Conduct of Operations Assessment Plan

for

Defense Nuclear Facilities Safety Board
Recommendation 94-4
Deficiencies in Criticality Safety
at Oak Ridge Y-12 Plant

October 1995

Dale Christenson
ORO:Y-12

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Approved by:

10/23/95

David Chaney, DP-24 Date
Team Leader - DOE Assessment

10/13/95

Daniel Branch Date
Team Leader - LMES Assessment

ACRONYMS

ANL	Argonne National Laboratory
ANS	American Nuclear Society
ANSI	American National Standards Institute
CAAS	Criticality Accident Alarm System
COO	Conduct of Operations
CS	Criticality Safety
CSA	Criticality Safety Approval
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DOE-HQ	Department of Energy Headquarters
DP	Office of Defense Programs
EH	Office of Environment, Safety and Health
ESS	Energy Systems Standard
LANL	Los Alamos National Laboratory
LMITCO	Lockheed Martin Idaho Technology Company
LLNL	Lawrence Livermore National Laboratory
LMES	Lockheed Martin Energy Systems, Inc.
M&O	Management and Operations
NCS	Nuclear Criticality Safety
OSR	Operational Safety Requirements
ORO	Oak Ridge Operations Office
PNL	Pacific Northwest Laboratory
SAIC	Science Applications International Corporation
SAR	Safety Analysis Report
SNL	Sandia National Laboratory
SMS	Systematic Management Systems
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

Preface:

This Assessment Plan is intended to support the Department of Energy (DOE) Implementation Plan in response to the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-4, *Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant*. The Plan provides guidance for performing two independent evaluations. One assessment involves an evaluation of conduct of operations (COO) direction, support, and oversight provided by the DOE at the Y-12 Site Office (YSO), the Oak Ridge Operations Office (ORO), and at DOE Headquarters (HQ). The other assessment focuses on the Lockheed Martin Energy Systems (LMES) COO Program at Y-12. These representative assessments will compare the full Y-12 COO Program against DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, by utilizing the method established during the Pantex Plant COO Enhancement Program and also the broader DNFSB Recommendation 92-5 concepts. Team members will use this methodology to evaluate:

- The actions completed to date at the Y-12 Plant
- The long-term posture of Lockheed Martin Energy Systems, Inc.
- The DOE Oak Ridge Operations Office accomplishments related to their COO implementation plans
- The requirements of DOE Order 5480.19.

The primary purpose of these evaluations is to help the site identify deficiencies and establish corrective actions associated with the COO Program at Y-12. The recommendations identified in the assessment reports should be useful, manageable, and support institutional improvements. The recommendations should also promote a positive standards-based, compliance culture that corrects the root causes of previously identified deficiencies. Return visits to the site may be required in order to help the site determine the effectiveness of the corrective actions associated with these assessments.

All parties should recognize that the assessments are an integral part of the DOE's commitment to ensure the safety of workers, the public, and the environment. All personnel involved in the assessment activities should share this common goal.

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1.0 Assessment Overview

The DOE has established two independent teams to evaluate the full Conduct of Operations (COO) Program at the Oak Ridge Y-12 Plant. The evaluations will assess both the DOE Operations Office and the Management and Operations (M&O) contractor (Lockheed Martin Energy Systems Inc.). The assessments are in response to Defense Nuclear Facility Safety Board (DNFSB) Recommendation 94-4, *Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant*. The Teams consist of DOE technical managers, M&O contractors, and consultants with COO expertise. The Team members will evaluate how well the Oak Ridge facility is complying with DOE Order 5480.19 and associated implementation plans, perform a comprehensive review of the COO Program at Y-12, and apply their experience gained from similar reviews at the Pantex Plant, Rocky Flats Site, and the Los Alamos TA-55 facility. In addition, the Teams will review previous Y-12 COO assessments and will independently assess the effectiveness of corrective actions taken as a result of these previous assessments.

This Plan defines the scope, outlines roles, and responsibilities, provides appropriate project management, and supplies the performance objectives, review criteria, and approach for the assessments.

The results from each assessment will be documented in separate reports and provided to the DOE 94-4 Senior Steering Committee. Once that Committee concurs with the reports, they will be submitted to the DNFSB to satisfy a Recommendation 94-4 Implementation Plan commitment.

2.0 Introduction

On September 27, 1994, the DNFSB issued Recommendation 94-4, which involved criticality safety deficiencies observed at the Oak Ridge Y-12 Plant. The Recommendation described a September 22, 1994, event in which members of the DNFSB staff noted discrepancies between the Criticality Safety Approval (CSA) requirements and the configuration of storage arrays while observing the unloading and storage of a weapon component. In responding to this identified violation of nuclear criticality safety limits, DOE and contractor personnel failed to take appropriate corrective actions in accordance with site procedures. Following the event, the operating contractor, Lockheed Martin Energy Systems Inc. (LMES), stopped all nuclear operations at the Y-12 Plant.

The DNFSB Recommendation stated that reviews of adherence to nuclear criticality safety limits at the Y-12 Plant revealed widespread noncompliance. The Recommendation also identified weaknesses in key areas of the criticality safety program including procedures and COO, as well as DOE and contractor experience, training, qualifications, and performance. In response to the DNFSB Recommendation, DOE established a Senior Steering Committee and a Senior Working Group to develop an overall strategy. In February 1995, Office of Defense Programs (DP) issued the *Department of Energy Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 94-4, Deficiencies in Criticality Safety at the Oak Ridge Y-12 Plant*. The Implementation Plan describes schedules for the phased resumption of activities at the Y-12 Plant. 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 Plan evaluates the long-term programmatic improvements associated with Task 4--Conduct of Operations. The activities of Task 4 will be coordinated with those of Task 2--*CSA/OSR Implementation*; Task 3--*Criticality Safety Program*; Task 5--*Technical Competence Review*; Task 6--*Corrective Actions*; and Task 7--*Reporting Requirements*. Assessment overlap in these areas will be minimized where possible.

A glossary of definitions specific to this assessment is included at the end of this Plan.

3.0 Purpose

This Assessment Plan provides the approach and guidelines for the independent assessments described in Task 4 of the Implementation Plan. The assessments evaluate whether the Oak Ridge facility is sustaining resumption oriented commitments and whether the facility's longer term plans are consistent with the other Recommendation 94-4 and related LMES commitments already specified in the Implementation Plan. The assessments will focus on the site's implementation of DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, and the effectiveness of the resulting Y-12 COO Program. The Plan for the Y-12 COO Program review includes separate evaluations of DOE (HQ, ORO, and YSO) and LMES. Each Assessment Team will prepare a final report.

4.0 Objective and Scope

The objectives of the Assessment Plan are to perform independent assessments of the implementation level of COO activities at Y-12 (for both DOE and LMES) and conduct a comprehensive review of the Y-12 COO Program. The activities of Task 2-*CSA/OSR Implementation*, and Task 3-*Criticality Safety Program*, will be coordinated with activities in this Task 4 Plan. The training process (e.g., methodology, instructor qualifications, etc.) will not be addressed as part of this Plan because the training process is being addressed in Task 5-*Technical Competence*. The Task 4 assessments will evaluate the technical content and effectiveness of specific training or training related activities, such as required reading programs, as outlined in the Y-12 COO Program.

COO covers some aspect of the scope of all the 94-4 Tasks. The effort of the Task 4 assessment will be to evaluate how the subject programs/processes of the other 94-4 Tasks are conducted at Y-12. Task 4 will not evaluate how the other 94-4 Tasks are conducted.

Each Assessment Team will achieve these objectives through observations of facility activities, interactions with site personnel, review of procedures, review of corrective actions, tours of facilities, and inspections of equipment. In addition, the Team members will apply their experience gained from similar reviews conducted at the Pantex Plant, Rocky Flats Site, and the Los Alamos TA-55 facility to the Oak Ridge Y-12 Plant by making appropriate recommendations.

Appendix A, *Proposed Facilities List*, provides a preliminary listing of the facilities to be included as part of this Assessment Plan. The Team leaders will decide which facilities will be assessed.

The following additional topics are subject to evaluation, during these assessments:

- DOE and contractor management of COO programs
- Applicable portions of completed Readiness Assessments
- Completed actions in Near-Term Initiatives for COO activities
- Corrective actions related to probable causes documented in the Type C Investigation
- Corrective actions related to causal factors in the LMES internal report, *Evaluation of Criticality Safety Discrepancy Data*
- Progress by LMES in Phase III and IV activities involving criticality safety as defined in Y/AD-623, *Plan for Continuing and Resuming Operations*
- Any Special Operations that may be in progress at the time of the site visits. These include both one-time operations and those operations that will become part of standard operations.

Upon completion of the evaluations, each Assessment Team will prepare a final report documenting the findings, concerns, and noteworthy practices. The reports may also contain recommendations for improvement that can go into the combined Y-12 COO corrective action plan.

5.0 Team Composition

5.1 Assessment Team Members

Members of the Assessment Teams were selected on the basis of technical expertise and assessment experience. The use of Team members from a number of DOE sites promotes the exchange of good practices, lessons learned, and diverse perspectives. These individuals are familiar with assessment methodology and experienced in conducting interviews, observing in-progress activities, and performing walkdowns of facility systems and equipment operation. The Assessment Teams include DOE technical experts, senior M&O contractors, and highly qualified consultants.

ASSESSMENT TEAM MEMBERS

DOE ASSESSMENT

D. Chaney - DOE-HQ (Team Leader)
C. Everatt - DOE-SRO
D. States - DOE-HQ
J. Grise - Consultant/SMS
E. Stafford - Consultant/SWEC

LMES ASSESSMENT

D. Branch - Kaiser-Hill, RF (Team Leader)
G. Francis - Kaiser-Hill, RF
J. Angelo - Mason-Hanger, Pantex
D. Butler - Mason-Hanger, Pantex
W. Condon - Westinghouse, SRS

6.0 Roles and Responsibilities

6.1 Team Leaders

The Team leaders will be responsible for implementing this Plan, for managing the assessments, for briefing on-site personnel, and for writing the assessment reports. Prior to the onsite assessment, the Team leaders will coordinate with ORO, YSO, and LMES personnel on logistics, required training, security access requirements, identification of counterparts, selection of facilities to be assessed, and an assessment schedule. The Team leaders will also be responsible for conducting the entrance and exit meetings with ORO, YSO, and LMES personnel.

The Team leaders will conduct daily briefings with ORO, YSO, and LMES personnel to review observations, concerns and findings, and approve the near-term daily schedule of activities (e.g., interviews, walkdowns, observations, and technical discussions). Team leaders will also determine the validity of any finding identified by the Team and resolve any conflicts between Team members and ORO, YSO, or LMES personnel. The Team leaders will collect, for use in the final assessment report any photographs or other pertinent reference materials. They also will coordinate Task 4 activities with activities of Tasks 2, 3, 5, 6, and 7.

6.2 Assessment Team Members

The Team members have the responsibility to conduct a comprehensive review based on the criteria specified in this Plan's Appendix C, *Task 4 Performance Objectives, Review Criteria, Approach and Expectations for the Assessment of DOE Actions Regarding the Implementation of Conduct of Operations at Y-12;* and this Plan's Appendix D, *Task 4 Performance Objectives, Review Criteria, Approach and Expectations for the Assessment of LMES.* The Team members will review prior Y-12 COO assessments, focusing on LMES and Y-12 findings, corrective actions, interim actions, and post-resumption activities. They will document their reviews on the Assessment Forms found in this Plan's Appendix E, *Assessment Forms.*

The Teams will accomplish these tasks by independent verification, direct observation of facilities (walkdowns), interviews with appropriate DOE and LMES personnel, and review of documents and programs. Examples of background materials that are to be made available to the Team members include the results of relevant prior assessments, the corrective action database, occurrence reports, procedures, maintenance records, training records, etc.

Additional reference materials for Team members are listed in this Plan's Appendix G, *DNFSB Recommendations* 92-5, 93-6, and 94-4.

Team members will be responsible for a daily summary of their activities that will be provided to the Team leaders and utilized during the daily site management briefings and Team meetings. The daily summaries will also be used as the bases for the final assessment reports.

Additional Team member responsibilities include the following:

- Prepare and sign assessment forms,
- Prepare assigned report sections,
- Provide written descriptions of dissenting issues,
- Provide concurrence with the final report.

6.3 ORO, YSO, and LMES Personnel

ORO, YSO, and LMES personnel will be responsible for providing Team members with appropriate site specific training and with any information the Assessment Teams may need for a comprehensive evaluation. YSO and LMES personnel will also be responsible for providing office spaces with work stations for use by the Teams.

ORO, YSO, and LMES personnel may be requested to serve as counterparts, responsible for providing necessary technical assistance for the Team members. ORO, YSO, and LMES personnel will review the approved Assessment Forms and provide a response acceptance in Section IV of Assessment Form 2 (Appendix E). A signature line is provided for acceptance of the observation, concern, or finding.

ORO, YSO, and LMES personnel, in conjunction with the Team members, will be responsible for establishing what corrective actions are needed to close any identified findings. In addition, ORO may be requested to provide the Team leaders with photographs of the site processes and other specified reference materials for use in the final report. YSO and LMES personnel will arrange for secure environments and equipment to support reviews of classified documents and activities. This could include classification reviews of any materials that the Team members take offsite during the course of the assessments or at the conclusion. Classified information security is discussed further in Section 7.4 of this Plan.

7.0 Site Assessment Team Process

7.1 Organization and Training

Prior to the onsite assessment activities, the Assessment Teams will be trained so they have escorted access to the Y-12 facility. Training will include basic security training and site orientation. Team leaders will verify that each Team member is technically competent and has no direct connection with Y-12 operations that could affect their independence.

7.2 Protocol

The assessments require an open exchange of information between Team members, ORO, YSO, and LMES. Successful communication between these individuals should include the following:

- Entrance meeting with ORO, YSO, and LMES to discuss the objectives of the assessment and obtain ORO, YSO, and LMES perspectives on assessment activities. The Team leaders will brief ORO, YSO, and LMES site management on the scope, purpose, and objective of the assessments and will obtain the current status of Y-12 operations.
- Counterpart contacts who facilitate information flow and logistics for the Team. The site should identify technical and administrative contacts within the ORO, YSO, and LMES organization to assist the Assessment Teams.
- Candid discussions that involve all parties; however, information flow related to the formulation of observations, concerns, or findings will be formalized. This Plan's

Appendix E provides forms for this purpose. These forms will be administratively controlled to facilitate information flow and ensure that responsible personnel from ORO, YSO, and LMES are fully aware of, and involved in, responses to identified issues.

