improve effectiveness, the training program could expand its target audience and continue its emphasis on procedural compliance.

Team members noted that maintenance, radiation control, technical support, and other personnel who may direct or instruct operators do not receive sufficient training on the new and revised criticality safety approvals for unattended work in key areas. Radiation control, maintenance, and other technical support workers receive general fissile worker "awareness level" training and not specific CSA training in key building areas. Although CSA deficiencies are still sometimes attributed to maintenance work and support staff sometimes work with limited operations oversight, CSA training is generally limited to operators and their direct supervisors. In

Conclusions

The review criteria for this performance objective have been met.

Recommendations

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Team members noted that maintenance, radiation control, technical support, and other personnel who may direct or instruct operators do not receive sufficient training on the new and revised criticality safety approvals for unattended work in key areas. Radiation control, maintenance, and other technical support workers receive general fissile worker "awareness level" training and not specific CSA training in key building areas. Although CSA deficiencies are still sometimes attributed to maintenance work and support staff sometimes work with limited operations oversight, CSA training is generally limited to operators and their direct supervisors. In

addition, CSA training is limited for other operations staff who may direct or instruct the floor workers.

In some cases, the criticality safety information given to support staff is too narrowly defined; information on surrounding work areas is often not given. The team concluded that some support workers do not always receive the continuing training in significant facility systems and component changes, and in applicable procedure changes, that they probably need. In addition, current training has not yet produced a safety culture among workers that prevents criticality safety deficiencies and ensures proper response if deficiencies occur.

The review criterion states that the safety culture should encourage workers to stop work and inform supervisors when a procedural noncompliance occurs. An effective safety culture would also prevent errors and lead to greater work place diligence and fewer error-prone situations. Partly because new training programs are not universally available and have been in place a short time, the change in safety culture has not progressed to the desired level. Moreover, the training program is not yet fully effective in correcting identified performance problems. For example, the team observed that easily preventable deficiencies still occur, and workers do not always stop work and inform supervisors immediately when a deficiency is detected.

The team heard evidence of at least three cultures in the workplace:

- The "experienced-based" culture values knowledge but lacks conduct of operations discipline
- The "procedure-based" culture values procedures that ensure consistent operations, but can discount worker experience and work team insights
- The "need-to-know based" culture values prevention of worker overconfidence, but the lack of safety limit knowledge can also result in unnecessary errors.

While each culture has positive elements, the process of melding the best features of each into one effective safety culture is not yet complete. Team members also noted that job-specific criticality safety training programs are compartmentalized, reducing effectiveness.

The review criterion states that training should include applicable, seldom-used knowledge and skills, and other training to correct identified performance problems. The new job-specific CSA training programs in place or in development are significant improvements over past practices and do incorporate these two training elements of the criterion. LMES has developed several creative training concepts, but the team did not find a mechanism for trainers to share these good practices among organizations.

The review criteria also states that training should include applicable industry operating experience. The assessment team noted that this training element is unevenly applied, probably because incorporation of lessons learned is often informal. Performance Objective CO-4.0 of this report further addresses this observation.

Issues

The following finding, concern, and observation were identified specific to this performance objective.

F-17—Maintenance, radiation control, technical support, and others who may direct or instruct operators do not receive sufficient training on the new and revised CSAs for unattended work in key areas.

C-18—Current training has not yet produced a safety culture among workers consistent with DOE 5480.19 to prevent criticality safety deficiencies and ensures proper response if deficiencies occur.

O-19—Job-specific criticality safety training programs are compartmentalized, reduces effectiveness.

Drums and Storage Array

Conclusions

The review criteria for this performance objective have not been met.

Recommendations

Operations personnel should ensure that support organization work in their facility is performed within the same limits of operation mandated for the applicable CSA. If a maintenance activity needs to be performed in an MAA, the facility operations group needs to ensure the worker(s) are trained in CSAs and understand the area controls. If not, personnel need to be escorted to ensure CSA limits and conditions are not challenged. LMES should clarify criticality safety postings to summarize key operating limits for work areas and include support staff in pre-job briefings where job-specific CSA questions and concerns can be addressed. Support organizations should review job-task analyses to determine if, at a minimum, support worker training should include training in the umbrella CSAs. LMES should encourage workplace teams that include operations and support staff.

LMES should produce a unified safety culture by promoting respect for experienced workers' insights, for use of disciplined work practices, for detailed and accurate procedures, and for team identification of error prone conditions in the workplace.

Lessons learned should be used as a basis for discussions to improve teamwork and anticipate problems. The assessment team recommends that a site-wide forum for training coordinators be established to communicate both problems and successful training ideas, such as the drill programs developed for some facilities (Building 9720-5). The team believes that a more extensive classroom use of lessons learned from the site, the DOE complex, and industry operating experience could encourage lively case study discussions beneficial to procedure compliance, accident prevention, safety culture development, team building, and communications.

5.15 Performance Objective CO-3.0

LMES has identified the root cause of identified violations and established corresponding corrective actions

Discussion

Team members reviewed the results of the LMES evaluation and the LMES near-term initiatives, and the corrective actions associated with Y/AD-622, Type C Investigation, the internal LMES report entitled Evaluation of Criticality Safety Discrepancy Data, the Plan for Continuing and Resuming Operations, and the completed Readiness Assessments in assessing this performance objective. In addition, the team independently determined the root cause of the CSA and OSR occurrences identified since stand down of the facility.

Many factors led to the identification of the following root cause of the precipitating event, identified after evaluation of the results of a CSA walkdown and several reports prepared by experts external to LMES:

> ***Delays in implementing a standards-based, compliance culture and administrative and physical controls necessary to ensure that activities are performed within the approved facility safety basis established a work environment in which supervisors, operators, and technical staff failed to note and react properly***

Drums and Storage Array

Conclusions

The review criteria for this performance objective have not been met.

Recommendations

Operations personnel should ensure that support organization work in their facility is performed within the same limits of operation mandated for the applicable CSA. If a maintenance activity needs to be performed in an MAA, the facility operations group needs to ensure the worker(s) are trained in CSAs and understand the area controls. If not, personnel need to be escorted to ensure CSA limits and conditions are not challenged. LMES should clarify criticality safety postings to summarize key operating limits for work areas and include support staff in pre-job briefings where job-specific CSA questions and concerns can be addressed. Support organizations should review job-task analyses to determine if, at a minimum, support worker training should include training in the umbrella CSAs. LMES should encourage workplace teams that include operations and support staff.

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> *Delays in implementing a standards-based, compliance culture and administrative and physical controls necessary to ensure that activities are performed within the approved facility safety basis established a work environment in which supervisors, operators, and technical staff failed to note and react properly*

to noncompliances with safety-based requirements.

