Department of Energy
Washington, DC 20545

JUN

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

Dear Mr. Chairman:

The May 1996 deliverable called for in the Department's Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 94-4 is enclosed. The specific deliverable is Commitment 5.5, the Training Assistance Team's report assessing the technical competence of key contractor personnel supporting the Oak Ridge Y-12 Plant. The results and recommendations that came out of this assessment were briefed to the Department's 94-4 Senior Steering Committee on May 28, 1996.

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

Sincerely,

for Daniel Whaley

Thomas P. Seitz
Deputy Assistant Secretary for
Military Application and
Stockpile Management
Defense Programs

Enclosure

cc w/enclosure:
M. Whitaker, S3.1

Department of Energy
Washington, DC 20585

May 29, 1995

MEMORANDUM FOR Thomas P. Seitz
Deputy Assistant Secretary
Military Applications and Stockpile Support
Defense Programs

FROM: Thomas W. Evans
Technical Personnel
Program Coordinator

SUBJECT: Training Assistance Team Visit for Contractors at the Oak Ridge Y-12 Plant

The Training Assistance Team's report assessing the technical competence of key contractor personnel supporting the Oak Ridge Y-12 Plant is approved and enclosed. The report meets the Implementation Plan 94-4 deliverable required by Commitment 5.5.

Please distribute the report to the appropriate Departmental personnel for action in accordance with the requirements of Commitment 5.6 of the 94-4 Implementation Plan.

Enclosure

cc: Dan Rhoades
Roy Schepens

TP-96-0038

staff at (301) 903-4513

Sincerely,

for Thomas P. Seitz
Deputy Assistant Secretary for
Military Application and
Stockpile Management
Defense Programs

Enclosure

cc w/enclosure:
M. Whitaker, S3.1

TRAINING ASSISTANCE TEAM VISIT

FOR

CONTRACTORS

AT THE

OAK RIDGE Y-12 PLANT

May 6-10, 1996

Approved by:

Roy J. Schepens 5/13/96

Roy Schepens Date

Team Leader
U. S. Department of Energy

Tom Evans 5/16/96

Tom Evans Date

Technical Personnel Program Coordinator
U. S. Department of Energy

EXECUTIVE SUMMARY

A Training Assistance Team (Team) visited the Oak Ridge Y-12 Plant on May 6-10, 1996 to evaluate the technical competence of key contractor personnel supporting the Y-12 Plant. The Team visit was in accordance with the Department's Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 94-4, "Deficiencies in Criticality Safety at the Oak Ridge Y-12 Plant." The Team reviewed three functional areas: Organization Infrastructure, Current Staffing, and Training Organization and Administration.

Key contractor personnel observed or interviewed were technically competent and demonstrated an adequate level of knowledge to support current operations at the Y-12 plant. The recent assignment of a Y-12 Training Manager and a YSO Training Assistant has been positive and should result in improvements in Y-12 training. A majority of the issues discussed in this report were known by these two people. Progress has been made in developing long term improvements in training programs. However, the contractor has not complied with established schedules and agreements. Other weaknesses were also identified. Significant recommendations that will assist with correction of these noted deficiencies follow:

RECOMMENDATIONS

General

- Training programs should be revised from a procedure based system to a system which emphasizes system knowledge, interactions, and relationship to safety related processes.

- Management should quickly revise the training directives to more effectively provide sufficient guidance to implement the training programs at Y-12. This will allow standardization of training programs at the Y-12 Plant. The development of the training directives should have line management involvement and be approved by Senior Line Management.

- Include facility and process specific training at the appropriate level for those personnel who work in Y-12 nuclear facilities.

- Review the process to establish qualified and certified positions listed in the TIM. Ensure that the decision process includes a critical review of the job and task analyses associated with the position so that an accurate determination of qualified/certified positions results. It should be recognized that decisions made directly impact the safe operation of the facilities and also dictate the costs associated with the qualification and certification process.

- Establish a system to ensure senior managers are informed and line managers are held accountable for achieving Training Implementation Matrix (TIM) Integrated Project Plan (IPP) milestones.

- Training self-assessments should include more performance based evaluations and focus on level of knowledge.

- Establish effective continuing training and proficiency programs. Some organizations currently have credible programs. Benchmark the best programs for use in other areas of the site.