- Daily meetings should be held between the Team leaders and appropriate DOE or facility management throughout the assessments. These meetings will be used to review observations, concerns, and findings, as well as to arrange and schedule activities (e.g., interviews, walkdowns, observations, and technical discussions). Team leaders and Team members should have daily meetings at the close of the business day to review assessment status and potential issues. The site's representatives are invited to attend these evening meetings. Published schedules should be used and activities planned to the maximum practical extent.

- Exit meeting at the end of the assessment with Team members, ORO, YSO, and LMES to discuss the issues identified are correct and reflect the most up-to-date information available. The purpose of the meeting is to identify any outstanding concerns and review any suggested corrective actions.

All parties should recognize that the assessments are an integral part of the DOE's commitment to ensure the safety of workers, the public, and the environment. All personnel involved in the assessment activities should share that common goal.

7.3 Procedure

7.3.1 Planning Activities

Team leaders of each Assessment Team will conduct a preliminary site visit for training and to resolve any pre-assessment issues. During the preliminary visit, the Team leaders will select buildings to be assessed and establish lists of interviews, references, and site counterparts. Training may include basic security access training, LMES General Employee Training, Radiation Worker II, Criticality Safety, Emergency Preparedness, and/or Hazard Communications. Before the assessments, Team members will become familiar with DNFSB Recommendations 92-5, 93-6, and 94-4 (Appendix G); the DOE Implementation Plan; and other background information.

7.3.2 Performance Objectives, Review Criteria, Approach, and Expectations

The Assessment Plan provides the necessary guidance for conducting the evaluations associated with Task 4. The expected deliverables are noted in Section 8.0. Appendices C and D contain the performance objectives, review criteria, approach, and expectations for each assessment. The criteria developed provide the basis for the Teams to conduct their work within the defined scope of the assessments. The review criteria provide guidance for interviews with personnel, reviews of procedures and programs, walkdowns of systems, and observations of facility conditions.

7.3.3 Assessment Forms

Appendix E contains the assessment forms to be used by Team members for documenting their review. Assessment Form 1 will be used for documenting the detailed review of each objective. Assessment Form 2 will be used to identify findings, concerns, observations, or noteworthy practices. Team members will discuss with the Team leaders and appropriate ORO, YSO, or LMES representatives any issue raised prior to classification as a finding, concern, or observation. Definitions of these terms can be found in the glossary which follows Section 8 of this Plan.

Completed forms should be legibly written and provide sufficient detail. Team members will submit assessment forms to their Team leader for review and approval. The Team leader will then submit the Assessment Form 2 to appropriate ORO, YSO, or LMES personnel for their response. ORO, YSO, and LMES personnel will be responsible for reviewing the approved Assessment Forms, providing a response, recording the date, and indicating their acceptance in Section IV of Assessment Form 2. In the event that ORO, YSO, or LMES does not accept a particular observation, concern, or finding, then the

Team leaders will be responsible for facilitating resolution.

7.3.4 Document Reviews, Facility Walkdowns, and Interviews

An initial tour of Y-12 facilities will be conducted during the first day on site to familiarize the attending Team members with the layout of Y-12 facilities. During the assessments, Team members may conduct additional walkdowns to identify and characterize issues and concerns. DOE and/or LMES representatives knowledgeable of facility conditions or site counterparts should accompany Team members during these walkdowns.

Interviews may be required in order to gather information on a specific topic. Interviews will be scheduled after the document reviews and initial facility walkdowns and observations. The Assessment Teams may prepare suggested lines of inquiry and use them for guidance in these interviews.

7.3.5 Lessons Learned Review

The observations and lessons learned presented in Appendix F are from similar criticality safety events and resumption efforts at Rocky Flats Building 771, the Pantex Site, the Sequoyah Fuels Corporation, and Los Alamos TA-55. Summaries of the events and lessons learned are presented in Appendix F so that Team members may determine how the lessons learned at these facilities apply to the resumption activities at the Y-12 Plant.

7.4 Classified Information Security

Some of the information needed to complete these assessments may be classified. These assessments will report as much information as possible in an unclassified form. All materials generated onsite (e.g., working notes, Assessment Forms, etc.) will be reviewed for classification.

The site will provide the necessary safeguards and security administrative support to the Assessment Team members. This will include providing secure environments and equipment. Areas approved for classified work should be identified during the preliminary site visit. The goal is to provide classified work support so that classified documents, notes, and discussions can be declassified through revision and interpretation in order not to impede the work of the Assessment Team. The scope of this security related administrative support includes the following items:

- Secure work areas and areas outside security zones
- Access to unclassified and secure equipment (personal computers, laser printers, copiers, etc.)
- Unclassified and classified document storage
- Access to an authorized classifier
- Site classified documents
- Personnel access and badging
- Telephones (including access to secure telephones if needed)
- Authorization for to/from Y-12 transport of personal notebook computers and diskettes

The final report will also be reviewed for classification. To allow complete access to all technical security areas, Assessment Team members will have current Q clearances.

7.5 Reading List

The following reading list has been developed to assist the Team members in preparation for the assessments. Additional references are noted in Appendix H, *References*.

- Conduct of Operations Assessment Plan for Defense Nuclear Facilities Safety Board Recommendation 94-4, Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant (latest revision)
- DNFSB Recommendation 94-4, *Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant.*
- DNFSB Recommendation 93-6, *Maintaining Access to Nuclear Weapons Experience*

- DNFSB Recommendation 92-5, *Discipline of Operations in a Changing Defense Nuclear Facilities Complex*
- Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 94-4, *Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant*, February 1995
- Y/AD-622, *Type C Investigation of the Y-12 Plant Criticality Safety Approval Infractions Event at Building 9204-2E*
- Y/DD-623, *Plan for Continuing and Resuming Operations*, October 1994

8.0 Deliverables

Team members will assist in the preparation of assessment reports, after the conclusion of their assessments. Each report will document the review of the performance objectives and identify any findings, observations, concerns, and/or noteworthy practices. These reports may contain corrective actions completed or proposed, along with implementation schedules. Appendix I, *Final Report Outline*, provides the suggested format to be used for development of the final report.

The Assessment Forms will provide the bases for the final reports. The Assessment Forms shall be completed and signed prior to the Team's final departure from the Y-12 site.

Glossary

Concern -- Any situation that is not in violation of any written procedure, but in the judgment of the Assessment Team member indicates less than optimal performance. A concern could be an indicator of more serious problems.

Finding -- A statement of fact documenting a deviation from an applicable Federal law, DOE Order, Standard, safety requirement, performance standard, or approved procedure.

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

Observation -- An issue that is not in violation of any written procedure or requirement, but in the judgment of the Assessment Team member is worthy of raising to the attention of site management in order to enhance overall performance.

Violation -- An operational issue, discovered during the Assessment, which may have existed for a period of time prior to the Assessment and is reportable under the site approved Occurrence Reporting System.

APPENDIX A

PROPOSED FACILITIES LIST

Y-12 BUILDINGS INVOLVED IN RESTART

The following is a preliminary listing provided by LMES of buildings involved in the Y-12 restart program. Any and all facilities at the Y-12 site under DP cognizance that continued operation or have been restarted are subject to this review.

RECEIPT, STORAGE AND SHIPMENT OF URANIUM

Entire Building

9720-5

Defined Areas in these Buildings

9204-2/2E
9204-4
9215
9998

Y-12 DEPLETED URANIUM OPERATIONS

Defined Areas in these Buildings

9201-5
9201-5N
9204-4
9212
9215
9996
9998

APPENDIX B

ASSESSMENT TEAM MEMBERS BIOGRAPHICAL SUMMARIES

FEDERAL ASSESSMENT TEAM

FEDERAL TEAM LEADER

DAVID CHANEY -- DOE HQ-DP (DEFENSE PROGRAMS)

Mr. Chaney is the Pantex Team Leader for the Office of Site Operations (DP-24), U.S. Department of Energy (DOE) Headquarters in Germantown, MD. He provides technical and programmatic leadership for the Pantex Team with responsibility for organizing work efforts, recommending the assignment of individuals, coordination and technical monitoring of contractor support of the Pantex Plant in Amarillo, Texas. He holds a B.S. in Systems Engineering from the U.S. Naval Academy, and MBA and Juris Doctor from the University of Miami. He has 25 years of Navy and commercial nuclear experience. His commercial nuclear experience includes positions as Corporate Director of Nuclear Licensing, Nuclear Station Engineering Manager, Director of Performance Assurance and in various project management areas. He has certification as a Senior Reactor Operator (SRO) from Westinghouse and as Engineer Officer in the Naval Nuclear Propulsion Program. Since joining DOE in 1992, he has been supporting various areas of DOE Defense Programs: the Office of Engineering and Operations Support, the Pantex Program Office and the Office of Site Operations. He lead the recent Pantex Conduct of Operations upgrade program, is the Defense Programs lead for the Nuclear Weapons Disposition Policy/Proposed Munitions Rule, and is the Weapons Components Team Co-Leader for the Materials-in-Inventory (MIN) Secretarial Initiative.

FEDERAL TEAM MEMBERS

CARL A. EVERATT

Mr. Everatt is currently the Director, Reactor and Spent Fuel Division at the DOE Savannah River Operations Office and has more than 12 years of nuclear experience. He was involved in the final stages of the startup of Florida Power and Light's St. Lucie Unit 2, the renovation and restart of the L-Reactor at SRS, and the restart of K-Reactor. Mr. Everatt has been a team member of the L-Reactor Operational Readiness Review, INPO evaluation team for Florida Power and Light's Turkey Point, and the conduct of operations assist team to Pantex. He has been responsible for the development of the K-Reactor facility representatives training and qualification program, SRS reactor operator peer evaluation certification program, safety analysis/technical specification development and implementation, and was a team member of the reactor seismic evaluation team. Mr. Everatt holds a Bachelor of Science in Nuclear Engineering.

JAMES E. GRISE

Mr. Grise is a Senior Executive Consultant with SMS Corporation. He holds a B.S. in Engineering and a MS in Marine Affairs. Mr. Grise has 36 years of experience in the engineering and nuclear fields. The first 29 years of his career were spent in the Navy, including 24 years in the Nuclear Propulsion Program. He spent six years as the Commanding Officer of two nuclear submarines. Post-submarine command tours included assignments in nuclear maintenance, operations, inspections, and training. As Commanding Officer of the Navy's largest afloat facility for nuclear plant repairs, he was responsible for the supply and repair of 13 submarines. In 1988, Mr. Grise retired from the Navy. Since that time, he has served as a consultant to the Department of Energy in the areas of training, inspection/appraisals, Operational Readiness Reviews (ORRs), and as a Conduct of Operations monitor at various facilities. He possesses expertise in most areas of nuclear operation and maintenance. His experience is particularly strong in training, management, and inspection/oversight. Additionally, Mr. Grise has three years of experience at Savannah River Site, one and one-half years at Rocky Flats, and two years at Los Alamos National Laboratory. Mr. Grise has participated in ORRs at K-Reactor, F-Canyon In-Tank Precipitation, and FB-Line at Savannah River Site. Additionally, he was at the Building 707 Corporate Operational Readiness Review at Rocky Flats, the Plutonium Facility Readiness Assessment at Los Alamos National Laboratory, and the Y-12 Readiness Assessment for Receipt, Storage, and Shipment (RSS) in the LMES management functional area at Oak Ridge.

EDWARD A. STAFFORD

Mr. Stafford is a Senior Principal Engineer with Stone & Webster Engineering Corporation. Mr. Stafford has more than 15 years of nuclear experience, including 11 years of supervisory, operational, and training experience in the commercial nuclear industry. His current assignment involves providing operations, technical, and training support to the DOE SR High Level Waste organization. His current responsibilities include reviews of safety basis documentation submitted for DOE approval, review of operational performance and conduct of operations (COO), development of assessment plans and procedures, development and presentation of Facility Representative (FR) training, and development of start-up validation and action plans for HLW facilities. Mr. Stafford provided technical support to the Director of the Reactors and Spent Fuel Division of DOE-SR under defined management assistance tasks. Job responsibilities included direct interface with the Defense Nuclear Facilities Safety Board staff, reviews of safety basis documentation submitted to the division for DOE approval, review of operational performance and COO, development and presentation of FR training, and development of assessment plans and procedures. During his assignments at DOE-SR, Mr. Stafford has participated in the K-Reactor Restart Task Force, Type B Investigations at the Defense Waste Process Facility and H-Canyon, two COO reviews of the Amarillo Area Office, the Savannah River Facility Representative Program Committee, and development of the "DOE Guidelines for Interface with the Defense Nuclear Facilities Safety Board." Mr. Stafford's prior commercial nuclear experience includes a Reactor Operator license and operating experience at a General Electric Boiling Water Reactor. He also had a Senior Reactor Operator License as well as construction, start-up, operating, and licensed operator classroom and simulator training experience at a Westinghouse Pressurized Water Reactor. During his assignments in licensed operator training, Mr. Stafford completed basic and advanced simulator instructor training courses presented by the Institute for Nuclear Power Operations. Mr. Stafford has a BA degree in Chemistry from the University of North Carolina.

DAVID C. STATES

Mr. States is an Operations Assessment Engineer with the Department of Energy. He holds a B.S. in Electrical Engineering from LeTourneau College (1985) and is a registered professional engineer. He has 10 years experience in nuclear reactor operation, engineering, training, maintenance, assessments, and testing. Mr. States spent seven years in the U.S. Navy as a nuclear trained officer, holding several supervisory

positions in the engineering department of a Navy nuclear submarine, and he completed qualification as a Navy Nuclear Engineer. Mr. States joined Digital Systems Research, Inc., in 1993 as a senior engineer to support the Office of Operations Assessment, EM-25. His responsibilities included performing assessments, developing and reviewing policy documents, and providing technical assistance to field offices. In January 1995, he joined the Department of Energy (EM-25) and became an assessment team leader. During the past two and a half years Mr. States has participated in more than 15 assessments/audits of EM and DP activities throughout the DOE complex. Throughout his career, Mr. States has been involved in the development and presentation of training to support engineering, security, and conduct of operations programs. He currently provides instruction to DOE Operations Office personnel on conduct of operations and conduct of radiological controls. His areas of expertise are conduct of operations, training, radiological controls, and nuclear reactor operation.

CONTRACTOR ASSESSMENT TEAM

CONTRACTOR TEAM LEADER

DANIEL B. BRANCH JR. -- KAISER-HILL, ROCKY FLATS

Mr. Branch works for Kaiser-Hill at the Rocky Flats Environmental Technology Site. He has been at Rocky Flats since 1990 and created the Independent Safety Review Program there. He has experience in quality assurance, conduct of operations, operational readiness reviews, and operations assessment. He has served as Deputy Assistant General Manager, Plutonium Production, and Deputy Associate General Manager Facilities Management and Operation. He created and managed the Mentor Program at Rocky Flats Plant and led the restart programs for Buildings 559, 707, 771. He has led Conduct of Operations and operational assessments at Pantex, the Mound facility and the Princeton Plasma Physics Laboratory. He has 30 years of experience in the U.S. Navy. Significant Navy positions included assignments as nuclear and conventional arms control policy advisor for the Supreme Allied Commander Atlantic, NATO HQ, Brussels, Belgium, and as a member of the High Level Task Force, NATO, which planned and started conventional arms control negotiations with the Warsaw Pact. He commanded a nuclear submarine and a major surface ship. He holds a B.S. from the U.S. Naval Academy and an M.S. from the George Washington University.