The tools used to help determine the root cause were barrier analyses (Type C Investigation), critiques, OSR/CSA nonconformances, and the observations of mentors, the Nuclear Criticality Safety Committee, and consultants. The assessment team considers the methodology of the review process to be thorough for the precipitating event. However, the identified root cause does not appear to directly address the original CSA infraction. Correcting the identified root cause could prevent recurrence of the deficiencies, but implementation may be difficult because the identified root cause is so broad.

A formalized and documented root cause analysis existed for the Type-C Investigation, external audit findings, and selected violations and discrepancies that were classified high risk by the Issues Management Review Board. No formalized root cause analysis was identified that supported the causal factors and corrective actions of the other documents.

LMES Y-12 Quality Assurance Procedure Y60-162, Root Cause Analysis, requires that a root cause analysis be performed for Category Level 4 occurrences (e.g., NCS deficiencies) that are repetitive or generic. A review of the deficiencies and Level 4 occurrences since stand down indicated that many could be classified as repetitive. Despite this indication, the team could find no documented root cause analysis of these incidents/deficiencies. These repetitive incidents may indicate that the corrective actions did not address the actual root cause(s) of the problems. The failure to perform root cause analyses on these incidents was inconsistent with the requirements specified in Y60-162, Appendix C. In addition, the team could identify no proceduralized trending program that required development of a root cause analysis for trends of NCS deficiencies. Interviews with various site personnel confirmed this observation.

The assessment team conducted a review of a representative sample of the Y-12 corrective actions. In many cases, the corrective actions were either incomplete or pending implementation. This is particularly evident in regard to the corrective actions associated with the recent readiness assessments. For the remaining items, either not enough time has transpired since implementation, or the corrective action will take an extended period before effectiveness can be determined.

The assessment team selected for review several completed corrective actions that were the result of the NCS deficiency walkdown, completed readiness assessments, items identified prior to the September 22, 1994 event, NCS deficiencies identified in 1995, and various internal reviews. Overall, the corrective actions associated with the readiness assessments appeared to address the findings, but they were not always supported by a documented root cause process. For those corrective actions supported by a root cause process, the analysis often did not fully identify all the root and contributing causes and causal factors.

Site procedures provide a methodology for detailed root cause analyses. A review of the closure evidence files resulted in an observation similar to the one identified by the DOE-OR readiness assessment. The DOE-OR finding addressed the inadequacies of the corrective action program as it related to evidence files that supported closure of identified issues. (Reference DOE Readiness Assessment Finding MG3-2.)

The assessment team performed an independent root cause analysis for four CSA/OSR occurrences that were documented as final reports on the ORPS system. The analysis was based upon information contained in the ORPS reports. Although several minor inconsistencies existed between the results of LMES analyses and the independent analyses, the team considers the methodology of the root cause process used by LMES for these violations to be thorough.

Issues

The following finding and observations were identified specific to this performance objective.

F-02—LMES is not performing a formalized root cause analysis for repetitive NCS deficiencies.

O-12—The root cause identified by LMES in Y/DD-679 is too broad in scope to allow for effective implementation of corrective actions.

O-21—ORPS reports emphasize detection of problems instead of the analysis of the causes and chronology of problems.

O-22—Final ORPS reports are not always submitted within the 45 day requirement.

Conclusions

The review criteria for this performance objective have not been met. Since a documented root cause analysis process was not used in all instances, the assessment team could not be sure the appropriate corrective actions were identified to preclude recurrence of events. In many cases, the corrective actions LMES identified were incomplete or pending implementation, or closure documentation was not in evidence. Repeated violations may continue to occur if the corrective actions documented in the Energy Systems Action Management System (ESAM) database address only the causal factors of identified deficiencies. It is inconclusive at this time whether they will provide overall long-term improvement.

Recommendations

LMES should perform a formalized root cause analysis using the information gathered as a result of previous investigations by an independent party for the precipitating event of September 22, 1994 and the resultant walkdown deficiencies. The results can be used to identify corrective actions to address directly the NCS deficiencies. LMES should also perform and document a formal root cause analysis for repetitive nuclear criticality incidents and deficiencies. The analysis should be of sufficient detail to identify the root causes, contributing causes, causal factors and associated corrective actions.

A guidance document should be developed that defines when to perform a root cause analysis for repetitive or generic trends related to NCS deficiencies. The document should provide for the establishment of corrective actions and the sharing of lessons learned across the site. The assessment team recommends that Y60-162 be revised to include the TapRooT® analysis process.

LMES should create a proceduralized trending program that provides guidance for the development of a formalized root cause analysis for repetitive and/or generic trends associated with CSA deviations. LMES should also perform an effectiveness review of the corrective actions for applicable Y-12 facilities six months after resumption.

5.16 Performance Objective CO-4.0

The applicability of experience gained from lessons learned at Rocky Flats Building 771, Sequoyah Fuels Corporation, Pantex, and Los Alamos TA-55 has been incorporated into Y-12 practices and procedures.

Discussion

The assessment team reviewed program documents, procedures, required reading and training and did formal and informal interviews, observed selected evolutions, reviewed LMES infractions and associated lessons learned and reviewed the lessons learned from Rocky Flats Building 771, Sequoyah Fuels Corporation, Pantex and Los Alamos TA-55. During the review the team observed several good practices and noted a significant trend toward increased use of lessons learned in training and procedure development. Favorable practices included:

Issues

The following finding and observations were identified specific to this performance objective.

F-02—LMES is not performing a formalized root cause analysis for repetitive NCS deficiencies.

O-12—The root cause identified by LMES in Y/DD-679 is too broad in scope to allow for effective implementation of corrective actions.

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O-22—Final ORPS reports are not always submitted within the 45 day requirement.

Conclusions

The review criteria for this performance objective have not been met. Since a documented root cause analysis process was not used in all instances, the assessment team could not be sure the appropriate corrective actions were identified to preclude recurrence of events. In many cases, the corrective actions LMES identified were incomplete or pending implementation, or closure documentation was not in evidence. Repeated violations may continue to occur if the corrective actions documented in the Energy Systems Action Management System (ESAM) database address only the causal factors of identified deficiencies. It is inconclusive at this time whether they will provide overall long-term improvement.

Recommendations

LMES should perform a formalized root cause analysis using the information gathered as a result of previous investigations by an independent party for the precipitating event of September 22, 1994 and the resultant walkdown deficiencies. The results can be used to identify corrective actions to address directly the NCS deficiencies. LMES should also perform and document a formal root cause analysis for repetitive nuclear criticality incidents and deficiencies. The analysis should be of sufficient detail to identify the root causes, contributing causes, causal factors and associated corrective actions.