Enriched Uranium Operations (EUO)

- Develop a comprehensive training and qualification plan. This plan should include:

  defining the level of knowledge and skill requirements for operating personnel,

  defining a certification process in accordance with DOE Order 5480.20A,

  assembling technical documents to support development of training materials, and

  defining instructional staff qualification requirements.

- Evaluate the current number of operator positions to determine which operators handle fissionable materials in significant quantities to require certification.

- Develop a method to improve retention of radiological controls knowledge.

- Evaluate staffing levels against requirements to determine if sufficient competent resources are currently available. In addition, sufficient time must be made available for operators to participate in required training.

Facilities Management Organization (FMO)

- Training Requirements for FMO supervisory positions should be established and the TIM should be revised accordingly.

- Complete the development of training materials and implement training to meet the requirements of maintenance organization positions.

Health, Safety, Environment, and Accountability (HSEA)

- Include basic Industrial Hygiene (IH) and Industrial Safety (IS) training in the qualification programs for IH and IS personnel, especially at the technician level.

- Provide the capability for training managers to access and sort the ESAMS data base to facilitate the management of training issues which have been entered into ESAMS.

Center for Continuing Education (CCE)

- The Y-12 Training Manager should regularly provide training requirements and issues to CCE Senior Management. CCE Senior Management must be proactive in meeting the needs of the Y-12 Plant.

Site Shift Operations and Emergency Management/Energy Systems Protective Services (SSO/EM/ESPS)

- Develop and conduct training for Plant Shift Superintendents (PSS) and Fire Department personnel on the attributes necessary to safely operate OSR related systems.

Development Organization, Disassembly and Storage Organization, Depleted Uranium Operations (DEV/DSO/DUO)

- Complete the provisional qualification process for DUO personnel by obtaining the Qualification Verification Official signature in the qualification records.

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1.0 INTRODUCTION

The purpose of this Training Assistance Team visit was to provide observations, recommendations, and sharing of lessons learned that will ensure that key Contractor personnel at the Y-12 Plant possess the proper training and experience and can perform their required tasks in a formal, deliberate fashion in accordance with reviewed and approved procedures. The training programs were reviewed to determine if the training provided to personnel enhanced the ability of personnel to perform their job tasks and increased their understanding of facility processes. The team attempted, where possible, to provide lessons learned from the complex in areas of training and qualification. The Training Assistance Team concept, developed in response to Defense Nuclear Facility Safety Board (DNFSB) Recommendation 93-3, was used by the Team. The Team reviewed training in seven topical areas within the Y-12 Plant and the Center for Continuing Education (CCE). The Y-12 areas included:

(1) Senior management and training policy,
(2) Enriched Uranium Operations,
(3) Quality Organization,
(4) Facilities Management Organization
(5) Health, Safety, Environment, and Accountability Organization,
(6) Site Shift Operations and Emergency Management/Energy, Systems Protective Services, and
(7) Development Organization/Disassembly and Storage Organization/Depleted Uranium Operations.

2.0 BACKGROUND

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 describes a September 22, 1994, event in which members of the DNFSB staff noted discrepancies between the criticality safety approval 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, the department and contractor personnel failed to take appropriate corrective actions in accordance with site procedures. Following the event, the operating contractor, Martin Marietta Energy Systems, initially curtailed all nuclear operations at the Y-12 Plant.

DNSFB Recommendation 94-4 stated that reviews of adherence to nuclear criticality safety limits at the Y-12 Plant revealed a widespread level of noncompliance. The Recommendation also identified weaknesses in the criticality safety program relative to procedures, conduct of operations, and Department and contractor personnel experience, training, qualifications and

performance. In February 1995, Defense Programs (DP) issued the Department of Energy Implementation Plan for DNFSB Recommendation 94-4, "Deficiencies in Criticality Safety at the Oak Ridge Y-12 Plant". The Implementation Plan describes plans and schedules for the phased resumption of activities at the Y-12 Plant.