CONTRACTOR TEAM MEMBERS

JAMES W. ANGELO

Mr. Angelo is the Division Manager, Manufacturing with Mason & Hanger, Silas Mason Co., Inc. at the Pantex Plant. He is responsible for all Dismantlement Weapon Programs, and for all Evaluation Programs associated with Stockpile Stewardship for the enduring national stockpile. He is also responsible for Program Management, Waste Stream Management, Engineering, Transportation and Storage, Weapon Movement, and Safety Envelope for all facilities associated with manufacturing processes. He led the implementation of Conduct of Operations at Pantex, including the creation of the conduct of operations manual and establishment of the site mentoring group. He was a principal contributor to site restart following a maintenance standdown. He has more than 20 years of experience with the U.S. Navy, including command of a nuclear powered fast attack submarine. He holds a B.S. in Mathematics from the U.S. Naval Academy and an M.B.A. from the Rensselaer Polytechnic Institute.

DAVID BUTLER

Mr. Butler is the Department Manager for the Operations Support Mentor Department with Mason & Hanger, Silas Mason Co., Inc. at the Pantex Plant. He has been at Pantex since February 1994, and established the Mentor program to implement formal Conduct of Operations at Pantex facilities. He led the development of the Pantex Plant Conduct of Operations Manual. He has more than 22 years Navy Nuclear propulsion and submarine experience with various power plants, commanding USS Jack (SSN 605). He is experienced in formal conduct of operations and conduct of maintenance. He has experience as a nuclear engineering inspector, safety inspector, quality assurance officer, training and qualification certification officer, casualty and abnormal event drill coordinator and evaluator, and as a Personal Reliability Program Certification Officer. He holds a B.S. in Applied Mathematics from the U.S. Naval Academy and an M.S. in Computer Systems Management from the Naval Postgraduate School.

WILLIAM A. CONDON

Mr. Condon has thirteen years of nuclear power experience, consisting of Commercial Nuclear (eight years) and Government Nuclear (five years). Mr. Condon has held various positions of responsibility, including Core Design and Accident Analysis for Brown's Ferry Nuclear, Senior Reactor Engineer, and Shift Technical Advisor for Sequoyah Nuclear, Reactor Division Operations and Administrative Procedure Manager, K-Reactor Assistant Operations Manager, and Reactor Division Environmental Stabilization Manager. Mr. Condon is currently assigned as the Area Manager for the Receiving Basin for Off-site Fuels (RBOF) and the Reactor Facilities. In this position, Mr. Condon is directly responsible for assuring safety, disciplined operations, cost effectiveness, and continuous review of operations for compliance with applicable laws, regulations, orders, technical specifications, and procedures. Mr. Condon was instrumental in the implementation of the DOE Radiation Control Manual. He was also instrumental in the development and implementation of the Savannah River Site (SRS) Conduct of Operations Manual. Mr. Condon has an M.S. in Nuclear Engineering from the University of Tennessee, Knoxville.

GARY E. FRANCIS

Mr. Francis works for Kaiser-Hill at the Rocky Flats Environmental Technology Site. His experience includes extensive involvement in performance-based training, environmental and waste management compliance and assessment, transition management, and conduct of operations. He was the team leader for development of a DOE operational readiness review plan of action and implementation plan for Building 771, and the coordinator for the recovery of Building 771 from unauthorized tank draining. He is a senior mentor for conduct of operations, a member of the conduct of operations manual development team, and a member of the conduct of operations assessment team for Pantex Plant. He has 20 years of operational and technical management experience in the U.S. Navy, performing various duties on four nuclear submarines including as Engineer and Commanding Officer. He holds a B.S. from the U.S. Naval Academy and an M.S. in Nuclear Engineering from the Catholic University of America.

APPENDIX C

TASK #4

PERFORMANCE OBJECTIVES, REVIEW CRITERIA, APPROACH AND EXPECTATIONS FOR THE ASSESSMENT OF DOE ACTIONS REGARDING THE IMPLEMENTATION OF CONDUCT OF OPERATIONS AT Y-12

Note: The DOE has established two independent teams to evaluate the full COO Program at the Oak Ridge Y-12 Plant. This Assessment makes a representative COO evaluation of the specific implementation status of recently restarted Receipt, Storage, and Shipping (RSS) activities and the Depleted Uranium Operations (DUO).)

Performance Objective F-COO-1

DOE DIRECTION AND GUIDANCE

Performance Objective F-COO-1.1: DOE Order 5480.19 Direction

The requirements of DOE Order 5480.19 to be performed by the DOE have been effectively accomplished as was committed to by the implementation plan for DNFSB Recommendation 92-5.

Criteria:

DOE-HQ/ORO/YSO have provided clear direction, guidance, and assistance to the field to effectively institute Conduct of Operations (COO) at Y-12.

Approach:

a. Verify receipt of direction by ORO from HQ, by YSO from ORO, and by LMES from YSO on implementation of COO.

b. Verify approval of the LMES Y-12 implementation plan for DOE Order 5480.19 by DOE-HQ/ORO/YSO.

c. For HQ: Determine if direction and guidance to ORO for COO has been different from that issued to other Operations Offices (i.e., RFO, SRO, AL) that might affect implementation or rate of implementation of COO.

d. For HQ: Review correspondence on DOE Order 5480.19, applicable correspondence from HQ to the DNFSB on topics associated with COO, and any HQ trip reports forwarded to the field to ensure guidance and direction had been sufficient for field offices to implement elements of DOE Order 5480.19.

e. Determine if roles, responsibilities, and objectives in implementing and monitoring COO at Y-12 are defined, understood and complementary between DOE-HQ, ORO, and YSO.

f. Evaluate HQ and ORO direction, guidance, and assistance with regard to the YSO Facility Representative Program.

g. Evaluate by reviewing applicable documents and interviewing appropriate individuals who assist in program development and implementation. COO performance criteria are provided by DOE to both LMES and DOE field elements in DOE Order 5480.19.

h. Interview ORO and YSO management and staff to understand roles in implementing DOE Order 5480.19, the actions taken by YSO to affect implementation, and those interfaces with the contractor regarding DOE Order 5480.19.

Expectations:

a. DOE management policies are in place which define expectations for COO.

b. The YSO organization provides effective control of operations to ensure COO implementation such as through the Facility Representative program.

c. Interfaces between and within DOE organizations for COO are defined.

d. DOE has placed emphasis on program execution and has adequate documentation.

Performance Objective F-COO-1.2: Oversight Program

DOE-HQ/ORO/YSO management and staff have provided sufficient oversight to insure guidance and direction is carried out in each area of COO.

Criteria:

DOE is to ensure the adequacy and implementation of LMES' COO program by performing independent assessments in accordance with DOE Order 5700.6C.

(NOTE: The Implementation Plan for the DOE Readiness Assessment (RA) of Receipt, Storage, and Shipment (RSS) will also assess oversight issues. This assessment will include a review of the results of that RA and the resulting corrective actions.)

Approach:

a. Determine that a comprehensive, coordinated DOE oversight program exists and is effective in evaluating the contractor's plans, procedures, and programs for implementing COO. The program includes continuing evaluation of site wide safety culture.

b. Determine if DOE-HQ and ORO are active in Y-12 COO oversight by reviewing DOE audits, appraisals, evaluations, surveillance reports, etc., pertaining to COO in which HQ and/or ORO participated.

c. For HQ: Determine if the amount and type of oversight provided to ORO and YSO are different from that oversight given to RFO, SRO, or AL. If oversight differences exist, determine the effect those differences had on promoting good COO at the respective facilities.

d. Evaluate the YSO Facility Representative program in providing day-to-day oversight of COO, including occurrence reporting F-COO-3, by interviewing and observing Facility Representatives and reviewing a sample of their written observations.

e. Determine if independent DOE assessments, required by DOE Orders 5480.19 and 5700.6C, have been performed to evaluate: the effectiveness of LMES implementation of DOE Order 5480.19; the LMES training program for COO; and the ability of LMES to assess their own COO program.

f. Determine if the organization performing independent assessments has authority and freedom

from the line organization to carry out its responsibilities. Persons conducting independent assessments shall be technically qualified and knowledgeable in the areas assessed.

g. Ensure Performance Indicators are adequate, tracked and trended to improve performance.

h. Determine if YSO has implemented a management walkthrough program.

i. Determine if issues are developed, tracked, and closed.

Expectations:

a. YSO management effectively measures LMES' COO performance.

b. ORO measures the effectiveness of YSO oversight of COO.

c. HQ measures the effectiveness of ORO oversight of COO.

d. YSO supervisors and managers monitor operations to determine program effectiveness.

e. YSO management is involved in issue identification and resolution.

f. DOE has issues management programs which are effective aids to improve LMES COO.

g. DOE has a self-assessment program at all levels which provides information as to DOE's effectiveness in the implementation of COO.

Performance Objective F-COO-1.3: Corrective Action Program

DOE has a Corrective Action Program that evaluates problems to prevent recurrence.

(Note: This is a practical evaluation and will not duplicate efforts by 94-4 Task 6.)

Criteria:

DOE-HQ/ORO/YSO has reviewed past problems regarding implementation of DOE Order 5480.19 and actions taken to correct these problems considering similar actions at Rocky Flats, Pantex, LANL and Savannah River.

Approach:

a. Review documentation of past actions. Interview appropriate individuals from DOE-HQ/ORO/YSO to understand the intent of past actions. Determine additional actions that should or could have been taken that would aid in implementation of day-to-day COO into the working processes at Y-12. Consider lessons learned at K Reactor at Savannah River, Building 559 Rocky Flats, TA-55 at LANL, and Pantex.

b. Determine if DOE has supported LMES efforts to implement COO.

c. Determine if COO performance has been evaluated as part of the Award Fee process.

d. Determine if DOE and/or LMES have evaluated previous attempts to implement COO and developed new improved plans which have been effective.

Expectations:

a. The correction of COO deficiencies is a priority item for DOE HQ, ORO, and YSO.

b. Systematic efforts to improve COO performance exist, they have been evaluated, and they have been changed to be more effective.

c. DOE has a Corrective Action Program that effectively functions at all levels to evaluate problems associated with COO, to propose solutions, and efficiently implement proposed solutions.

Performance Objective F-COO-1.4: DOE Personnel Training and Qualification.

DOE personnel are properly trained and qualified to perform their oversight functions.

Criteria:

DOE-HQ/ORO/YSO have provided adequate support in training/qualification of DOE personnel in the area of COO and adequate numbers of competent people are available to support the oversight program.

Approach:

a. Review the Task #5 report on Technical Competence and follow-up on recommendations and noted deficiencies pertaining to COO which relate to DOE-HQ/ORO/YSO and the YSO Facility Representative (FR) program.

b. Review the final report of the DOE Readiness Assessment for RSS and follow-up on findings related to DOE qualifications/resources for COO.

c. Verify that there is a staffing plan and that there are sufficient DOE-HQ/ORO/YSO personnel assigned.

Expectations:

a. COO training is a priority for DOE.

b. DOE staff has been provided training to understand COO concepts.

c. *Roles and responsibilities* for personnel performing oversight of COO at the Y-12 site are clearly identified for DOE-HQ/ORO/YSO.

d. Oversight of COO is included as part of DOE-HQ/ORO/YSO management goals and personnel are evaluated on their performance toward these goals.

Performance Objective F-COO-2

DOE PARTICIPATION IN CORRECTION OF PREVIOUS ASSESSMENT DEFICIENCIES

Performance Objective F-COO-2.1: Procedure Improvement

The DOE Readiness Assessment (RA) for the resumption of RSS determined that there was a significant problem with the LMES procedure program. The RA recommended that the operating procedures be upgraded before use and that an improved document control process, which became effective during the RA, be evaluated by the DNFSB 94-4 COO assessment.

Criteria:

DOE-ORO/YSO effectively participated in the closure of the procedures related pre-start findings and approved the corrective action plan for the post-start findings and that procedure improvement is validated.

Approach:

a. Review the closure packages/corrective action plan, as appropriate, for the DOE RSS RA Findings PR1-1 and PR1-2. Verify that DOE ORO/YSO have taken necessary action and that personnel involved with this action have adequate plans to verify effectiveness.

b. Review the results of the DNFSB 94-4 LMES COO assessment of this area to determine if the new procedures program has been effective. Determine if DOE ORO/YSO assessments have come to similar conclusions.

c. Verify that the Facility Representatives are familiar with the LMES procedure process and have conducted performance-based assessments to verify improvement.

Expectations:

a. In use procedures have received required review, verification, validation and changes have been entered properly. This includes not only RSS procedures, but other in use procedures at Y-12. DOE personnel contacted understand the procedure process.

b. The corrective action program for the RSS procedures has been expanded to all appropriate Y-12 facilities. The new LMES procedure process is effective and is routinely assessed by the FR and DOE support staff.

Performance Objective F-COO-2.2: COO Findings

The DOE RSS RA determined that there were a number of deficiencies in the implementation of COO at RSS.

Criteria:

DOE-ORO/YSO have effectively participated in the closure of COO related findings from the DOE RSS RA. They have approved effective corrective action plans where appropriate. Generic implications for other Y-12 facilities have been determined and actions initiated as appropriate.

Approach:

a. Review closure packages and corrective action plans for DOE RSS RA Findings, as appropriate, and determine if ORO/YSO has effectively participated.

b. Verify that generic implications have been determined and if actions have been taken to assure Y-12 wide correction.

Expectations:

a. All COO DOE RSS RA findings have been properly closed or a plan of action developed as appropriate.

b. Actions have been initiated to make sure the DOE RSS RA findings which apply to other facilities are corrected.

Performance Objective F-COO-2.3: DOE-OR Findings

The DOE RSS RA determined that there were a number of deficiencies related to DOE ORO/YSO performance of their oversight function.

Criteria:

ORO/YSO have effectively participated in the closure of the DOE-OR related findings from the DOE RSS RA. They have developed effective corrective action plans where appropriate. Generic implications for facilities other that RSS have been determined and actions initiated as appropriate.

Approach:

a. Review closure packages and corrective action plans for DOE RSS RA Findings, as appropriate, and determine if ORO/YSO have taken effective action on identified deficiencies.

b. Verify that generic implications have been determined and if actions have been taken to assure Y-12 wide correction.