A guidance document should be developed that defines when to perform a root cause analysis for repetitive or generic trends related to NCS deficiencies. The document should provide for the establishment of corrective actions and the sharing of lessons learned across the site. The assessment team recommends that Y60-162 be revised to include the TapRooT® analysis process.

LMES should create a proceduralized trending program that provides guidance for the development of a formalized root cause analysis for repetitive and/or generic trends associated with CSA deviations. LMES should also perform an effectiveness review of the corrective actions for applicable Y-12 facilities six months after resumption.

5.16 Performance Objective CO-4.0

The applicability of experience gained from lessons learned at Rocky Flats Building 771, Sequoyah Fuels Corporation, Pantex, and Los Alamos TA-55 has been incorporated into Y-12 practices and procedures.

Discussion

The assessment team reviewed program documents, procedures, required reading and training and did formal and informal interviews, observed selected evolutions, reviewed LMES infractions and associated lessons learned and reviewed the lessons learned from Rocky Flats Building 771, Sequoyah Fuels Corporation, Pantex and Los Alamos TA-55. During the review the team observed several good practices and noted a significant trend toward increased use of lessons learned in training and procedure development. Favorable practices included:

- The plant staff recognizes an LMES computerized lessons learned program as a source of information.

- Operating and support staff at all levels understand the importance of lessons learned and strive to use lessons learned appropriately.

- Operators understand the importance of the lessons learned program. Operators are enthusiastic when one of "their" lessons learned results in a procedure change and improvement in operations.

- Daily shift crew briefings and the required reading program effectively distribute in-facility lessons learned.

- The operations staff interviewed were all aware that a culture change to a "Conduct of Operations" style is occurring. Operators and supervisors favored the change. Management and support staff support continuing culture change.

- All operators, supervisors, managers, and support staff interviewed understand the importance of promptly reporting procedure infractions.

- A number of LMES senior management in Y-12 have been on site less than one year. They bring extensive experience in Conduct of Operations and lessons learned; however, they are not yet thoroughly familiar with Y-12 operations. As they become more familiar with operations, the culture change should accelerate.

- The DOE Facility Representative Program appears sound. Facility Representative experience in nuclear operations ranges from 6 to 21 years. All Facility Representatives are provisionally qualified and scheduled for full qualification from May 9, 1996 through July 8, 1996.

LMES has made significant progress in developing a procedure-based operation. Facilities that have resumed limited operation are most advanced in "changing culture" and developing the desired new operating style. However, several issues were identified during the assessment.

Compartmentalization of information inhibits flow of lessons learned. While the assessment team noted good practices, for example, it did not observe routine inclusion of lessons learned in shift crew/operator briefings and mechanisms to communicate lessons learned rapidly across organization lines.

Lessons learned follow the management chain, which can serve as a filter, removing information as it moves up or down the line organization. Some line organizations have placed current criticality safety lessons learned in required reading. This information is in the required system in EU Operations because of the initiative of the operations manager. But LMES does not have a formal system to identify and include lessons learned from one facility in the required reading for another facility or a support organization (e.g., Radiation Control, NCSD, Fire Protection, or Maintenance).

The plant-wide lessons learned system does not include a significant number of relevant criticality safety lessons learned. Significant safety lessons learned should be captured from Y-12, LMES, other DOE facilities, and commercial facilities. Procedure developers, operators, and the line organization all cited the LMES plant-wide lessons learned system as a source of information. However, the plant-wide system does not include DNFSB findings or lessons learned from recurring nuclear criticality safety incidents.

Root cause analysis does not always create a lessons learned finding that is distributed or communicated to operators and the line organization.

Although Y-12 has addressed many of the lessons learned from other recent events, several Y-12 deficiencies were identified. The following table (Lessons Learned Matrix) summarizes the lessons learned from Rocky

Flats Building 771, the Sequoyah Fuels Corporation, Pantex and Los Alamos TA-55 that Y-12 has not incorporated into its procedures and practices.

Issues

The following findings and observations were identified.

F-08—LMES's lessons learned program is deficient in measuring operational performance improvement and program effectiveness and in integrating the program throughout the management chain and across functional areas for nuclear criticality safety.

F-15—LMES has not fully addressed the examples of lessons learned from other sites.

O-01—The Plan of the Day meeting does not include representation from all required support organizations.

O-10—Contaminated combustible waste storage in nuclear facilities presents a housekeeping problem and potential safety issues.

Conclusions

The review criteria for this performance objective have not been met. Although LMES has an established program that can incorporate lessons learned from operating experience from both internal and external events, lessons learned for nuclear criticality safety have not been incorporated in the program. An effective program should provide for more rapid and consistent flow of lessons learned information from facility to facility. Key lessons learned from recent DNFSB recommendations need to be addressed.

The assessment team reviewed Appendix F of the Implementation Plan for the Criticality Safety Assessment, and each of the lessons learned identified was evaluated to determine if Y-12 continued to have similar problems. Examples are depicted in the following table in which the team determined that Y-12 was deficient for this performance objective.

In addition, the following observations were developed based on the review:

- All required support organizations are not always included in plan of the day. As a result support personnel may be late reporting for an evolution and require a separate briefing, which may not include lessons learned.

- Contaminated waste is stored in facilities due to lack of operating assay equipment. Most assayed waste can be disposed as low level waste. Stored waste presents potential fire protection and housekeeping issues.

Recommendations

LMES should address each of the findings listed above and provide corrective actions that ensure that Y-12 Nuclear Criticality Safety is included in the lessons learned program, that lessons learned from other facilities have been addressed, and that lessons learned flow from facility to facility.