Technical competence, the fifth of eight implementation plan tasks, requires assessment of Federal and contractor personnel associated with safety-related activities at the Y-12 Plant. The assessment of Federal workers was conducted in August-September 1995. This report documents the assessment of contractor personnel and meets the deliverable required in Task 5 (Commitment 5.5) of the 94-4 Plan. This report provides recommendations for long-term improvements associated with technical competence of the Contractor Personnel at the Oak Ridge Y-12 Plant. A response to this report (corrective action plan) is due by August 1996.

3.0 ASSESSMENT OF CONTRACTOR WORKERS SUPPORTING THE OAK RIDGE Y-12 PLANT

Key contractor personnel observed or interviewed were technically competent and demonstrated an adequate level of knowledge to support current operations at the Y-12 Plant. The recent assignment of a Y-12 Training Manager and a YSO Training Assistant has been positive and should result in improvements in Y-12 training. A majority of the issues discussed in this report were known by these two people.

3.1 SENIOR MANAGEMENT/TRAINING POLICY

The Y-12 Plant training policies were reviewed and Senior Managers were interviewed to evaluate the effectiveness of the training program to produce technically competent personnel to conduct the operations of the Y-12 Plant. Senior managers of the Y-12 Plant were interviewed including the Vice President Defense and Manufacturing. Of particular interest during the review was the newly established Y-12 Plant Training Manager. Members of the DOE Y-12 Site Office (YSO) were also included.

While not a part of this review, the team noted the interest and activity displayed by the DOE staff relative to the contractor training and qualification program. These reviews indicated a continued oversight involvement that was detailed and thorough. DOE's effort to require the contractor to perform training management self-assessments is noteworthy. The reassignment of a training specialist to the DOE YSO staff to assist in contractor training oversight is commendable and has produced notable results. With this effort the contractor's performance has been improved. This effort should be continued and should focus on performance based observations of training evolutions and plant

activities to verify an adequate level of knowledge.

A review was conducted of the planned role of the newly assigned Y-12 Training Manager. The establishment of this position and assignment of an individual to that position was formalized on April 10, 1996 (less than one month ago). The position is designed to provide programmatic guidance and direction in all areas of training implementation at the Y-12 Plant. This person functions as the leader of the Training Working Group (TWG) which is comprised of the training managers from the 11 divisions at Y-12. It should be noted that while this group has the responsibility for training policy, the line managers (operations and plant) have the responsibility for the implementation and the effectiveness of the training in their areas.

The TWG is a necessary step in establishing an effective, efficient training support organization. This organization can provide the guidance, policies, and standards for the various divisions. Additionally, the training manager will provide a single point of contact for the customer as well as a focus of Y-12 Plant needs to the Center for Continuing Education. However, there are three attributes that this organization will require that cannot be confirmed at this early stage. These attributes are: 1) the ability to cause implementation of the developed policy, 2) inspection to determine if the policies are being followed, and 3) enforcement of these policies. Interviews with senior managers indicate they were aware of this concern and plan to enforce the recommended training policies.

The following are general issues identified during this review that apply to training policy or are applicable to more than one area reviewed.

- Y-12 is not meeting milestones established in the Integrated Project Plan (IPP) for the activities associated with the Training Implementation Matrix (TIM). Line management is not holding themselves accountable for ensuring that milestones are met. Senior management attention should be directed to ensure TIM commitments are met and that they are met according to the prescribed schedules of the IPP.

- Most training at Y-12 consists of training personnel on procedures vice training on system operation, interaction, and relationship for safe operation of the nuclear facility or process.

- Continuing training programs at Y-12 are not effectively established. Most programs consist only of repeating required safety/radcon training, pre-job briefings, and required reading. There is no effective facility significant training in place on a continuing basis. The limited use of the continuing training program will not

support requalification as permitted by the training orders.

- The method for establishing qualified and certified positions as promulgated in the most recent addenda to TIM revision 5 appears to be a comprehensive process for making decisions regarding these assignments. However, the system as established, leads managers to a most conservative approach. That is, there is a tendency to establish excessive numbers of qualified and certified positions. The system does not include a comprehensive review of the job and task analyses for these potential assignments. In most cases these job and task analyses have yet to be completed. Senior managers should look closely at this process to ensure that qualified and certified position assignments are based on the most accurate assessments of on-the-job requirements. It should be recognized that decisions made directly impact the safe operation of the facilities and also dictate the costs associated with the qualification and certification process.