Expectations:

a. All DOE-OR findings from the DOE RSS RA have been properly closed or a plan of action developed as appropriate.

b. Actions have been initiated to make sure the DOE RSS RA findings with generic implications

have been identified for correction.

Performance Objective F-COO-2.4: Management Corrective Action Findings

The DOE RSS RA determined that there were a number of deficiencies in the LMES Corrective Action Program and the DOE verification of closure for RSS issues.

Criteria:

DOE-ORO/YSO have effectively participated in the closure of Findings from recent assessments at Y-12. They have approved effective corrective action plans where appropriate. Generic implications for other Y-12 facilities have been determined and actions initiated as appropriate.

Approach:

a. Review closure packages and corrective action plans for findings from recent assessments, as appropriate, and determine if YSO has effectively participated.

b. Verify that generic implications have been determined and if actions have been taken to assure Y-12 wide correction.

Expectations:

a. All recent assessment findings have been properly closed or a plan of action developed as appropriate.

b. Actions have been initiated to make sure recent assessment findings which have generic implications have been applied across Y-12.

c. The COO issues that were identified as a result of the DNFSB 94-4 Recommendation initiating event have been evaluated and the correction of the causal factors has been effective and validated by DOE.

Performance Objective F-COO-3

Occurrence Notifications and Reporting

Performance Objective F-COO-3.1: DOE ORO/YSO Involvement

DOE ORO/YSO involvement in the occurrence notification process and the Y-12 Site Emergency Response Organization is effective in ensuring uniformity, efficiency, and thoroughness of notifications to support fulfillment of DOE requirements consistent with DOE Order 5000.3B.

Criteria:

DOE ORO/YSO actively participate in the occurrence notification process in accordance with DOE Order 5000.3B.

Approach:

a. Verify appropriate DOE ORO/YSO personnel have been formally assigned to the Y-12 Emergency Response Organization and have received the required training.

b. Evaluate the effectiveness of the DOE ORO/YSO aspects of the Emergency Response Organization by interviewing personnel and reviewing a sampling of critiques from drills and/or actual events involving activation of the Emergency Response Organization.

Expectations:

a. Notifications of occurrences are properly executed within the DOE ORO/YSO organizations.

Performance Objective F-COO-3.2: Reducing Reportable Events

Occurrence Reporting at Y-12 is effective in reducing reportable events by effective correction of identified problems.

(Note: This is a practical evaluation and will not duplicate efforts by 94-4 Task 7.)

Criteria:

DOE-ORO/YSO actively participate in the Occurrence Reporting Process in accordance with DOE Order 5000.3B.

Approach:

a. Compare DOE daily reports, operations logs and Occurrence Reports over the past several months to determine effectiveness of the program.

Expectation:

a. Occurrences are properly reported and the trend of like occurrences is decreasing.

APPENDIX D

TASK #4

PERFORMANCE OBJECTIVES, REVIEW CRITERIA, APPROACH AND EXPECTATIONS FOR THE ASSESSMENT OF THE IMPLEMENTATION OF CONDUCT OF OPERATIONS AT Y-12 BY LMES.

(Note: The DOE has established two independent teams to evaluate the full COO Program at the Oak Ridge Y-12 Plant. This Assessment makes a representative COO evaluation of the specific implementation status of recently restarted Receipt, Storage, and Shipping (RSS) activities and the Depleted Uranium Operations (DUO).)

PERFORMANCE OBJECTIVE C-COO-1
Contractor Conduct of Operations Program

Performance Objective C-COO-1: The Conduct of Operations Program for the Y-12 Plant

The requirements of DOE Order 5480.19 have been adequately planned for implementation and will be of a level of quality required by today's performance standards complex-wide.

Criteria: The Conduct of Operations Program at the Y-12 Plant meets today's quality level expected within the DOE-complex. The Program should promote adequate Conduct of Operations performance when implemented.

Approach: a. Through interviews of workers and management and through direct observations of work activities in progress, evaluate the effectiveness of contractor management of, and involvement in, Conduct of Operations Programs at Y-12 Plant. The COO assessment will include an evaluation of all documentation showing management's ongoing involvement in conducting self-assessments in facilities.

b. Review the documentation relative to organizational structure and interview and observe management personnel to determine if the current and planned organizational structure provides for adequate Conduct of Operations ownership and management. The organizational structure documentation should also clearly define roles and responsibilities, as well as ensure that managers understand their responsibilities.

c. Review the Mentor Program contribution to improving Conduct of Operations in order to determine if suggestions for improvement can be provided.

d. Review the Training Program being conducted to improve Conduct of Operations in the facilities to determine if the Training Program is adequate based on experience at the other DOE facilities.

e. Evaluate the Site Conduct of Operations Implementation Plan to determine adequacy for achieving a quality program based on current standards, the graded approach, and experience at other DOE facilities.

f. Through documentation reviews, reviews of objective evidence of completed actions, interviews, and observations of activity in the facilities, assess the progress in Phase III and Phase IV activities involving criticality safety as defined in Y/AD-623, *Plan for Continuing and Resuming Operations*. This assessment will determine if progress has been adequate and the quality level is satisfactory.

g. Through documentation reviews, interviews of managers, and observations in the field, assess the adequacy of infrastructure programs in supporting satisfactory implementation of Conduct of Operations elements.

h. Through documentation reviews and interviews of managers, assess the adequacy of planned resources for implementing a quality Conduct of Operations Program based on experience at other DOE facilities.

l. Evaluate through direct observations and relevant record reviews, any special operations which might be ongoing at the Site during the period of the assessment to determine adequacy of Conduct of Operations practices.

j. Review the Procedure Program documentation, a sampling of procedures in facilities, and observe procedures being used for work and surveillance to determine the adequacy of the Procedure Program to support Conduct of Operations.

Expectations: Upon completion of Performance Objective C-COO-1, the Assessment Team should be able to determine if:

a. The Y-12 Plant Conduct of Operations Program as planned and being implemented will be sufficiently comprehensive.

b. The Y-12 Program will have adequate resources and adequate management involvement.

c. The Y-12 Program will meet today's DOE-wide standards for an adequate Conduct of Operations Program.

PERFORMANCE OBJECTIVE C-COO-2
Contractor Conduct of Operations Implementation in Operational Facilities

Performance Objective C-COO-2: Conduct of Operations Implementation

The quality level of implementation of DOE Order 5480.19 in facilities is adequate based on today's DOE-wide performance standards.

Criteria: The quality level of implemented elements of DOE Order 5480.19 in facilities meets today's DOE-wide performance standards based on the Assessment Team's experience with Rocky Flats, Pantex, and Savannah River Conduct of Operations Program performance.

Approach: a. Evaluate implementing directives and procedures for Conduct of Operations in facilities to determine adequacy of those documents.

b. Evaluate the facility implementation plans for facilities to determine if they are adequate to achieve a quality program based on current standards and the graded approach.

c. Evaluate the implementation status and quality of each applicable chapter of DOE Order 5480.19 in operating facilities to determine the percentage of implementation attained to date based on benchmarked programs. This evaluation will be accomplished through document reviews, interviews of managers and workers, inspections of Program element effectiveness in the facilities, and observations of work.

d. Evaluate ownership and understanding of Conduct of Operations elements, including formality and discipline of operations by facility managers and workers through interviews and observations of work and other activities in the facilities.

Expectations: Upon completion of Performance Objective C-COO-2, the Assessment Team should be able to determine the quality level of the implemented Conduct of Operations elements relative to benchmarked programs and to determine if:

a. Ownership and understanding of Conduct of Operations requirements by the work force are adequate based on today's standards.

b. Work is conducted according to Conduct of Operations requirements.

PERFORMANCE OBJECTIVE C-COO-3
Contractor Conduct of Operations Corrective Actions

Performance Objective C-COO-3: Corrective Actions Effectiveness

The corrective actions planned and accomplished by the contractor have been adequate and effective in addressing Conduct of Operations deficiencies.

Criteria: The corrective actions taken to date have been adequate and have been effective in implementing positive change in the work force in Conduct of Operations.

Approach: a. Review Conduct of Operations assessments, internal reports, evaluations, readiness reviews, root cause analysis, the Type C investigation, and other activities which included corrective actions to determine if objective evidence is on file for the completed corrective actions.

b. Evaluate by interviewing individuals and reviewing applicable documents in Approach item (a). Ensure that the breadth and scope of corrective actions taken and planned are adequate, based upon the root cause.

c. Verify through interviews of appropriate personnel that there has been appropriate and effective communication of the root cause to the work force.

d. Verify through document reviews, interviews, and observations of work and other activities in facilities that corrective actions completed to date have been effective in making positive changes in Conduct of Operations in the work force.

e. Evaluate corrective actions related to causal factors in the LMES Internal Report, *Evaluation of Criticality Safety Discrepancy Data*, to determine comprehensiveness and effectiveness of the actions taken by document reviews and interviews of workers in facilities.

Expectations: Upon completion of Performance Objective C-COO-3, the Assessment Team should be able to determine if:

a. Conduct of Operations corrective actions taken and planned are adequate based on the root cause.

b. Conduct of Operations corrective actions completed have been effective in improving work force performance.

APPENDIX E

ASSESSMENT FORMS

Assessment Form 1

Date:

Assessment Form 1 No.:
Review Area:
Responsible Individual:

I. Performance Objective:
(List the Performance Objective number and description from the Assessment Program)

II. Expectations:
(Provide the expectations for the Performance Objective as stated in the Assessment Program)

III. Review Criteria:
(Provide the criteria used for conducting the review.)

IV. Approach:
(List the procedures and documents reviewed, names and titles of personnel interviewed, references used, and evolutions observed.)

V. Discussion of Results with Basis:
(Document the results of the review in sufficient detail using both the review criteria and the expectation statement as guidance.)

Assessment Form 1

Date:

Assessment Form 1 No.:
Review Area:
Responsible Individual:

VI. Conclusion:
(Concluding statement based on the discussion of results. The statement should conclude whether the criteria of the objective was met.)

VII. Issues:
(List any issues identified as part of this review. All issues should also be documented on Assessment Form 2.)

Originator _____ Date _____

Approved _____ Date _____

Assessment Form 2

Date:

Assessment Form 2 No.:
Review Area:
Responsible Individual:

Finding -- A statement of fact documenting a deviation from an applicable Federal law, DOE Order, standard, safety requirement, performance standard, or approved procedure.
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.
Noteworthy Practices -- Practices that are notable and will have general application to other DOE facilities for the improvement of overall safety or performance.

I. Identification Section

A. Statement
(Provide exact wording of the potential or final Finding, Concern, Observation or Noteworthy Practice):

B. Information Requested
(List any information needed to further evaluate this item):

Assessment Form 2

Date:

Assessment Form 2 No.:
Review Area:
Responsible Individual:

II. Basis Section

For Findings, identify the related requirements (e.g., applicable DOE Orders, Standards or Review Criteria).
For Concerns, discuss how the situation results in less than optimal performance and is considered an indicator of more serious problems.
For Observations, identify the situation worthy of raising to the attention of site management and discuss how it will enhance overall performance.
For Noteworthy Practices, identify those practices considered notable and that have general application to other DOE facilities for the improvement of overall safety or performance.

A. Description of Basis:

B. Documents reviewed, activities performed, persons contacted (include titles):

Assessment Form 2

Date:

Assessment Form 2 No.:
Review Area:
Responsible Individual:

III. Approval Section (Signatures)

Originator _____ Date _____

Approved _____ Date _____

Suggested Corrective Action:

IV. Contractor/DOE Response
(Provide results of Contractor/DOE review with technical basis and references.)

Accepted By: _____ Date _____

APPENDIX F

LESSONS LEARNED FROM ROCKY FLATS BUILDING 771, PANTEX, SEQUOYAH FUELS CORPORATION, and LOS ALAMOS TA-55

APPENDIX F
LESSONS LEARNED FROM ROCKY FLATS BUILDING 771, PANTEX, SEQUOYAH FUELS CORPORATION, and LOS ALAMOS TA-55

The observations and lessons learned presented in this Appendix are from similar Conduct of Operations (COOP) and criticality safety events at Rocky Flats Building 771, the Pantex Site. the Sequoyah Fuels Corporation and Los Alamos TA-55. Summaries of the events and lessons learned are presented such that team members may determine applicability of the lessons learned at these facilities to the resumption activities at the Y-12 Plant. Team members should read the full assessment reports in order to gain a better understanding of the applicability of these lessons learned to the Y-12 Site.

ROCKY FLATS BUILDING 771 EVENT

On September 29, 2994, an incident occurred at the Rocky Flats Environmental Technology Site (RFETS) in Building 771. Operations personnel drained Tank 467 that contained 210 liters of solution with a plutonium concentration of 0.5 g/L into 54 four-liter bottles inside a glovebox. The process vacuum was left on for one hour to ensure complete removal of any remaining moisture in the tank and process lines. All personnel left the area except for one process specialist. Without authority or direction, the process specialist drained 5 liters of solution from the process line from Tank D973. The liquid was darker in color than the other solution drained from D467, which usually indicates a higher plutonium concentration. While the line was being drained, the foreman and production manager returned, witnessed the event, but did not stop the unauthorized activity. The three individuals diluted the solution among five four-liter bottles and falsified the entries on the glovebox nuclear material balance card. Several days later, the production manager had the unauthorized sample analyzed. The results indicated a concentration that violated the Nuclear Material Safety Limits for the glovebox. Upon notification of the event, the shift manager terminated nuclear operations in the building.

Examples of lessons learned from this event include the following:

- 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.

- 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.

- Rocky Flats was unable to maintain an effective authorization basis, thereby increasing the potential for an accidental criticality.

- There was a severe communications breakdown between management and workers.

- There was a large backlog of criticality safety evaluations requiring peer review and CSAs requiring review. Reviews were being conducted by CSEs with only a marginal knowledge of the operations.

- Operating personnel considered that their extensive process knowledge kept them safe despite such unknowns as tank stratification, valve leakage, etc.

PANTEX CONDUCT OF OPERATIONS ASSESSMENTS AND LESSONS LEARNED

Assessments were conducted during January 1994 to evaluate the Conduct of Operations practices at the Pantex Plant. One assessments was done to determine what additional actions should be taken within

DOE to aid in the implementation of the Conduct of Operations at the Pantex site. A separate team assessed the contractor's actions. An action plan was developed by the contractor to address the weaknesses identified and the recommendations of the assessment teams.

The DOE Assessment Team identified the following weaknesses:

- Facility Representatives were weak in the fundamental concepts and practical implementation of SARs, OSR requirements, and Basis for Interim Operation for facilities for which they were responsible

- Facility Representatives spent a significant portion of the field time assessing facility material conditions while assessments of ongoing activities were less evident. While the overall understanding of facility operations was judged to be adequate, the understanding of the operational details was not as evident.