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LESSONS LEARNED MATRIX

Site	Lessons Learned	Comment
Rocky Flats	"The incident primarily reflected the inability of the contractor management to establish an appropriate safety culture. This permitted risky behavior by operating personnel. Management was ineffective in putting corrective actions in place to prevent recurrence of events."	A culture change is taking place at Y-12. Pockets of resistance to the new safety culture remain which need to be remediated (e.g., operators moving drums first before calling supervision and NCSD for guidance, Rad Tech not paying attention to signage, and an individual in Building 9204-4 questioning the value of Conduct of Operations when expert knowledge is available).
	"There was a shortage of experienced Nuclear Criticality Safety Engineers. In addition, the training program was determined to be inferior and the Nuclear Criticality Safety Committee was ineffective."	The Y-12 Nuclear Criticality Safety Committee meets bimonthly. The Committee recommends to management criticality safety policy and philosophy, leads investigations of Level 3 incidents, and conducts an annual review of the Criticality Safety program. The narrow focus of this committee results in a limited overview of the criticality safety program for identifying problems and remediation for Y-12 operations. The Committee identified a number of deficiencies in 1992-93 (Y/DD-679, Appendices D and E) which remain today.
	"Rocky Flats was unable to maintain an effective authorization basis, thereby increasing the potential for an accidental criticality."	The OSR bases at Y-12 have not always been documented (see Finding No. 06 for discussion on this item).
	"Operating personnel considered that their extensive process knowledge kept them safe despite such unknowns as tank stratification, valve leakage, etc.	There remains pockets within the Y-12 organization that continue to rely on process knowledge for plant operations. See Item 1 above.
Pantex	"The Radcon program needed improvement."	An incident involving a Rad Technician not paying attention to signs indicates problems in Conduct of Operations for Radcon. Other observations include signs remaining in the area after a job is complete, and improper storage of radioactive sources in a change room.
Sequoyah Fuels Corporation	"Management and the work force must believe in a safety culture that reward compliance with established procedures. There must also be negative consequences for not supporting the safety culture."	Recent incidents in Radcon operations and general observations such as kicking back a drum that was over the boundary line and not checking hood height during operator rounds indicate a continuing lack of discipline in adherence to procedures. More forceful corrective actions may be needed to reach the level of compliance required for restart.
Los Alamos Scientific Laboratory	"The performance of a surveillance in support of OSRs revealed deficiencies in the verification that operations are conducted within the safety envelope."	See Finding No. 09 on OSRs.
	"Review of LANL TA-55 Order Compliance Self-Assessment revealed inadequacies in documentation of objective evidence of compliance."	See Findings No. 13 and 20 on criticality safety (5480.24).
	"Review of the status and plans of the TA-55 training and qualification program revealed the need for several improvements, including the addition of fundamentals and systems training, in order to become compliant with DOE 5480.20. Many of the improvements have already been planned by LANL and will correct deficiencies noted in the Board Staff trip report forwarded to DOE in January 1994."	See Findings No. 17, 18, and 19 on training.

6.0 CONCLUSIONS

The team members identified twelve Findings, three Concerns, and seven Observations. These were based on reviews of procedures, previous contractor readiness assessments, contractor evaluations, corrective action plans, and closure documentation, interviews with various contractor and DOE personnel, and observations of evolutions. Team members used the review criteria and expectations of the performance objectives identified in the Criticality Safety Assessment Program for Defense Nuclear Facilities Safety Board Recommendation 94-4, Revision 1, to assess the Y-12 Site. The contractor and DOE met the review criterion for nine of the sixteen performance objectives. The following table illustrates the results of this assessment.

Item	Criteria Satisfied	Finding, Concern or Observation
CO-1.1	Yes	C-04, O-03
CO-1.2	Yes	None
CO-1.3	Yes	None
CO-1.4	No	F-06, F-09, C-05
CO-1.5	Yes	None
CO-1.6	Yes	None
CO-1.7	Yes	None
CO-1.8	Yes	None
CO-2.1	Yes	None
CO-2.2	No	F-07, F-11, F-13, F-14
CO-2.3	No	F-16
CO-2.4	No	F-20
CO-2.5	Yes	None
CO-2.6	No	F-17, C-18, O-19
CO-3.0	No	F-02, O-12, O-21, O-22
CO-4.0	No	F-08, F-15, O-01, O-10

The Task 2 Assessment Team reached the following conclusions.

- The resumed facilities are operating safely and many self improvement plans exist to upgrade operations in other facilities.
- LMES has made significant progress in developing a procedure-based operation.
- The existing path forward chosen by the contractor to resolve the prior OSR and CSA problems will likely continue to result in CSA deficiencies after resumption of operations at the Y-12 facilities.
- Most of the progress made in OSR and CSA implementation at the Oak Ridge Y-12 Plant has been incremental, focusing on the existing system of OSRs and CSAs, instead of addressing the fundamental difficulties and problems with the existing system that led to the 1994 incident.
- Progress has been very slow in establishing the documentation supporting the safety basis for certain facilities, making it difficult to develop OSRs as required by DOE Orders.
- The structure, format, and content of the OSRs and criticality safety evaluations, approvals, and requirements are far from optimum. The approaches taken at Y-12, while safe, are often far from the best practices of either the commercial nuclear industry or the DOE complex. The assessment team is particularly concerned about the structure of the OSRs, the technical content of the criticality safety evaluations, the identification of criticality safety requirements in the criticality safety approvals, and the postings of the criticality safety requirements in the facilities.
- Although the site is fulfilling its resumption oriented commitments, operations at Y-12 have not benefited fully from prior assessments' corrective

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CO-1.6	Yes	None
CO-1.7	Yes	None
CO-1.8	Yes	None
CO-2.1	Yes	None
CO-2.2	No	F-07, F-11, F-13, F-14
CO-2.3	No	F-16
CO-2.4	No	F-20
CO-2.5	Yes	None
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- Although the site is fulfilling its resumption oriented commitments, operations at Y-12 have not benefited fully from prior assessments' corrective

and interim actions. The use of root cause analysis was inconsistent, and the site may not have identified the necessary corrective actions to preclude recurrence of events and provide overall long-term improvement.

- Y-12 has not yet established a working, accessible lessons learned program to help the operations system. Although the contractor has an established program that can incorporate lessons learned from operating experience from both internal and external events, lessons learned for nuclear criticality safety have not been incorporated in the program.

- The safety culture change at Y-12 is incomplete. Some pockets of success are evident, largely in the resumed operations, but the change in other facilities remains to be proven. The change in safety culture has not progressed to the desired level, and the training program is not yet fully effective in correcting identified performance problems. Easily preventable deficiencies still occur, and workers do not always stop work and inform supervisors immediately when they detect a deficiency.

In summary, the contractor and DOE still have much work to do concerning OSR and CSA adequacy and compliance. Many weaknesses identified in Recommendation 94-4 are still evident at the Y-12 Plant. Although site personnel have shown a willingness to correct the root cause of these deficiencies, significant programmatic improvements concerning OSRs and CSAs are not fully evident at this time. Y-12 has not yet institutionalized the needed program improvements and culture changes needed to ensure an acceptable level of safety for the long-term.

7.0 REFERENCES

The following major references were used in the development of this report. Additional references can be found in the Form 1s and Form 2s.