- Proficiency procedures for certified positions have not been established in most organizations. These requirements are difficult to implement and require supervisory attention to ensure they are effective. Y-12 Plant Management should ensure these procedures are adequately implemented by assessing the process carefully after they are established.

- The record management staff in Building 9709 do not always receive direction from the parent organizations concerning the qualification/certification programs so that the records can be organized effectively. Some delays occur in the entering of record data. Staffing levels for this effort should be reviewed.

- Senior managers recognize the need to revise the Y-12 training directives. These directives currently do not provide sufficient guidance to implement the training program. The revised training directives should be approved by the line organization VP. Approval of the current training directives do not indicate involvement by the line organization. In addition, for order compliance purposes, a matrix can be developed to show how the revised procedure complies with the requirements within 5480.20A.

3.2 ENRICHED URANIUM OPERATIONS

The Enriched Uranium Operations (EUO) Training and Qualification program was reviewed against the requirements of DOE Order 5480.20A. Training plans and procedures, classroom and OJT materials, an OJT session, and exams were reviewed to determine the program's basis, emphasis, and rigor. Interviews with the Operations Training Manager, an Operations Manager, Shift

Manager, Shift Technical Advisor, Process Engineering Manager, operators and a DOE Facility Representative were conducted to ascertain the status and effectiveness of the training program.

The following observations were made:

The EUO training program is in a state of transition. The training procedures governing the development and implementation of the training program were recently approved as the Conduct of Training Manual. Although not fully developed, this manual provides more specific guidance than the Y90 procedures previously used and should provide a framework for consistent development and implementation of training using the Performance Based Training model. Some pivotal sections remain to be developed including oral examinations and oral boards, development of Qualification/Certification Cards and Standards, development and conduct of Operational Evaluations, training staff instructor qualifications, and pass/fail policies. Recent task specific training in support of "Special Operations" was accomplished using this manual and appears to be a significant improvement.

Personnel interviewed displayed a positive attitude, provided candid answers, and appeared sincere in their concern to resume full operations.

Historically, the training and qualification program was task based, and emphasized regulatory training and on-the-job completion of Performance Demonstration Checksheets (PDCs). Current plans call for emphasizing facility specific training and transitioning to process area qualifications. The Training Assist Team fully endorses this approach. It has the potential to offer increased operator versatility and related productivity, improved knowledge of integrated plant operations, and the potential for reduced operational costs.

The Resumption level of knowledge requirements for operators, supervisors, shift managers, production managers, and shift technical advisors are not well defined.

An approved Training and Qualification plan is not developed to integrate with other Facility Resumption initiatives to clearly define the pathforward to Resumption. Training and Qualification program descriptions are under development.

Few technical documents to develop process training materials are readily accessible and some that are available are not current.

Training material covering applied engineering concepts for the EUO facilities is not developed.

Facility operating personnel are not trained on the safety

envelope and bases.

The knowledge level of radiological fundamentals among facility operating personnel is weak.

Current plans call for all EUO operators to be certified resulting in a large number of certified operator positions and candidates. The Order states that personnel manipulating or handling significant quantities of fissionable materials, or manipulating the controls of equipment used to produce, process, transfer, store, or package significant quantities of such materials require certification.

About 75% of current operating personnel have completed basic reading and comprehension, and math initiatives.

Training staff technical qualification requirements are not defined. A sufficient number of technically qualified training resources are not on staff.

3.3 QUALITY ORGANIZATION

The Quality Organization was reviewed to evaluate compliance with DOE Order 5480.20A. Selected qualification records and Training Management System (TMS) printouts were examined to assess the completeness of the qualification process. Interviews with the deputy division manager, department managers, first line supervisors and quality technicians including radiographers and dimensional inspectors were conducted to determine the training relevance to assigned tasks, understanding of the training processes and level of knowledge. The Quality Organization Management Self Assessment (MSA) of the Y-12 Plant Quality Training Program, Report No. Y-96-1, approved April 30, 1996 was also reviewed.