- Facility Representatives did not demonstrate ownership of the occurrence reporting system. Despite a belief that the contractor was under-reporting, they did not challenge classifications on a daily basis or elevate unresolved items to DOE management.

Other issues included:

- The Facility Representatives have little experience in operations that are performed in a disciplined and formal manner.

- The qualification program for Facility Representatives was halted by AAO when management identified program problems. However, there were no corrective actions established.

- Training qualifications standards did not exist to define the program expectations nor provide a method for consistency and objectivity in evaluations.

- Inadequate resources are being utilized to develop and implement an oversight program.

- There was no written guidance for a daily routine for Facility Representatives and there was no written guidance for a systematic assessment program. No formal method for tracking closure of issues raised by Facility Representatives was noted.

- There was a lack of oversight of operations from DOE groups other than Facility Representatives.

The following are examples of the observations of the contractor assessment team:

- Most senior level, middle level, and lower levels of management had a shallow understanding of Conduct of Operations requirements and did not adequately understand the comprehensiveness involved in successfully implementing the Order.

- The concept of, and requirements for Facility Management needed to be formulated and promulgated.

- The Lockout/Tagout system had many deficiencies and needed strengthening.

- The RADCON program needed improvement.

SEQUOYAH FUELS CORPORATION

On January 4, 1986, one worker was killed and several injured when an overfilled cylinder of UF_6 ruptured during heating at the Sequoyah Fuels Corporation in Gore, Oklahoma. The accident occurred despite the fact that heating of overfilled cylinders was recognized as dangerous and company procedures prohibited the practice.

Review of the failure of Sequoyah Fuels Corporation also offered several significant lessons learned. Those of particular applicability to the Y-12 NCS program improvement activities include those centered on building a safety culture in which management and the workforce fully understand their regulatory environment. In particular, these include:

- A workforce culture that does not understand the need to conform to committed programs and procedures will erode regulator confidence and create a negative environment.

- Management and the workforce must believe in a safety culture that rewards compliance with established procedures. There must also be negative consequences for not supporting the safety culture.

- The safety culture must be based on absolute integrity and candidness by all employees. There must be an absolute mandate to be self-policing, to identify issues and problems, and to report violations and other information needed by regulators.

LOS ALAMOS DNFSB FINDINGS AND LESSONS LEARNED

On April 15, 1994, LANL management at TA-55 terminated normal operations within PF-4. Their actions followed two events caused by weaknesses in the implementation of OSR surveillance requirements. One involved the inoperability of the facility's diesel-driven fire pumps. Another event involved failure of an OSR surveillance regarding safe shutdown of the facility. These events emphasized deficiencies in the inadequacy of surveillance procedures, the failure of the technicians to perform surveillances, and the lack of notification of the facility management of the failure to meet surveillance acceptance criteria. LANL decided to continue the shutdown until tests intended to verify the surveillance requirements were assessed for their quality. The following items were identified as part of a DNFSB review of TA-55.

- The performance of a surveillance in support of OSRs revealed deficiencies in the verification that operations are conducted within the safety envelope.

  Several operating parameters found to be out-of-specification were not reported as such.

  The applicable procedures were not used. A checklist provided with a procedure was not filled out as required.

  The procedures were not written such that verbatim compliance was possible.

- Review of LANL TA-55 Order Compliance Self-Assessment revealed inadequacies in documentation of objective evidence of compliance.

  Requirements of DOE training Order 5480.20 were assessed as compliance based on the existence of a procedure with which the facility has not yet complied. This action delays consideration of corrective or compensatory measures for known noncompliances.

Compliance with some of the industry nuclear criticality standards required by DOE Order on criticality safety (5480.24) was based on previous assessments that actually indicated areas of noncompliance.

- Observation of a Cassini Line operation revealed deficiencies in the facility conduct of operations

  The work instruction used to change parts of the procedure appears to circumvent the normal review and approval process for procedure changes

  Critical steps requiring independent verification by a Quality Assurance Representative were signed off by the technician performing the step

- 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.

Additional lessons learned from similar events at other facilities can be obtained from a review of the Occurrence Reporting and Processing System (ORPS).

APPENDIX G

DNFSB RECOMMENDATIONS 92-5, 93-6, and 94-4
DNFSB Report on 94-4

RECOMMENDATION 92-5 TO THE SECRETARY OF ENERGY
pursuant to 42 U.S.C. § 2286a(5) Atomic Energy Act of 1954, as amended.

Dated: August 17, 1992

The changes in defense-related plans in the Department of Energy are beginning to have a profound effect on the activities directed to systematic upgrading of the conduct of operations at defense nuclear facilities, plans that have often been discussed between the Board and its staff, on the one hand, and members of your staff on the other.

The Rocky Flats Plant presents an excellent example of the major changes being made by DOE while reconfiguring the nuclear weapons complex. It had been planned that as the Rocky Flats Plant moved toward resumption of production of plutonium components of nuclear weapons, a succession of facilities would be readied for renewed operation, beginning with Building 559 (the analytical chemistry laboratory), and followed by Building 707 and then others. This process was to include systematic upgrading of the quality of operations in each case, including Operational Readiness Reviews by the contractor and by DOE to verify that the desired improvements had been accomplished by line management. Resumption of operations is now proceeding in Building 559, in accordance with this process and following the path proposed in your Implementation Plan for the Board's Recommendations 90-4 and 91-4.

You have announced, however, that in light of international developments, plutonium production operations will not be resumed at the Rocky Flats Plant, and future activities there will be confined to cleanup and decontamination of the site, decommissioning of some facilities and parts of others, and placing of some facilities and parts of others in a state of readiness for resumption of operations in the future in the event such a step should be needed. Thus for most facilities at Rocky Flats there is now a major change from the mission and activities previously planned and for which the Board's Recommendations and your implementation plans specific to the Rocky Flats Plant were to be applied, for those recommendations were predicated upon resumption of plutonium production.

At a number of other defense nuclear facilities, similar changes are taking effect. Many facilities are now scheduled for cleanout, shutdown, and decommissioning. Some are to be devoted to aspects of cleanup and decommissioning of sites and of facilities located within sites. Some are slated to be placed in a standby mode, available for restart at a later date if needed. Some are to be continued in operation either in reduction of the stockpile of nuclear weapons or in the maintenance of a reduced stockpile and improvement of its safety.

Some of these facilities have been inactive for long periods of time. Some are to become involved in operations that differ from past usage. Experience shows that when operations are resumed at a facility that has been idle for an extended period, or a facility is operated in a new mode, there is an above-average possibility of mistakes, equipment failures, and violations of safety requirements, that could cause accidents. We believe that special attention is needed at such times. The appropriate measures to be followed depend on

specific features of the facility, the nature of the planned campaign of use, and the long-term plan for the facility. For example, one needs to know if further campaigns are likely, of the same or different kinds; if the facility is to be decommissioned after the planned use; or if it is to be placed in a standby mode.

The Board has found, through experience at the Savannah River Sites and the Rocky Flats Plant and other defense nuclear facilities, that an extended period of time has been required at major facilities to develop an acceptable style and level of conduct of operations. Accomplishing the cultural changes you have required and meeting safety standards comparable to those required of the civilian nuclear industry remains an ongoing challenge. Major improvements have been necessary including development of configuration control, revised and acceptable safety analysis, revised Limiting Conditions of Operation derivative from the safety analysis, operating procedures consistent with the configuration and the safety analysis, and training and qualification of operators for the new mode of operation. Continued improvement has been sought by the Board.

The Board has been informed that DOE does not intend to devote equivalent time and resources to improving the quality of operation at a facility being restarted only for a short campaign or intended for use only in a short campaign in a different mode, but would on a cost-benefit basis use a graded approach, always being sure, however, to take whatever compensatory and other measures are needed to ensure the acceptable level of safety.

The definition and exposition of a graded approach as it is meant to be used in ordering the conduct of operations have not been provided. In discharging its responsibilities in the context of the new defense-related plans of the Department of Energy, the Board intends to carefully review future operations at defense nuclear facilities on a case-by-case basis, starting in each instance from the best information as to the intended future use of the facility. Any proposals to use special measures or controls to compensate for deviations from those ordinarily used to achieve high quality conduct of operations will be closely scrutinized.

Therefore, it is requested that as you decide the future status of individual defense nuclear facilities you inform the Board, designating which ones are to continue in operation and their mission, which are to be shut down for decommissioning within a short time period, which are to be used for an extended time period and then shut down for decommissioning, and which are to be moved to a standby mode (along with the schedule for this).

Regardless of the category, the Board believes that operation and maintenance of defense nuclear facilities in all modes should be in accordance with the Nuclear Safety Policy statement that you issued on September 9, 1991 as SEN-35-91, and the safety goals stated therein.

The Board also believes that, to the extent practicable, facilities that are to be shut down and decommissioned should be cleaned up, and hazards from radiological exposures sufficiently reduced that access can be made freely without need for precautions against radioactivity, and facilities meant for standby status should be placed in such a condition that sudden need to reactivate them would not subject a new operating group to unacceptable radiation hazards.

In furtherance of this view it is recommended that:

1. For defense nuclear facilities scheduled for long term continued programmatic defense operations or for other long term uses such as in cleanup of radioactive contamination or in storage of nuclear waste or other nuclear material from programmatic defense operations, the Department of Energy should institute a style and level of conduct of operations comparable to that toward which DOE has been working at Building 559 at the Rocky Flats Plant and the K-Reactor at the Savannah River Site, and which is at least comparable to that required for commercial nuclear facilities, addressing at a minimum the areas referred to above in connection with style of conduct of operations.

2. Where a facility, after a long period of idleness for whatever reason, is being readied for new use or reuse, special care should be taken to ensure that the line organization, both DOE and contractor, has the technical and managerial capability needed to carry out its responsibilities. Appropriate and effective Operational Readiness Reviews should be conducted by the contractor and by DOE before restart of the facility, to establish confidence that line management has provided satisfaction of safety requirements. Where national security requirements lead to urgent need to restart such facilities before necessary upgrades can be fully completed, compensatory measures should be instituted and their adequacy in ensuring the desired level of safety should be confirmed through appropriate independent review.

3. For facilities designated for the various other future modes of use (such as standby), DOE should undertake to develop specific criteria and requirements that ensure meeting the safety goals enunciated in your Nuclear Policy Statement (SEN-35-91). Accomplishment of these criteria and requirements by line management should be confirmed by appropriate independent review.

/s/

John T. Conway, Chairman

RECOMMENDATION 93-6 TO THE SECRETARY OF ENERGY
pursuant to 42 U.S.C. § 2286a(5) Atomic Energy Act of 1954, as amended.

Dated: December 10, 1993

The ongoing reduction in size of the stockpile of nuclear weapons and the related changes in the defense nuclear complex have a number of safety-related consequences. The Board has addressed several of its sets of recommendations to such problem areas, including 92-5, which concerned discipline of operations in a
changing defense nuclear facilities complex, and 93-2, which stated a continued need for capability to conduct critical experiments. We wish now to draw attention to the need to retain access to capability and capture the unique knowledge of individuals who have been engaged for many years in certain critical defense nuclear activities, in order to avoid future safety problems in these and related activities.

The first critical area requiring continued access to departing personnel is the disassembly of nuclear weapons at the Pantex site, an activity that will continue for a number of years. The second is the testing of nuclear explosives at the Nevada Test Site, an activity presently subject to a moratorium. However, the President, in establishing that moratorium, said that he has retained the possibility of later resumption of tests if that is needed, and that he expects the Department of Energy to maintain a capability to resume testing. In reaction to the recent Chinese underground test he has instructed the Department of Energy to take steps necessary to prepare for resumption, pending a decision as to whether further tests at the Nevada Test Site should be conducted.

A substantial amount of documentation exists on the design and safety aspects of nuclear weapons that will have to be dismantled at Pantex. This information is essential for the dismantlement program and is used in that program. Even so, the Board has pointed out that it is also important, for safety reasons, to involve individuals from the design laboratories of Los Alamos, Livermore, and Sandia in review of detailed dismantlement procedures and specialized procedures responding to problems encountered in the course of dismantlement. This practice has been initiated, and it has already been seen to be vital to safety assurance in the dismantlement program.

The design individuals from the laboratories most needed in connection with dismantlement of a specific weapon are those who had been active in the original design of that weapon. They are believed to possess information not recorded in documentation, such as reasons for specific design features, and personal knowledge of any problems that have arisen during design, fabrication, and stockpile life. Many of the remaining individuals with this background are being lost from the system, because of the University of California's recent retirement incentive, planned layoffs by contractors, and DOE downsizing and retirements. Some recent moves to prevent or discourage use of retired individuals as consultants compound the problem; they erect barriers that could prevent access to the needed expertise. Similar problems also arise in connection with maintaining capability for testing of nuclear explosives at the Nevada Test Site. On the assumption that the testing moratorium will continue, we foresee an impairment of capability to ensure the safety of

tests if national priorities call for resumption of testing at some future time. This impairment will occur both through reduction in competence that naturally follows when a highly skilled operation is not conducted over a long period of time, and through loss of skilled and experienced personnel. The loss of skilled personnel will be especially troubling because there has traditionally been a high degree of dependence on administrative controls for safety in testing of nuclear explosive devices at the Nevada Test Site. Proper exercise of these administrative controls requires considerable background in past methods of test emplacement and test conduct, and extensive institutional memory.

The Board recognizes the Department's efforts to develop a "stockpile stewardship" program focused to ensure the continued safety and reliability of fielded weapons, to ensure maintenance of laboratory development capability, and to ensure a limited production capability. Our areas of concern complement these necessary activities, but are focused instead on ensuring that capability is maintained to conduct testing operations safely if they must be done, and that all future dismantlement activities can be completed safely. Although it may be relatively straightforward to maintain these capabilities in the near term, ensuring their availability 5 to 20 years in the future may be very difficult.

In accordance with the above concerns, the Board makes the following recommendations:

(1) That a formal process be started to identify the skills and knowledge needed to develop or verify safe dismantlement or modification procedures specific to all remaining types of U.S. nuclear weapons (retired, inactive, reserve, and enduring stockpile systems). Included among the skills and knowledge should be the ability to conduct relevant safety analyses.

(2) That a similar formal process be started to identify the skills and knowledge needed to safely conduct nuclear testing operations at the Nevada Test Site, including the processes of assembly/disassembly, on-site transportation, insertion/emplacement, arming and firing, timing and control, and post-shot operations. Included among the skills and knowledge should be the ability to conduct relevant safety analyses.

(3) That a practice be instituted of reviewing the personnel losses at the nuclear weapons laboratories and the Nevada Test Site, as well as the losses of key personnel from DOE's own staff engaged in nuclear defense activities, to ascertain which of the skills and knowledge are projected to be lost through departure of personnel.