- ANSI 16.5/ANS-8.7-1975 (R1987), Guide for Nuclear Criticality Safety in Storage of Fissile Materials
- ANSI/ANS-8.1-1983, Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors
- ANSI/ANS-8.3-1986, Criticality Accident Alarm Systems
- ANSI/ANS-8.5-1986, Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material
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- ANSI/ANS-8.9-1987, Nuclear Criticality Safety Criteria for Steel-Pipe Intersections Containing Aqueous Solutions of Fissile Materials
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- Criticality Safety Analysis 18092, High Capacity Evaporator Operation, 3/29/95
- Criticality Safety Analysis 18131, Modular Storage Vaults (MSVs) (U), 5/7/95
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- Criticality Safety Approval 18221, SNM Vehicle Loading and Shipping, 5/7/95
- Criticality Safety Approval 18235
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- Criticality Safety Approval Nonconformance Walkdown Corrective Action Forms
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- Daily Orders and Standing Orders for Building 9720-5
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- ORO-MMES-Y12NUCLEAR-1995-0003 (OSR violation, TSR not completed on CAAS)
- ORO-MMES-Y12NUCLEAR-1995-0004 (TSR on fire protection system not completed)
- ORO-MMES-Y12NUCLEAR-1995-0008 (Unauthorized procedure change)
- ORO-MMES-Y12NUCLEAR-1995-0011 (OSR violation, TSR on ventilation system fire suppression not performed)
- ORO-MMES-Y12NUCLEAR-1995-0020 (CAAS not audible in roof top fan housing)
- ORO-MMES-Y12SITE-1994-0022 (September 22, 1994 event description)
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- Y/TS-1314, OSR Requirements to Procedures Matrix, OSR for 9204-2 and 9204-2E MAA, Revision 1, 9/18/95
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- Y50-66-CS-327, Nuclear Criticality Safety Incidents and Deficiencies
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- Y60-160, Corrective Action Program, 01/23/95
- Y60-162, Root Cause Analysis, 06/30/92
- Y60-163, Quality Organization Quality Assurance Procedure, Validation and Verification, 01/23/95
- Y60-164, Quality Assurance Procedure, Lessons Learned
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- YSO-95-09, DOE Y-12 Site Office Monthly Assessment Report
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8.0 SELECTED ACRONYMS

ANL	Argonne National Laboratory
ANS	American Nuclear Society
ANSI	American National Standards Institute
BIO	Basis for Interim Operations
CAAS	Criticality Accident Alarm System
CFR	Code of Federal Regulations
CIR	Criticality Incident Review
CONOPS	Conduct of Operations
CoO	Conduct of Operations
CRT	Container Restraint Transport
CS	Criticality Safety
CSA	Criticality Safety Approval
CSC	Criticality Safety Committee
CSE	Criticality Safety Engineer
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DOE-HQ	Department of Energy Headquarters
DOT	Department of Transportation
DP	Office of Defense Programs
DSO	Disassembly and Storage Operations
DWPF	Defense Waste Processing Facility
EG&G	Edgerton Germerschausen & Greer
EH	Office of Environment, Safety and Health
EM	Office of Environmental Management
ESAMS	Energy System Action Management System
ESH	Environment Safety and Health
ESS	Energy Systems Standard
EU	Enriched Uranium
EUO	Enriched Uranium Operations
HEPA	High Efficiency Particulate Air
HS&E	Health, Safety and Environment
HSEA	Health Safety Environment and Accountability
ICPP	Idaho Chemical Processing Plant
ICSBEP	International Criticality Safety Benchmark Evaluation Project
INEL	Idaho National Engineering Laboratory
ITRB	Internal Technical Review Board
LANL	Los Alamos National Laboratory
LCDR	Lieutenant Commander
LCO	Limiting Condition of Operation
LLNL	Lawrence Livermore National Laboratory
LMES	Lockheed Martin Energy Systems
LMITCO	Lockheed Martin Idaho Technology Company
LOC	Limiting Operating Condition
M&O	Management and Operations
MAAS	Material Access Areas
NCS	Nuclear Criticality Safety
NCSA	Nuclear Criticality Safety Analysis
NCSD	Nuclear Criticality Safety Department
NMSSS	Nuclear Materials Safeguarded Shipping and Storage
NRC	Nuclear Regulatory Commission

OJT	On the Job Training
OR	Oak Ridge Operations Office
ORO	Oak Ridge Operations
ORPS	Occurrence Reporting and Processing System
ORR	Operational Readiness Review
OSR	Operational Safety Requirements
PNL	Pacific Northwest Laboratory
POD	Plan of the Day
PRA	Probabilistic Risk Assessment
PRMP	Plutonium Residue Modification Project
PSS	Plant Shift Superintendent
QFSD	Quality Facility Safety Department
RA	Readiness Assessment
RADCON	Radiation Control
RCA	Root Cause Analysis
RSS	Receipt Shipment and Storage
SA	Safety Analysis
SAIC	Science Applications International Corporation
SAR	Safety Analysis Report
SIS	Special Isotope Separation
SMS	Systematic Management Systems
SNL	Sandia National Laboratory
SNM	Special Nuclear Material
SR	Surveillance Report
SRS	Savannah River Site
SST	Safe Secure Transport
STA	Shift Technical Advisor
TSR	Technical Safety Requirement
USF	Uranium Solidification Facility
USQ	Unreviewed Safety Question
USQD	Unreviewed Safety Question Determination
WHC	Westinghouse Hanford Company
WSRC	Westinghouse Savannah River Company
Y-12	Oak Ridge Y-12 Plant
YSO	Y-12 Site Office

OJT	On the Job Training
OR	Oak Ridge Operations Office
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RSS	Receipt Shipment and Storage
SA	Safety Analysis
SAIC	Science Applications International Corporation
SAR	Safety Analysis Report
SIS	Special Isotope Separation
SMS	Systematic Management Systems
SNL	Sandia National Laboratory
SNM	Special Nuclear Material
SR	Surveillance Report
SRS	Savannah River Site
SST	Safe Secure Transport
STA	Shift Technical Advisor
TSR	Technical Safety Requirement
USF	Uranium Solidification Facility
USQ	Unreviewed Safety Question
USQD	Unreviewed Safety Question Determination
WHC	Westinghouse Hanford Company
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Y-12	Oak Ridge Y-12 Plant
YSO	Y-12 Site Office