(4) That DOE and its defense nuclear contractors negotiate the continued availability (through retention, hiring, consulting, etc.) of those personnel scheduled to depart whose skills and knowledge have been determined to be important in accordance with the above.

(5) That programs be initiated to obtain from these expert personnel (and to record) the as yet undocumented anecdotal technical information that would be of value in augmenting the technical knowledge and expertise of successor personnel. This should be done either prior to departure of the retiring personnel or shortly thereafter.

(6) That procedures for safe disassembly of weapons systems be developed while the personnel with system-specific expertise on the original development of the weapons are still available. Likewise, analyses of the possibility of hazard from degradation of

remaining nuclear weapons with time should be expedited, while these individuals are available. In addition, the current participation of design laboratory experts in the safety aspects of disassembly of weapons at the Pantex Site should be strengthened.

(7) That a program be developed and instituted for maintaining expertise in operations key to safety of nuclear testing at the Nevada Test Site, to ensure that if testing is resumed at any future time, it can be performed with requisite safety. Possible components are those activities and experiments that would be permitted within limitations of treaties being discussed, for example: hydro-nuclear tests, backdrilling for isotopic analysis of residues from old shots, and exercises including steps in preparation for tests, up to actual emplacement.

(8) Given the loss of experienced personnel, that a determination be made as to whether traditional dependence on administrative controls to ensure nuclear explosive safety at the Nevada Test Site would be adequate and appropriate if nuclear testing should be resumed at a later time. It may be found necessary to develop an approach for ensuring nuclear explosive safety in the testing program that is less dependent on the performance of highly experienced personnel, such as through the use of engineered safeguards similar to those used in fielded weapons as part of the arming and firing, and timing and control systems.

/s/
John T. Conway, Chairman

RECOMMENDATION 94-4 TO THE SECRETARY OF ENERGY
pursuant to 42 U.S.C. § 2286a(5) Atomic Energy Act of 1954, as amended.

Dated: September 27, 1994

The Defense Nuclear Facilities Safety Board (Board) has issued a number of recommendations concerning formality of operations, including Recommendation 92-5, Discipline of Operations in a Changing Defense Nuclear Facilities Complex. In that recommendation, the Board stated that facilities scheduled for continued operations should develop a style and level of conduct of operations which is comparable to that achieved at commercial nuclear facilities. Recommendation 92-5 further noted that, prior to achieving an acceptable level of formality, major improvements were required in a number of areas, including safety analysis reports, limiting conditions of operation, and training and qualification of personnel.

The Board and its staff have been monitoring the Department of Energy's (DOE) efforts to implement an acceptable level of conduct of operations at the Y-12 Plant in Oak Ridge, Tennessee, which is scheduled for continued operations. The Board has forwarded a number of reports to DOE during the last two years indicating the existence of safety-related concerns regarding operations at Y-12. DOE and its operating contractor, Martin-Marietta Energy Systems (MMES), have taken some actions to correct deficiencies; however, a number of recent events have led the Board to the conclusion that more aggressive and comprehensive management actions are required to bring the level of conduct of operations at Y-12 to a satisfactory level.

The Board notes that during the past four months a number of violations of Operational Safety Requirements and other safety limits have occurred at the Y-12 Plant. Most recently, the Board's staff identified a substantial violation of nuclear criticality safety limits within a special nuclear material storage vault at Y-12. When the staff identified this deficiency to on-site personnel, including a senior MMES manager, an MMES nuclear criticality safety specialist, and one of DOE's facility representatives, immediate corrective actions that were required by Y-12 procedures were not taken. In fact, proper corrective actions were not taken until the Board's staff informed the DOE Y-12 Site Manager. Subsequently MMES curtailed a number of operations at the Y-12 Plant. Reviews of compliance with nuclear criticality safety limits at the Y-12 Plant revealed that a widespread level of non-compliance exists.

In its Annual Report to Congress (February 1994) the Board noted that personnel and procedures are complementary elements in implementing conduct of operations. The report stated, "The health and safety of the public and workers rest on a properly trained workforce accomplishing tasks in a formal, deliberate fashion in accordance with reviewed and approved procedures." In responding to the Board's Recommendation 93-6, Maintaining Access to Nuclear Weapons Experience, DOE is evaluating the impact of expertise presently being lost through ongoing staff reductions on their ability to perform nuclear weapons dismantlement at Y-12.

The Board recognizes that DOE and MMES management have begun taking aggressive actions to correct the specific problems of adherence to nuclear criticality safety limits, since the nuclear criticality safety occurrence referred to above. However, the Board believes that more remains to be done. Accordingly, the Board recommends that:

(1) DOE determine the immediate actions necessary to resolve the nuclear criticality safety deficiencies at the Y-12 Plant, including actions deemed necessary before restarting curtailed operations and any compensatory measures instituted. These actions should be documented, along with an explanation of how the deficiencies remained undetected by MMES and DOE (line and oversight).

(2) DOE perform the following for defense nuclear facilities at the Y-12 Plant:
   (a) An evaluation of compliance with Operational Safety Requirements and Criticality Safety Approvals (CSAs), including a determination of the root cause of any identified violations. In performing this assessment, DOE should use the experience gained during similar reviews at the Los Alamos plutonium facility and during the recent "maintenance mode" at the Pantex Plant.

   (b) A comprehensive review of the nuclear criticality safety program at the Y-12 Plant, including: the adequacy of procedural controls, the utility of the nuclear criticality safety approvals, and a root cause analysis of the extensive level of non-compliance found in recent reviews.

   (c) A comparison of the current level of conduct of operations to the level expected by DOE in implementing the Board's Recommendation 92-5.

   (d) Development of plans, including schedules, to address any deficiencies identified in the analyses conducted above.

(3) DOE evaluate the experience, training, and performance of key DOE and contractor personnel involved in safety-related activities at defense nuclear facilities within the Y-12 Plant to determine if those personnel have the skills and knowledge required to execute their nuclear safety responsibilities (in this regard, reference should be made to the critical safety elements developed as part of DOE's response to the Board's Recommendation 93-1).

(4) DOE take whatever actions are necessary to correct any deficiencies identified in (3) above in the experience, training, and performance of DOE and contractor personnel.

/s/

John T. Conway, Chairman

DNFSB Report on 94-4

John T. Conway, Chairman
A.J. Eggenberger, Vice Chairman
John W. Crawford, Jr.
Joseph J. DiNunno
Herbert John Cecil Kouts

December 21, 1994

The Honorable Victor H. Reis
Assistant Secretary
for Defense Programs
Washington, D.C. 20585

Dear Dr. Reis:

The Defense Nuclear Facilities Safety Board (Board) submitted Recommendation 94-4, Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant, to you on September 27, 1994. In preparing the Recommendation, the Board had the benefit of a report prepared by its staff. The enclosed report may be of use to you and your associates in preparing an implementation plan.

The Board has designated Mr. James McConnell of our technical staff to be available to provide any additional information DOE personnel may require. He can be reached at (202) 208-6479.

Sincerely,

John T. Conway
Chairman

c: The Honorable Charles B. Curtis, Under Secretary
Mr. Mark Whitaker, EH-6

Enclosure

ADHERENCE TO SAFETY REQUIREMENTS AND CONDUCT OF OPERATIONS AT THE OAK RIDGE Y-12 PLANT

This issue paper prepared for the Defense Nuclear Facilities Safety Board by the following staff members:

Wayne Andrews
Steve Krahn
James J. McConnell

September 27, 1994

ADHERENCE TO SAFETY REQUIREMENTS AND CONDUCT OF OPERATIONS AT THE OAK RIDGE Y-12 PLANT

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ADHERENCE TO SAFETY REQUIREMENTS AND CONDUCT OF OPERATIONS AT THE OAK RIDGE Y-12 PLANT

1. **Overview:** Proper conduct of operations is a key aspect of any integrated, systems engineering-based health and safety management strategy. The Defense Nuclear Facilities Safety Board (DNFSB) places a high level of attention on evaluating this functional area at the Department of Energy's (DOE's) defense nuclear facilities. This report describes the conduct of operations at the Y-12 Plant at Oak Ridge, Tennessee.

   Formal conduct of operations is a fundamental cultural approach in the nuclear industry that significantly lessens the likelihood of an inadvertent criticality excursion. Although Y-12 has made some improvements over the past two years, activities at the plant still do not comply with DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities. The DNFSB staff has identified many conduct of operations deficiencies during reviews at Y-12. The DNFSB has pointed out this fact to both DOE Oak Ridge and Martin Marietta Energy Systems (MMES) senior management.[1,2,3] Although the Y-12 management appears willing to change the existing operational culture, they clearly have not implemented the changes effectively.

   From June to September 1994, several violations of Operational Safety Requirements (OSRs) and other safety limits occurred at the Y-12 Plant. On September 22, 1994, the DNFSB staff identified several violations of nuclear criticality safety limits for special nuclear material storage vaults at Y-12. Because of these findings, MMES management made a decision to curtail Y-12 activities performed under Criticality Safety Approvals (CSAs). MMES also began a comprehensive site-wide review of compliance with all CSAs. In the first few days of this review, several hundred CSA noncompliances have been identified. The DNFSB staff believes this is a clear indication of an institutional culture that lacks the appropriate level of rigor and formality associated with conduct of operations.

   This report is based on the DNFSB's visits to Y-12, including visits by DNFSB staff and outside experts. It addresses conduct of operations and other closely related topics including safety requirements, training and qualification of personnel, and operational readiness reviews. The report identifies the various Orders, standards, and guidelines that are pertinent to these functions at Y-12. In addition, it summarizes the various DNFSB correspondence on these issues related to the Y-12 Plant.

2. **Discussion:** This section identifies the standards and requirements related to conduct of operations and criticality safety, describes the operations at the Y-12 Plant, and identifies the issues and DNFSB actions in these areas.

   a. **Assessment of Y-12 Operations Against Applicable DOE Orders, Guidelines, and Standards:** The Y-12 Plant processes and stores more highly enriched uranium (HEU) than any other site in the United States. Therefore, it is essential that Y-12 properly execute the conduct of operations and nuclear criticality safety functions. DOE Orders 5480.19, Conduct of Operations Requirements for DOE Facilities and 5480.24, Nuclear Criticality Safety are among the most important DOE standards describing necessary attributes of programs in these two functional areas.

      The DNFSB stated in its 1994 Annual Report to Congress that it has"... observed only limited progress toward implementation of [DOE Orders and other guidance

documents related to conduct of operations] at many facilities and has noted a general lack of understanding and commitment to the concepts set forth in DOE Order 5480.19 by DOE's managers and contractors."4 This statement was made regarding all DOE defense nuclear facilities, but could have been made more strongly if the DNFSB were describing the Y-12 Plant specifically. The following paragraphs will review DOE Orders 5480.19 and 5480.24 and cite only a sampling of examples where noncompliances have been observed by the DNFSB staff. The examples cited should not be considered all inclusive, but rather as representative of the DNFSB's observations at Y-12 over the last two years.

1. **DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities**

Chapter I: Operations Organization and Administration

States in part, "Investigations, audits, reviews, and self-assessments are a part of the checks and balances needed in an operating program." These inspections were not being done, at least not effectively. If they were, many hundreds of CSA noncompliances would have been identified previously and could have been corrected.

Chapter II: Shift Routines and Operating Practices

States in part, "Round inspection sheets should be developed and approved by the operations supervisor... Safety limits derived from Technical Specifications or Operational Safety Requirements should be highlighted." Recently, a DNFSB staff member observed a shift changeover in Building 9212. Neither the off-going operators nor the oncoming ones used a written checklist or procedure. This appeared to be the standard operating procedure for shift changeover. The shift changeover process did not include comprehensive safety limits in the form of references to CSAs, OSRs and/or Limiting Conditions of Operation.

Chapter XII: Operations Turnover

States in part, "Shift turnovers should be guided by a checklist...and should include an inspection of appropriate facility instrumentation." During a DNFSB staff-observed changeover, a staff member asked an oncoming supervisor what an illuminated "high temp" light meant. He stated, "I don't really know but since it's already been on for over a week, it probably doesn't matter."

2. **DOE Order 5480.14, Nuclear Criticality Safety:**

Paragraph 7a.(2)(b) states that programs for nuclear criticality safety shall satisfy the requirements of the following American National Standards Institute/American Nuclear Society ANSI/ANS nuclear criticality safety standards.

ANS-8.1, Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors, except paragraphs 4.2.2 and 4.2.3.

"4.1.4 Materials Control. Appropriate materials labeling and area posting shall be maintained specifying material identification and all limits on parameters that are subjected to procedural control." Many CSA noncompliances were a result of inappropriate or nonexistent labels and/or postings concerning fissionable material being stored.

"4.1.5 Operational Control. Deviations from procedures and unforeseen alterations in process conditions that effect nuclear criticality safety shall be reported to management and shall be investigated promptly." This was not accomplished during the original event -- it took almost an hour for proper actions to be taken.

ANS-8.7, Guide for Nuclear Criticality Safety in the Storage of Fissile Materials.

"4.1.2 Methods of storage control and operational practices approved by management shall be described in written procedures. Persons participating in the transfer and storage of material shall be familiar with these procedures. Limits for storage shall be posted." During a tour of Building 9212, the staff noted that limits were not posted on a storage array. In addition, operating personnel proved their lack of familiarity by being unable to find the CSA applicable to a particular HEU storage array.

ANS-8.19, Administrative Practices for Nuclear Criticality Safety.

"9.5 Control of spacing, mass, density, and geometry of fissile material shall be maintained to assure subcriticality under all normal and credible abnormal conditions." Although the intent of the MMES CSA process was, in part, to ensure the provisions of this paragraph were implemented, a fundamental unfamiliarity with the CSAs and poor conduct of operations allowed noncompliant events to take place.

b. **Description of Y-12 Operations**, Particularly Highly Enriched Uranium Processing: The Y-12 Plant has been the primary DOE site for the chemical and metallurgical processing of HEU since the beginning of the Manhattan Project. The following operations are conducted at Y-12.

1. Receipt and Preparation of Materials: Building 9212 can receive HEU in virtually any form possible including metal, alloys, oxides, fluorides, chlorides, sulfides, phosphates, and organics. The 'head-end' chemical processes in Building 9212 separate the HEU steams from some impurities. The output is an impure uranium-bearing nitric acid solution - uranyl nitrate hexahydrate [$UO_2(NO_3)_2$ $6H_2O$ suitable for purification in the extraction process.

2. Uranium Extraction: After any required pre-treatment in the head-end processes, the HEU product stream goes through a fairly standard chemical processing system.5 The extraction portion of the uranium processing system removes impurities from the HEU product stream. The input to this section is unpurified $UO_2(NO_3)_2$ $6H_2O$ and the output is highly purified $UO_2(NO_3)$n $6H_2O$.

3. Reduction and Conversion: This final phase of chemical processing in Building 9212 involves reducing the uranyl nitrate to an oxide and, if required, to a fluoride and then metal. The input to this phase is purified $UO_2(NO_3)_2$ $6H_2O$ and the output is either UO_3, U_3O_8, or uranium metal.

4. Parts Manufacturing Process: Enriched uranium feedstock is prepared in Building 9212 and cast into either part shapes or billets. Part shapes and billets are then transferred to Building 9215 for additional processing or final machining.

5. Assembly and Disassembly: Enriched uranium assembly and disassembly operations are concentrated in Buildings 9204-2 and 9204-2E. Components, including enriched uranium parts, are fabricated and/or procured and subsequently installed in capsule or canned subassemblies. Disassembly operations are divided into two groups, Quality Evaluation and Reclamation. Quality Evaluation involves the disassembly of weapons returned from the field and subassemblies selected from current production programs, both for evaluation purposes. Reclamation involves the disassembly of obsolete subassemblies to reclaim salvageable materials.

6. Interim Storage: Most of the U.S. supply of HEU in interim storage is at Oak Ridge. This material is stored primarily as metal but some is also stored as an oxide (predominantly U3O8). This material is stored in Building 9720-5 and in vaults and vault-type cages in other facilities at Y-12.

c. **Chronological Summary** of Recent DNFSB Reviews and Correspondence on Safety Issues at Y-12: The DNFSB's recent concerns at the Y-12 Plant focus on four major areas: 1) compliance with safety requirements, 2) conduct of operations, 3) training and qualification, and 4) operational readiness reviews. The following is a discussion of the facts and bases for these concerns at the Y-12 Plant.

1. Compliance with Safety Requirements: The DNFSB first raised the issue of safety requirements with DOE in Recommendation 90-2, Design, Construction, Operation, and Decommissioning Standards at Certain Priority DOE Facilities on March 8, 1990. In Recommendation 90-2, the DNFSB recommended that DOE identify the safety standards used to control defense nuclear facilities, assess their adequacy, and determine the extent of their implementation. The DNFSB followed up Recommendation 90-2 with Recommendation 91-1, Safety Standards on March 8, 1991, which asked DOE to strengthen its ability to implement a standards-based safety culture.

   The staff conducted a review to assess the implementation of Recommendation 90-2 and 91-1 at the Y-12 Plant in June 1992. That review identified several deficiencies in the implementation of the DOE standards program at Y-12 including failure to implement and assess compliance with DOE Orders such as 5480.21, Unreviewed Safety Questions, 5480.22, Technical Safety Requirements, and 5480.23, Nuclear Safety Analysis Reports, in a timely fashion. The review also noted concerns about the then draft DOE Order 5480.CRIT on criticality safety. On July 7, 1992, the DNFSB

issued a letter to the Secretary of Energy forwarding the staff's trip report for DOE action.6

On January 21, 1993, the DNFSB issued Recommendation 93-1 which included a sub-recommendation that DOE give priority to completing site-wide Order compliance self assessment (OCSA) reviews at facilities that assemble, disassemble, and test nuclear weapons, including the Y-12 Plant. In May 1993, the staff visited Y-12 to assess the OCSA program. The staff found that little had been done to address the issues raised in the DNFSB's 1992 letter and that most of the technical deficiencies persisted. As a result, the DNFSB issued a reporting requirement on June 8, 1993, requiring DOE to analyze both the 1992 trip report and the 1993 trip report (provided with letter) and describe the corrective actions planned.7 On August 31, 1993, DOE submitted a plan to improve the OCSA program at Y-12.8 This plan also became the Oak Ridge specific portion of the DOE Implementation Plan for sub-recommendation four of DNFSB Recommendation 93-1.

The DOE's schedule for improving its OCSA program at the Y-12 Plant extended over many months. In December 1993, the DNFSB staff visited Oak Ridge to assess progress on the schedule. Subsequently, the DNFSB issued a letter to the Secretary of Energy on December 27, 1993, complimenting the DOE on its efforts up to that point, but also suggested that more remained to be done.9

In April 1994, the DNFSB staff conducted another review to assess the OCSA program at Y-12. The staff found that, while most of the commitments from the DOE Implementation Plan for Recommendation 93-1 had been satisfied, the program still required significant upgrades. The staff noted that improvements were specifically required in the program to assess adherence to DOE safety Order requirements.

On August 23, 1994, the DNFSB forwarded six trip reports to DOE concerning staff reviews at Y-12 conducted since April 1993. One of those reports discussed a DNFSB staff review conducted at Y-12 on November 3-5, 1993.10 That report identified a concern with the definition of the authorization bases for facilities at Y-12 and suggested that Y-12 management review their criticality safety analyses.

Over the last few months there have been several occurrences at the Y-12 Plant that suggest a continued failure to comply with CSA/OSR requirements and other safety requirements. On June 28, 1994, the Y-12 Plant had an occurrence involving an over pressurization of the deuterium plant in Building 9805-1 caused by an explosive mixture of oxygen and hydrogen in four cells.[11] The MMES investigation of that occurrence identified two instances when different people noted indications requiring the plant to be immediately shut down and the building to be evacuated. Neither operator took the proper actions.

In an occurrence on July 13, 1994, a safety system in Building 9212 actuated when carry-over from an evaporator containing uranium solids activated a gamma detector.12 Three occurrences involving OSR violations followed this incident.[13,14,15]

On September 22, 1994, four members of the DNFSB staff (S. Krahn, J. McConnell, W. Andrews and T. Dwyer) identified an array of storage containers for nuclear device components in Building 9204-2E that violated the CSA for the vault-like cage in which they were stored.16 The staff then evaluated the other vault-like cage in the same immediate area and identified that dissimilar containers were mixed on the same pallet and arranged in various arrays. These arrays also violated the CSA (the same CSA applied to both vault-like cages.)[17]

After the DNFSB staff notified DOE management of the event, DOE and MMES began a comprehensive review of all CSAs at Y-12 and other sites operated by MMES under DOE Oak Ridge Operations Office purview. By Monday, September 26, 1994, DOE and MMES had identified 238 violations of CSAs, although none were more serious than a classification of a discrepancy that does not result in less than two contingencies remaining in place to prevent an actual criticality event. Maintaining double contingency (as defined in ANSI/ANS-8.1-1983, Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors) is a requirement of DOE Order 5480.24, Nuclear Criticality Safety.

2. Conduct of Operations: Formal DNFSB and Department of Energy interaction on the subject of conduct of operations (ConOps) dates from the DNFSB's first full-year annual report in 1991.18 That annual report described the DNFSB's view of disciplined operations, including the tie to safety analyses and requirements and the tie to personnel training and qualification.

On August 18, 1992, the DNFSB issued Recommendation 92-5, Discipline of Operations, which recommended that, for nuclear facilities scheduled for long-term continued programmatic defense operations (such as Y-12), DOE should institute a style and level of conduct of operations at least comparable to that required for commercial nuclear facilities.

In March 25, 1994, letter to DOE, the DNFSB noted that they had observed slow implementation of the DOE Orders pertaining to training and ConOps at Y-12. The report enclosed with the letter identified numerous problems such as inadequate procedures, lack of action to correct procedural violations, failure to follow safety-significant requirements of procedures, and lack of approved procedures for some operations. The letter went on to state:

> "The Board is forwarding the enclosed report to you for use by the Oak Ridge Operations Office during their review of MMES's revised [ConOps and training] implementation plans. The Board expects you and your staff to consider the systemic problems that are evident from the attached report during your assessment of the larger process of achieving

compliance with all DOE safety Orders at the Oak Ridge Y-12 Plant"(emphasis added).

The various occurrence reports noted previously also highlight inadequate ConOps. For example, the MMES report for the deuterium plant incident identified such problems as failure to follow the Class 1 procedure (i.e., a safety-significant procedure requiring verbatim compliance), failure to follow safety-related requirements, and failure to take logs or record required data.

In September 1994 CSA violation incident, the DNFSB staff identified the violation to the supervisor of the material handlers responsible for stacking the containers, a senior MMES manager and his deputy responsible for the facility in which the containers were stored, a criticality safety engineer, and the DOE Facility Representative. None of the supervisors or managers present took the proper actions required by the MMES procedure Y70-150, Nuclear Criticality Safety. Those requirements are: back away at least 15 feet, control the area (to prevent any physical changes), and notify Criticality Safety or the Plant Shift Superintendent. Only the Facility Representative even acknowledged that the conditions were a potential criticality safety violation (but he did not take the appropriate immediate action). DOE and MMES took the proper actions only after members of the DNFSB staff notified DOE Site Office Manager.

3. Training and Qualification: The DNFSB has consistently identified the lack of sufficient numbers of adequately trained personnel as one of the most significant safety-related problems at DOE's defense nuclear facilities.

On May 28, 1992, the DNFSB issued Recommendation 92-2, DOE Facility Representative Program, which recommended improvements in the training and qualification program for DOE Facility Representatives. On September 27, 1992, the DNFSB issued Recommendation 92-7, Training and Qualification, which addressed the need for DOE to increase senior management involvement in training issues. The Recommendation also stressed the need to accelerate plans at DOE nuclear facilities to implement the DOE Order on training and qualifying nuclear material handlers, supervisors, and support personnel. Recommendation 92-7 explicitly identified reviews at the Oak Ridge Y-12 Plant as providing part of the basis for the Recommendation.

On June 1, 1993, the DNFSB issued Recommendation 93-3, Technical Capability in the Defense Nuclear Facilities Programs, which identified the need for improved selection and training of federal employees involved in defense nuclear facility safety activities. This Recommendation became the blanket under which DOE planned to implement both Recommendation 93-3 and Recommendation 92-7.

The DNFSB sent a letter to the Secretary of Energy on September 24, 1993, forwarding three trip reports on training and qualification.19 One of those trip reports concerned the Y-12 Plant. In the cover letter, the DNFSB stated that "Observations from these visits have led the Board to focus considerable

attention on DOE's need to improve the selection, training, and qualification of personnel associated with the defense nuclear facilities, especially the weapons complex, on the premise that properly trained and qualified personnel are essential for the protection of public health and safety." The Y-12 Plant trip report enclosed with that letter identified numerous deficiencies with both the DOE Oak Ridge and MMES training and qualification programs.

On March 25, 1994, the DNFSB issued the results of a six-month study of training, qualification, and conduct of operations at Y-12 (see also Section 2 above).3 The report identified that the training and qualification program at the Y-12 Plant had retrogressed considerably over the span of the six-month study. The report stated that the MMES training and qualification program was informal and did not ensure that only appropriately trained and qualified operators were assigned to fissionable material handler duties. In response to the DNFSB staff's findings, DOE and MMES proposed corrective action plan to address the DNFSB's concerns. That program is being implemented but the schedule has been slipping.

During the occurrence of September 22, 1994, the DNFSB staff questioned the DOE and MMES escorts about the required actions for a suspected criticality safety infraction. The personnel all responded with technically satisfactory answers. However, they were unable to discuss the applicable CSA although it had been updated only 13 days before the incident. Additionally, the first criticality safety engineer who arrived at the scene was apparently unable to interpret the CSA.

4. Operational Readiness Reviews: The DNFSB has issued six Recommendations on Operational Readiness Reviews (ORRs) including: 90-4, 91-3, 91-4, 92-1, 92-3, and 92-6. As a specific deliverable of Recommendation 92-6, DOE developed an Order, 5480.31, Startup and Restart of DOE Nuclear Facilities and associated standard to cover ORRs and Readiness Assessments (RAs). In addition, the DNFSB has discussed ORRs in each of its last four annual reports. The DNFSB continues to provide clarification to DOE concerning the pivotal role the DNFSB believes ORRs play in verifying that nuclear activities are safe to start or restart.

   On March 24-25, 1993, the DNFSB staff conducted a review of the MMES ORR conducted to support the startup of disassembly operations conducted in Building 9204-2E. The staff found numerous deficiencies with the MMES process. Subsequently, the DNFSB issued a reporting requirement 20 requiring DOE to assess the MMES ORR process and to identify any required improvements. The DOE response dated June 10, 1993, identified many weaknesses with the MMES ORR process. The DOE committed that all future Y-12 Plant nuclear activity ORRs and RAs would be conducted according to DOE Order 5480.31 and the tenets of DNFSB Recommendation 92-6. MMES has not conducted any nuclear facility/activity ORRs or RAs since the DOE issued their June 10, 1993, response, although they have conducted non-nuclear startups (see below).

ADHERENCE TO SAFETY REQUIREMENTS AND CONDUCT OF OPERATIONS AT THE OAK RIDGE Y-12 PLANT

On December 17, 1993, approximately 1900 gallons of dilute sodium hypochlorite solution (NaOCl) leaked into a storm drain from a dike in Building 9204-2. One finding of the subsequent Type B Investigation was that MMES incorrectly concluded that an ORR was not required before restarting the process that resulted in the release.

The June 28, 1994, deuterium plant incident (discussed earlier) also involved an inadequate contractor RA for a non-nuclear start-up. The investigation report identified that the RA did not evaluate several core requirements of DOE Order 5480.31. These included a failure to check for adequate procedures and safety limits, a failure to ensure safety-related management responsibilities were well understood, a failure to adequately assess the level of conduct of operations, and a lack of a startup test plan. The deficiencies of the contractor's RA became obvious when the incident occurred just 25 hours after resuming operations.

3. **Summary and Conclusions**: Despite the DNFSB Recommendations, site specific reporting requirements, publicly-issued trip reports, and numerous staff reviews described above, recent events indicate that the personnel at the Oak Ridge Y-12 Plant still have not integrated several fundamental concepts supporting safe operations into their daily routines. These fundamental concepts include providing adequate procedures (based on safety analyses), ensuring the work force is properly formally. All these concepts are necessary in an integrated, systems engineering-based health and safety management strategy required for a modern DOE defense nuclear facility.

ADHERENCE TO SAFETY REQUIREMENTS AND CONDUCT OF OPERATIONS AT THE OAK RIDGE Y-12 PLANT

END NOTES

1. August 31, 1993 letter from the Honorable Hazel R. O'Leary, Secretary of Energy, to the Honorable John T. Conway, Chairman, DNFSB, Response to the June 8, 1993 Letter and Trip Report Regarding the Review of Implementation of DNFSB Recommendations 90-2 and 91-1.

2. February 28, 1994 letter from the Honorable John T. Conway, Chairman, DNFSB, to the Honorable Victor H. Reis, Assistant Secretary for Defense Programs, Report on Liquid and Gaseous Effluent at the Y-12 Plant, December 1-3, 1993.

3. March 25, 1994 letter from the Honorable John T. Conway, Chairman, DNFSB, to the Honorable Victor H. Reis, Assistant Secretary for Defense Programs, Staff Review of Training, Qualification, and Conduct of Operations Conducted at the Oak Ridge Y-12 Plant.