APPENDIX A

ASSESSMENT TEAM MEMBERS BIOGRAPHICAL SUMMARIES

TEAM LEADERS

MILTON HAAS – EH 34

Mr. Haas is a chemical engineer who began his career in 1960 as a leadman with the Coors Porcelain Company where enriched urania-berylia fuel elements were fabricated for the Tory II-C reactor, a part of Project Pluto. In addition to his operations responsibilities, he was designated as a nuclear criticality safety inspector. He subsequently joined the Chemical Engineering Division at Argonne National Laboratory and performed bench scale development in support of the fluidized-bed fluoride volatility reprocessing of reactor fuels. This work was performed with plutonium, uranium, and "mock" fission products. In 1973 Mr. Haas transferred to the EBR-II Project at Argonne West where initially he was special Projects Engineer for the restart of the Argonne Fuel Fabrication Line. Later, he led the driver fuel assembly group. At Los Alamos he participated in the shutdown of plutonium operations at DP West and the startup of aqueous plutonium/americium recovery operations and R&D at TA-55. Mr. Haas ultimately became the group leader of MST-12 (Nuclear Materials Process Technology), responsible for all aqueous plutonium processing at TA-55 and the Enriched Uranium Recovery Operations remaining at DP West. Concurrent to this assignment, Mr. Haas served on the Los Alamos Nuclear Criticality Safety Committee. In 1985 he moved to the Rockwell Hanford Operations (later Westinghouse Hanford Co.) and served in various capacities. These included management of three analytical laboratories in the 200 Area. Then at the Plutonium Finishing Plant, he served as Engineering Manager and later as the Deputy Plant Manager. Mr. Haas also served on the Safety and Environmental Advisory Council to the President of Westinghouse Hanford Company. Prior to joining the Department of Energy, EH-34, Mr. Haas was detailed to the Office of Facility Transition and Management, EM-60 at DOE Headquarters during 1993-1994, dedicated principally to the EM interests at Rocky Flats, and he served in the core group of the Plutonium Vulnerability Assessment as Deputy Team Leader for the Sandia and Argonne West assessments. He later co-authored the Plutonium Vulnerability Management Plan.

JON M. MACLAREN – DP 24

LCDR MacLaren received a B.S. in Mechanical Engineering from the University of Texas and is pursuing an M.S. in Engineering Management. He has over 12 years of naval nuclear engineering and operations experience in positions concerning Reactor Controls, Chemical and Radiological Controls and plant operations. Additionally, he has been involved in an extensive shipyard submarine overhaul and a 14 month shipyard submarine depot modernization and is certified as a chief nuclear engineer by Naval Reactors. Since being assigned to DP-24 his primary responsibilities have concerned Order Compliance, Standards and Requirements and Quality Evaluation.

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ASSESSMENT TEAM MEMBERS

ROGER BREWER

Mr. Brewer is a criticality safety engineer at Los Alamos National Laboratory (LANL). He holds a B.S. and M.S. in Nuclear Engineering. He has over 10 years experience in the nuclear industry. He began his career with the U.S. Navy on nuclear submarines. He has worked in the commercial nuclear power industry with the Tennessee Valley Authority and South Carolina Electric and Gas. More recently, he has participated in the Plutonium Vulnerability Assessment at the Savannah River Site. He is currently involved in the International Criticality Safety Benchmark Evaluation Project. He provides criticality safety guidance for nuclear material operations at LANL.

DENELLE E. FRIAR

Ms. Friar is a criticality safety specialist at Westinghouse Hanford Company (WHC). She has over 20 years experience in nuclear criticality safety. She has written criticality safety technical analyses and implementing documents for operations, conducted facility appraisals, and developed criticality safety programs and associated documentation. She has trained thousands of employees in criticality safety, including management, operations staff, crafts people, and administrative support personnel. She was acting manager of the WHC criticality engineering analysis group for over a year. Ms. Friar has been a member of the Executive Board of the Nuclear Criticality Safety Division of the American Nuclear Society, and a member of the writing group for ANS 8.20, the standard for criticality safety training. She has served on two assessment teams for DOE-HQ. Her current assignment is to assist the Rocky Flats site in developing a criticality safety program manual. Ms. Friar holds a BS in physics and a masters in business administration.

DAVID P. HEINRICHS

Mr. Heinrichs is a physicist, nuclear engineer, and criticality safety specialist in the Hazardous Control Department of the Lawrence Livermore National Laboratory (LLNL). Mr. Heinrichs performs nuclear criticality safety evaluations in support of fissile material operations at nine on-site nuclear facilities and three off-site operations at nuclear explosive facilities. His primary duties presently include the criticality safety of LLNL nuclear weapons, devices and components and liaison to the DOE Complex and DNA/military. Mr. Heinrichs is a member of the Weapons Criticality Committee, Nuclear Emergency Search Team and Accident Response Group. Mr. Heinrichs has over thirteen years of experience in the nuclear safety field with four and one-half years in his present position. Prior to joining LLNL, Mr. Heinrichs was a Senior Principal Criticality Safety Engineer at the Rocky Flats Plant and a Reactor Physicist for Middle South Utilities/Systems Services and Yankee Atomic Electric Company. Mr. Heinrichs holds a B.S. in physics and applied mathematics and an M.S.E. in nuclear engineering.

WILLIAM M. HOGLE

Mr. Hogle has over 20 years experience providing support in engineering, operations, maintenance, radioactive waste management, safety analysis, and management oversight for

ASSESSMENT SUB-TEAM LEADERS

THOMAS A. REILLY

Mr. Reilly has 24 years of experience in the processes for the recovery of plutonium and uranium as implemented at the separation plants at the Savannah River Site. For the past 17 years Mr. Reilly has had both technical and managerial assignments concentrated on the nuclear criticality safety aspects of these operations. Mr. Reilly earned a Master of Chemical Engineering from the University of Delaware. Mr. Reilly is knowledgeable in the application of the DOE Orders and Standards and national consensus standards that are pertinent to nuclear criticality safety.

ALAN K. WILLIAMS

Mr. Williams has 43 years experience in design, development, operation, and management of chemical processes for the recovery of nuclear materials such as uranium, plutonium and americium. He is currently a consultant supporting DOE-HQ in conducting technical reviews. He has been a member of the ORR teams for B-559 startup and B-707 thermal stabilization at Rocky Flats, cold chemical runs for the Defense Waste Processing Facility and FB-Line at SRS, and restart of the Hanford 242-A Evaporator. He was a contributor to the DOE-DP study and criteria for interim storage of plutonium metal and oxide, a member of the working group for the ES&H Plutonium Vulnerability Study and Deputy Team Leader for the SRS assessment, is chairman of the EM-64 Surplus Materials Peer Panel, co-chair of the EM-60 Research Committee for response to DNFSB Recommendation 94-1, and member of the Technical Review Group for review of SARs for DWPF and West Valley Demonstration Project. Prior to joining SAIC, he was employed by Bechtel National as a project engineer and project manager on the SIS and PRMP projects, with Allied-General Nuclear Services where he was Vice President of Operations and Technical, and the Dow Chemical Co. at Rocky Flats Plant where he had increasingly responsible positions in process development, production support, and chemical operations for plutonium, americium and high enriched uranium.

ASSESSMENT TEAM MEMBERS

ROGER BREWER

Mr. Brewer is a criticality safety engineer at Los Alamos National Laboratory (LANL). He holds a B.S. and M.S. in Nuclear Engineering. He has over 10 years experience in the nuclear industry. He began his career with the U.S. Navy on nuclear submarines. He has worked in the commercial nuclear power industry with the Tennessee Valley Authority and South Carolina Electric and Gas. More recently, he has participated in the Plutonium Vulnerability Assessment at the Savannah River Site. He is currently involved in the International Criticality Safety Benchmark Evaluation Project. He provides criticality safety guidance for nuclear material operations at LANL.

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Ms. Friar is a criticality safety specialist at Westinghouse Hanford Company (WHC). She has over 20 years experience in nuclear criticality safety. She has written criticality safety technical analyses and implementing documents for operations, conducted facility appraisals, and developed criticality safety programs and associated documentation. She has trained thousands of employees in criticality safety, including management, operations staff, crafts people, and administrative support personnel. She was acting manager of the WHC criticality engineering analysis group for over a year. Ms. Friar has been a member of the Executive Board of the Nuclear Criticality Safety Division of the American Nuclear Society, and a member of the writing group for ANS 8.20, the standard for criticality safety training. She has served on two assessment teams for DOE-HQ. Her current assignment is to assist the Rocky Flats site in developing a criticality safety program manual. Ms. Friar holds a BS in physics and a masters in business administration.

DAVID P. HEINRICHS

Mr. Heinrichs is a physicist, nuclear engineer, and criticality safety specialist in the Hazardous Control Department of the Lawrence Livermore National Laboratory (LLNL). Mr. Heinrichs performs nuclear criticality safety evaluations in support of fissile material operations at nine on-site nuclear facilities and three off-site operations at nuclear explosive facilities. His primary duties presently include the criticality safety of LLNL nuclear weapons, devices and components and liaison to the DOE Complex and DNA/military. Mr. Heinrichs is a member of the Weapons Criticality Committee, Nuclear Emergency Search Team and Accident Response Group. Mr. Heinrichs has over thirteen years of experience in the nuclear safety field with four and one-half years in his present position. Prior to joining LLNL, Mr. Heinrichs was a Senior Principal Criticality Safety Engineer at the Rocky Flats Plant and a Reactor Physicist for Middle South Utilities/Systems Services and Yankee Atomic Electric Company. Mr. Heinrichs holds a B.S. in physics and applied mathematics and an M.S.E. in nuclear engineering.

WILLIAM M. HOGLE

Mr. Hogle has over 20 years experience providing support in engineering, operations, maintenance, radioactive waste management, safety analysis, and management oversight for

commercial nuclear power facilities and the Department of Energy. He is currently assigned as a principal consultant on various projects for the EH Office of Engineering Assistance and Site Interface and the EM Office of Safety and Health. Mr. Hogle has served on several assessment teams for DOE-HQ including HB Line, FB Line and F-Canyon at SRS, the Y-12 Plant at Oak Ridge, and the Portsmouth Gaseous Diffusion Plant. During these assessments, he was responsible for the areas of safety analysis, fire protection, maintenance and operations, configuration management, and engineering. He was a member of the ES&H Vulnerability Assessment Plutonium Working Group and the Savannah River Site Working Group Assessment Team. As part of the EM Worker Safety Improvement Program task team, Mr. Hogle worked with senior management at the Hanford, Idaho National Engineering Laboratory, Fernald, and Rocky Flats sites to improve workplace safety and health. He has authored several white papers for the Environmental Management Advisory Board on worker safety performance measures and has developed a worker safety indexing system for senior EM management. In addition, Mr. Hogle has participated in performance-based assessments for several commercial utilities and the Institute of Nuclear Power Operations. Prior to his work with DOE, Mr. Hogle was the Technical Support Systems Engineering Manager for Carolina Power & Light's Brunswick Nuclear facility. He holds a B.S. in Materials Science Engineering and a masters in business administration.

DOUGLAS A. OUTLAW

Mr. Outlaw is a PhD nuclear physicist with a broad safety-related background that includes university teaching, experimental nuclear physics research at a DOE accelerator laboratory and over 17 years of experience in safety analysis and assessment of non-reactor nuclear programs and activities for DOE, NRC, and NASA. Most recently, his efforts have included assisting DOE headquarters in development of nuclear safety guidance, review of specific nuclear safety concerns at DOE facilities, and serving as a nuclear facility safety expert to DOE for Technical Safety Appraisals and Operational Readiness Reviews of DOE facilities. Other recent related activities have included criticality safety evaluations, probabilistic risk assessments, hazards evaluations, accident consequence modeling, and the preparation of accident analysis portions of safety analysis reports, environmental assessments, and environmental impact statements for DOE, NASA, and others. He is currently serving as a Senior Program Manager and Senior Scientist at SAIC. Dr. Outlaw served as a technical expert in the areas of safety analysis, criticality safety, engineering support, and other safety-related areas for facility reviews of DOE Defense Programs facilities. Between 1991 and 1993, Dr. Outlaw served as a technical expert in eight DOE-HQ/DP-67 sponsored Technical Safety Appraisals of DOE major facilities, including Mound Laboratories, Lawrence Livermore National Laboratories, the Pantex Plant, the Nevada Test Site, and the Kansas City Plant. Since 1993, Dr. Outlaw has served on Operational Readiness Reviews for Zone 4 at Pantex and F-Canyon at the Savannah River Site. Among the areas Dr. Outlaw in which had the lead were safety analysis, criticality safety, emergency preparedness, and engineering support.

LOUIS F. RESTREPO

Mr. Restrepo has extensive experience and knowledge in implementing Code of Federal Regulations (10CFR), DOE Orders, Regulatory Guides, ANSI standards, and other industry standards in all areas of safety analysis, probabilistic risk assessment (PRA), and design of DOE nuclear facilities. He managed, contributed, and wrote close to two dozen safety analysis

documents (SARs, SAs, OSRs, Tech. Specs, TSRs); prepared several other safety analysis documentation like USQs, ORRs; participated in DOE investigations and audits; and he has also developed guides on the implementation of DOE Orders including format/content guides to various safety analysis documentation. He also has experience as a graduate and undergraduate instructor in engineering physics and PRA. He is currently in charge of implementing and developing methods in PRA and preparing safety analysis documentation for various Sandia facilities. He has served as a consultant to the nuclear power industry, DOE facilities, and DOE in all phases of safety analysis and PRA activities, including training. He was the lead engineer at Rocky Flats, where he supervised and coordinated the technical work of the Safety Analysis organization, also developed and implemented state-of-the-art methods and calculations in PRA; he was a co-author and author of all the safety analysis documentation (SARs, SAs) and Operational Safety Requirements (OSRs) for their nuclear facilities respectively; and developed the guidelines for the design of high-hazard nuclear facilities. Mr. Restrepo is also familiar with over two dozen computer codes and tools to support PRA and safety analysis activities, he has over 40 publications and papers in these areas. Mr. Restrepo has a BS in mathematics/physics from Montclair State, a MS in nuclear engineering from Cornell University, a MS in health physics from Georgia Institute of Technology and is currently completing his dissertation for a Ph.D. in nuclear engineering at the University of New Mexico.