4. Defense Nuclear Facilities Safety Board, Annual Report to Congress, February 1994.

5. Benedict, Pigford, and Levi, Nuclear Chemical Engineering, McGraw-Hill, Inc. New York, 1981.

6. July 7, 1992 letter from the Honorable John T. Conway, Chairman, DNFSB, to the Honorable James D. Watkins, Secretary of Energy, Review of Implementation of DNFSB Recommendations 90-2 and 91-1.

7. June 8, 1993 letter from the Honorable John T. Conway, Chairman, DNFSB, to the Honorable Hazel R. O'Leary, Secretary of Energy, Review of Implementation of DNFSB Recommendations 90-2 and 91-1 and Radiological Controls at the Y-12 Plant.

8. August 31, 1993 letter from the Honorable Hazel R. O'Leary, Secretary of Energy, to the Honorable John T. Conway, Chairman, DNFSB Response to the June 8, 1993 Letter and Trip Report Regarding the Review of Implementation of DNFSB Recommendations 90-2 and 91-1.

9. December 27, 1993 letter from the Honorable John T. Conway, Chairman, DNFSB to the Honorable Hazel R. O'Leary, Secretary of Energy, Improvements in Compliance with DOE Orders at the Y-12 Plant.

10. Memorandum C.H. Keilers to G.W. Cunningham, Y-12 Safety Analyses/Criticality/Chemical Safety Review (November 3-5, 1993).

11. Occurrence Report ORO--MMES--Y12DEFPGM-1994-0013.

12. Occurrence Report ORO--MMES--Y12DEFPGM-1994-0015

13. Occurrence Report ORO--MMES--Y12DEFPGM-1994-0017.

14. Occurrence Report ORO--MMES--Y12DEFPGM-1994-0019.

15. Occurrence Report ORO--MMES--Y12DEFPGM-1994-0021.

16. Criticality Safety Approval FM-B2E-106, Stacked Fissile Container Storage (U), CSA is CONFIDENTIAL.

17. Occurrence Report ORO--MMES--Y12DEFPGM-1994-0022.

18. Defense Nuclear Facilities Safety Board, Annual Report to Congress, February 1991.

19. September 24, 1993 letter from the Honorable John T. Conway, Chairman, DNFSB, to the Honorable Hazel R. O'Leary, Secretary of Energy, Selection, Training, and Qualification of Personnel in the Defense Nuclear Complex.

20. April 21, 1993 letter from the Honorable John T. Conway, Chairman, DNFSB, to Dr. Everet H. Beckner, Acting Assistant Secretary for Defense Programs, Operational Readiness Review Process at the Y-12 Plant Building 9204-2E.

APPENDIX H

REFERENCES

APPENDIX H -- REFERENCES

The following reference list has been developed to assist the assessment team members in preparation for the assessments. Copies of these references are available in the assessment teams' work area.

- Compliance Schedule Agreements/Request for Approvals (LMES Implementation Plans for implementation of DOE Order 5480.19)
  - MMES/Y-12-DOE-5480.19-CSA-137B-Receipt, Storage, and Shipment (RSS)
  - MMES/Y-12-DOE-5480.19-CSA-147B-Depleted Uranium (DU)
  - MMES/Y-12-DOE-5480.19-CSA-85B-Sitewide
- DNFSB Recommendation 94-4, *Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant.*
- DNFSB Recommendation 93-6, *Maintaining Access to Nuclear Weapons Experience*
- DNFSB Recommendation 92-5, *Discipline of Operations in a Changing Defense Nuclear Facilities Complex*
- Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 94-4, *Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant,* February 1995
- Letter; V. Reis (DOE) to J. Conway (DNFSB), dated November 8, 1994
- Letter; J. Conway to V. Reis, dated December 21, 1994
- Lockheed Martin Energy Systems, Inc., *Management Self Assessment Report for Y-12 Nuclear Operations Receipt, Shipment, and Storage Mission Area*, August 18, 1995
- Memorandum; R. Poe to J. La Grone & G. Smithwick, dated October 13, 1994, "Determination of the DOE/ORO Role in the Y-12 Incident"
- Nuclear Facility Operations Safety Assessment Team Report Draft for Rocky Flats Environmental Technology Site, March 27, 1995
- Operational Safety Requirements, Buildings 9204-2 and 9204-2E, Revision 1 (or latest revision)
- Pantex Conduct of Operations Review
- Readiness Assessment by DOE for Resumption of the Receipt, Storage, and Shipment (RSS) Mission Area at the Oak Ridge Y-12 Plant, September 13, 1995
- Report (Draft) by DOE on the 94-4 Task 2 Assessment Team Evaluation of Y-12 Plant Operational Safety Requirements, Criticality Safety Approvals and Supporting Procedures
- Report by LMES Evaluations Group of Assessment of Y-12 Conduct of Operations, "Conduct of Operations Baseline Assessment", March 23, 1995
- The Initial Report of Martin Marietta Energy Systems Evaluation of the Oak Ridge National Laboratory, September 17-28, 1990

- Y50-66-CS-326, *Nuclear Criticality Safety Operational Review* (latest revision)
- Y50-66-CS-327, *Nuclear Criticality Safety Incidents* (latest revision)
- Y70-150, *Nuclear Criticality Safety* (latest revision)
- Y70-160, *Criticality Safety Approval System* (latest revision)
- Y70-01-150, *General Nuclear Criticality Safety Requirements -- Disassembly and Storage* (latest revision)
- Y70-37-19-071, *General Nuclear Criticality Safety Requirements -- Building 9215 Enriched Uranium Operations* (latest revision)
- Y/AD-622, *Type C Investigation of the Y-12 Plant Criticality Safety Approval Infractions Event at Building 9204-2E on September 22, 1994*, October 14, 1994
- Y/AD-627, *Mentor Program Description for Y-12 Resumption*, March 27, 1995
- Y/AD-630, *Lockheed Martin Energy Systems, Inc. Readiness Assessment Report for the Resumption of Receipt, Storage, and Shipment of Special Nuclear Materials at the Oak Ridge Y-12 Plant August 7-18, 1995*, August 22, 1995
- Y/DD-623, *Plan for Continuing and Resuming Operations*, October 1994
- Y/DD-669, *Nuclear Criticality Safety Management Plan for 1995 Resumption* (latest revision)
- Y/DD-679, *Preliminary Evaluation of the Y-12 Nuclear Criticality Safety Program, Criticality Safety Approvals, and Operational Safety Requirements Supporting Receipt, Storage, and Shipment of Special Nuclear Materials*, April 26, 1995
- Y/NO-00002, *Corrective Action Plan for the Y-12 Nuclear Criticality Safety Program, Criticality Safety Approvals, and Operational Safety Requirements Supporting Receipt, Storage and Shipment of Special Nuclear Materials*, May 1995
- Y/NO-00003, *Status of Conduct of Operations Program in Response to DNFSB Recommendation 94-4*, May 1995
- Y/NO-00006, *Use of Mentors as Compensatory Measures for COOP Requirements*, August 1995
- Y/NO-00007, *Compensatory Measures Related to CSA/OSR Implementation*, August 1995
- Y/NO-00008, *Closure Report for the Y-12 Nuclear Criticality Safety Program, Criticality Safety Approvals, and Operational Safety Requirements Supporting Receipt, Storage, and Shipment of Nuclear Materials*, August 1995
- Y/OA-6240, *Conduct of Operations Implementation Plan for Receipt, Storage, and Shipment*, March 1995
- Y-12 Site Office Documents
  - Y-12 Facility Representative Program

- Y-12 Site Office Annual Assessment Plan
- Y-12 Facilities Conduct of Operations Assessment Program Plan and Guidance
- Y-12 Site Office Restart Team (YSORT) Assessment of Receipt Storage and Shipment (RSS) Activities at the Y-12 Plant, August 24, 1995
- YSORT Assessment of Depleted Uranium (DU) Operations and Support Functions at the Y-12 Plant, September 26, 1995

APPENDIX I

FINAL REPORT OUTLINE

APPENDIX I -- FINAL REPORT OUTLINE

To the extent practical, all supporting information should be typed in WordPerfect format. Handwritten information such as relevant field notes from interviews or walkdowns, should be retained by the team members. The report will provide clearly defined technical bases for the conclusions, concerns, and findings. The following format is suggested for the final reports.

TASK 4 FINAL REPORT
(Separate Assessment Report for DOE and for LMES)

Executive Summary
- Assessment Purpose
- Major Conclusions
- Major Recommendations
- Summation

Introduction

Background

Assessments

- Performance Objective F-COO-1.1....-3.1 (C-COO-1....3)
  - Issues
  - Conclusions
  - Recommendations

Summary of Conclusions and Recommendations

Glossary/Acronyms

Appendix A -- Assessment Forms
Appendix B -- Reference Document List
Appendix C -- Biographical Summaries of Assessment Team

APPENDIX J

AREA ASSIGNMENTS FOR FEDERAL ASSESSMENT TEAM

Area Assignment for Federal Assessment Team

Member Name	Counterpart(s)	Area	Comments
Dave Chaney	Dale Christenson	COO Management	Federal Team Leader
Carl Everatt	Mike Miller (FR) David Wall (FR) Steve Wellbaum (RSS)	Facility Representative (FR) Program Rad Con Practices	
Jim Grise	Ken Ivey (RSS)	Organization Resource Management Procedure Program	HQ, ORO, & YSO HQ, ORO, & YSO
Ed Stafford	Mike Glasman (DUO)	Subject Matter Expert (SME) Program Drill/Casualty Response Program Control of Safety Envelope / Documentation	DOE and DOE/LMES
David States	Jeff Cravens (DUO)	Interfaces	HQ-ORO-YSO-LMES

APPENDIX K

Y-12 CONDUCT OF OPERATIONS ASSESSMENT SCHEDULE

Y-12 Conduct of Operations Assessment Schedule

NOTE: Special Operations will be observed by the Teams during the Assessment.

Monday, October 30, 1995

0730 — Teams arrive for badging / RadCon film

0815 - 0900 — Team Administration
- Security briefing
- Assessment forms
- Assessment drills / evolutions

0900 - 1200 — Entrance Meeting
- Welcome
- Introductions
- Presentations
  - Y-12 Overview
  - September 1994 Incident review
  - RSS and DUO Overview
    (Mission, Org, Current status of correcting deficient conditions which caused shutdown)
  - Site-wide COO Program and Site Implementation Plan
  - 10CFR835 implementation status
    (specifics for RSS & DUO)
  - Site CSA / Criticality Safety Operating Limits
    (Process control management with specifics for RSS & DUO)
  - Authorization Basis for RSS & DUO
    (include management and control within the facilities)

1200 - 1300 — Lunch

1300 - 1700 — Tours (2 groups: Federal & Contractor Assessors)

Projected Tour I	Projected Tour II
9204-4	9998
9720-5	9201-5/5N
9215	9996
9212	9204-2/2E

1700 — Combined Team Meeting
Debrief YSO and LMES on Assessment Path Forward

Tuesday, October 31, 1995

0730 - 1115	COO Program evaluation / Record review / Interviews
0730 - 1115	Evolution observation: SNM Movement between buildings
0730 - 1115	Evolution observation: DUO evolution
1130 - 1230	Lunch
1230 - 1515/1615	Continue COO Program evaluation / Record review / Interviews
1530	Federal Assessment Team meeting in Executive Dining Room
1630	Contractor Assessment Team meeting in Executive Dining Room

Wednesday, November 1, 1995

0730 - 1115	Continue COO Program evaluation / Record review / Interviews
1130 - 1230	Lunch
1230 - 1515/1615	Continue COO Program evaluation / Record review / Interviews
1230 - 1515/1615	Criticality Safety Recognition/Reporting Evolution (recognizing simulated criticality safety violations. Management to participate in scenario, after individual recognition exercises)
1530	Federal Assessment Team meeting in Executive Dining Room
1630	Contractor Assessment Team meeting in Executive Dining Room

Thursday, November 2, 1995

0730 - 0800	Federal Assessment Team meeting in work spaces
0730 - 0800	Contractor Assessment Team meeting in Executive Dining Room
0800 - 1130	Continue COO Program evaluation / Record review / Interviews
1130 - 1230	Lunch
1230 - 1515/1615	Continue COO Program evaluation / Record review / Interviews
1230 - 1515/1615	Spill Drill in RSS Facility (to include pre-evolution brief / post drill critique by Contractor)
1530	Federal Assessment Team meeting in Executive Dining Room
1630	Contractor Assessment Team meeting in Executive Dining Room

Friday, November 3, 1995

0730 - 1130	Continue COO Program evaluation / Record review / Interviews
0800 - 1130	Fire Drill in RSS Facility (to include pre-evolution brief / post drill critique by Contractor)
1130 - 1230	Lunch
1230 - 1515/1615	Continue COO Program evaluation / Record review / Interviews
1530	Federal Assessment Team meeting in Executive Dining Room
1630	Contractor Assessment Team meeting in Executive Dining Room

Saturday, November 4, 1995 (as needed)

0800 - 1630	Administration period Process Assessment Forms Compile Assessment Reports Compose Assessment Reports

Sunday, November 5, 1995 (as needed)

0800 - 1630	Administration period Process Assessment Forms Compile Assessment Reports Compose Assessment Reports

Monday, November 6, 1995

0730 - 1130	Continue COO Program evaluation / Record review / Interviews
0800 - 1130	Maintenance & Surveillance evolutions observation
1130 - 1230	Lunch
1230 - 1515/1615	Qualification and training records reviews for applicable RSS & DUO
1230 - 1515/1615	Continue COO Program evaluation / Record review / Interviews
1530	Federal Assessment Team meeting in Executive Dining Room
1630	Contractor Assessment Team meeting in Executive Dining Room

Tuesday, November 7, 1995

0730 - 0800	Federal Assessment Team meeting in work spaces
0730 - 0800	Contractor Assessment Team meeting in Executive Dining Room
0800 - 1130	Makeup COO Program evaluation / Record review / Interviews
0800 - 1130	Administration period Process Assessment Forms Compile Assessment Reports Compose Assessment Reports
1130 - 1230	Lunch
1230 - 1515/1615	Makeup COO Program evaluation / Record review / Interviews
1230 - 1515/1615	Administration period Process Assessment Forms Compile Assessment Reports Compose Assessment Reports
1530	Federal Assessment Team meeting in Executive Dining Room
1630	Contractor Assessment Team meeting in Executive Dining Room

Wednesday, November 8, 1995

0730 - 0800	Federal Assessment Team meeting in work spaces
0730 - 0800	Contractor Assessment Team meeting in Executive Dining Room
0800 - 1130	Administration period Process Assessment Forms Finalize Assessment Reports
1130 - 1230	Lunch
1300 -	Outbriefing / Exit Meeting in Executive Dining Room