MICHAEL R. SHARPSTEN

Dr. Sharpsten is a senior technical staff member in the safety analysis unit supporting Lockheed Martin Idaho Technologies operations associated with nuclear fuel dispositioning at the Idaho Chemical Processing Plant (ICPP) at the Idaho National Engineering Laboratory (INEL). He has received a B.A. in chemistry from the State University of New York at Plattsburgh, NY and a Ph.D. in chemistry from Montana State University at Bozeman, MT. Dr. Sharpsten started work at the ICPP in 1985 as a process chemist in the operations support section of the technical department. Primary responsibilities included flowsheet development and support for counter-current solvent extraction reprocessing operations utilizing successive purification cycles based upon tributylphosphate in n-dodecane and methylisobutyl ketone. Contributing work applied to head-end nuclear fuel dissolution flowsheets, uranium salvage processing, product denitration operations, and treatment/storage of high level wastes. Current work includes support to the generation of safety basis documents enveloping operations for nuclear fuel storage and high level waste treatment/storage. Major efforts being worked to transition the existing ICPP basis documents to currently required TSR DOE 5480.22 and SAR DOE 5480.23 formats. Dr. Sharpsten has participated in a number of safety assessment and vulnerability reviews and has been a member of the ICPP Radiation, Environment, Safety Committee since 1991. Contributing work has been provided to the Hanford Tank Waste Disposal Redefinition Peer Review (1991), the ICPP Tomsk-7 Lessons Learned Self Assessment Team (1993), and the ICPP dry product storage facility Operational Readiness Review (1995).

J. TODD TAYLOR

Mr. Taylor is the manager of the criticality safety group at the Idaho National Engineering Laboratory (INEL). Prior to his current position, Mr. Taylor was the Technical Group Leader for the criticality safety group at the Idaho Chemical Processing Plant (ICPP). Mr. Taylor has over 13 years of criticality safety experience, primarily with nuclear fuel processing and storage at the ICPP. Mr. Taylor was a member of the HS&E transition team for the Rocky Flats Plant and has been involved with evaluations/projects at Fernald and LLNL.

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DOUGLAS K. VOGT

Mr. Vogt is a nuclear engineer with over 20 years experience in performing engineering analysis, safety analysis, and management oversight of commercial and government nuclear facilities. He has reviewed and analyzed activities at commercial nuclear fuel cycle facilities, nuclear power plants, and waste management facilities. He has experience with DOE research and production facilities. He has led or participated in safety analyses for numerous DOE facilities at Rocky Flats, LLNL and LANL. Mr. Vogt holds a Bachelor of Engineering Science and a Master of Science in Nuclear engineering, both from the Georgia Institute of Technology. Safety Analyses have included probabilistic risk assessments (PRA) for nuclear criticality accidents and the establishment of OSRs to prevent accidental nuclear criticality. He has assisted LLNL in developing and implementing an independent Conduct of Operations program.

SUPPORT

MICHAEL J. CROUSE

Mr. Crouse has three years of experience in nuclear criticality safety as it relates to the separation processes at the Savannah River Site. Recently, Mr. Crouse was involved in performing the criticality safety analysis in support of the SRS Solidification Facility Project (USF). The SRS USF is modeled on a similar facility as the Oak Ridge Y-12 plant. Mr. Crouse earned a Master of Nuclear Engineering degree from the University of Tennessee. Mr. Crouse has experience in the conduct of facility compliance assessments for site specific and DOE Order requirements.

DENNIS GALVIN

Mr. Galvin is a general engineer with the Office of Engineering and Operations Support for Defense Programs. He joined the Department of Energy as a technical intern in 1991. As an intern for two and one-half years, he assisted on several engineering assessments, including assisting facility representatives at Rocky Flats for five months and assisting the resident inspectors at the Susquehanna Steam Electric Station for nine months. For the past one and one-half years, he has provided criticality safety support to Defense Programs. Mr. Galvin has a BS in nuclear engineering from Penn State University.

BARBARA K. KNEECE

Ms. Kneece has over 20 years of experience in administrative management and support to various elements of public and private enterprises. She currently is assigned as a project analyst for the Office of Engineering Assistance and Site Interface (EH-34). Ms. Kneece has performed as the administrative support coordinator for numerous assessments for EH including Rocky Flats Building 707, Building 559, and Supercompaction and Repackaging facilities; Savannah River Site HB-Line, FB-Line, and Replacement Tritium facilities; Princeton Plasma Physics Laboratory Tokamak Fusion Test Reactor; Portsmouth Gaseous Diffusion Plant; the DOE Complex Spent Fuel Initiative; and the Plutonium Vulnerability Assessment. As administrative coordinator and office manager for Argonne National Laboratory, she established a satellite office for the DOE New Production Reactor program in Aiken, S.C.

SAMUEL ROSENBLOOM

Mr. Rosenbloom earned the degrees of Bachelor of Science in Biophysics and Master of Science in Nuclear Engineering from the University of Maryland. He has extensive training in electrical instrumentation. Mr. Rosenbloom completed an internship for his degree in Biophysics at the University of Maryland Medical School Teaching Facility. He has managed instrumentation and sensor development programs. Mr. Rosenbloom served the Defense Nuclear Agency as the principal point-of-contact during extremely controversial environmental litigation against the U.S. Government concerning alleged adverse environmental impact of Department of Defense facilities in Virginia and New Mexico. Mr. Rosenbloom has an academic knowledge of contracts and contract law. He is the author of DOE 5480.24, *Nuclear Criticality Safety*, and he has extensive knowledge of DOE policy development.

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APPENDIX B

ASSESSMENT FORM 2

Disposition of Site Comments

The Contractor/DOE responses have been included in the revised Form 2s and any additions have been demarcated as a redline. The Task 2 team leaders have accepted the responses with the following exceptions.

Exception 1 The suggestion to combine certain findings was not accepted in the interest of maintaining the integrity of each team member's perspective.

Exception 2 The Task 2 team leaders have chosen to maintain Finding 16 as written. The basis is that although a Class 2 procedure had been approved on October 12, 1995 for the unloading of the Blue Goose, the procedure was not at the job site, nor was its existence known to the personnel conducting the evolution. The evolution was conducted using a canceled and superseded procedure. (Reference memorandum from M. Haas/J. MacLauren to R.J. Spence dated November 28, 1995)

Copies of the original signed Form 2's are available on request.

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