Management personnel and supervisors interviewed were supportive of the qualification program and indicated that the training provided had enhanced the ability of personnel to perform their assigned tasks. The management personnel interviewed in the Quality Organization demonstrated ownership of the training and qualification programs for their assigned personnel. In some instances management had participated in training with quality inspectors, including On-Job-Training (OJT) training and classroom training. Supervisors typically aid the staff in learning job tasks prior to actual OJT to ensure successful completion. Managers have arranged for a local community college to provide technical courses. This aids inspectors in job performance and has resulted in personnel receiving college course credits when they successfully complete courses. The technical courses provided include Computer Aided Measurement and Analysis, Geometric Dimensioning and Tolerancing and Computer Assisted Coordinate Measuring. The participation rate in these

courses is more than 70%. Each of the managers interviewed demonstrated interest in the development of their assigned personnel.

The Quality Organization Management Self Assessment (MSA) had been completed less than one month prior to the Training Assistance Team visit. The assessment was adequate and only minor deficiencies were identified. However, future assessments should be more performance based and determine if the level of knowledge of personnel is adequate. Resolution of the deficiencies identified in the MSA should enhance the performance of the organization. After reviewing the MSA and completing the Training Assistance Team review it was determined that the Quality Organization implementation of DOE Order 5480.20A is satisfactory.

Managers interviewed demonstrated knowledge of DOE Order 5480.20A. Training is available for managers on the order.

Supervisors and inspectors were knowledgeable of requirements to verify qualification prior to performing job tasks and the methods for verifying completion of qualification requirements. Additionally, personnel were knowledgeable of requirements to maintain proficiency on qualified tasks.

Supervisors are included in the review and approval of training material for position specific training.

3.4 FACILITIES MANAGEMENT ORGANIZATION (FMO)

The Facilities Management Organization (FMO) training and qualification programs were evaluated using the guidance of the Training Assistance Team Program for Key Contractor Personnel at the Oak Ridge Y-12 Plant. This review was accomplished in company with a representative of the FMO training organization. Selected qualification records and Training Management System (TMS) printouts were examined to assess adherence to FMO requirements and the completeness of the qualification process. Interviews were conducted with managers, general supervisors, first line supervisors, maintenance technicians, and support engineers to determine each individual's understanding of the training processes and to assess the level of competence. FMO training documentation and procedures were evaluated against the requirements of DOE Orders 4330.4B and 5480.20A.

The FMO contains three groups including Utilities Operations, Defense Programs Maintenance, and General Plant Services. Of these groups, the Utilities Operations organization qualification program is the most mature. Qualifications are defined for all stations and assigned to individuals.

To better define current qualification status of the various

maintenance groups, the FMO training organization developed a set of personnel to task matrices. These matrices provide an excellent management tool for the prioritization of training resources and activities.

The FMO Training and Qualification program personnel, as outlined in the FMO Training Development and Administrative Guide (TDAG), have developed a complete set of job task requirements. There is no agreement as to how these requirements are to be aligned to develop individual position qualifications. The TIM developed to implement the program is not accurate and several of the established commitments have not been met. Specific deficiencies which led to these observations are:

- There are no personnel who meet the TDAG qualification requirements for the supervisory positions listed in the TIM. Qualification was based on incumbency only, hence no training or qualification enhancement was realized for these individuals. While additional supervisor requirements were identified in the TDAG, these have not been added to specific individuals' qualification requirements. Additionally, training programs have not been identified or developed to allow supervisors to meet all these requirements;

- The needs analysis results presented in the TDAG have not been evaluated to fit specific task requirements to the needs of the FMO organization. Poor communication between management elements of the FMO organization has contributed to a poor understanding of the path forward for achieving qualifications in the maintenance organizations. The qualification requirements that will be established for a given position have not been agreed to by all levels of management;

- The majority of craftspersons and First Line Supervisors (FLS) do not have a good understanding of what they need to do to achieve qualification or to meet staffing (task qualification) needs for their work group. Qualification card development currently occurs well into an individual's training process, consequently training takes place which is not directly focused towards achieving qualification for specific assigned tasks. Additionally, interviews indicated that most supervisors have not directed craftspersons to complete task qualifications based on work group needs;

- The contractors method of compliance with TIM requirements was to establish a "composite man." This is a group of individuals which in aggregate, met all requirements for one position's qualifications as

defined in the TIM and TDAG. The "composite man" is not defined in the TIM and the concept has not been agreed to by DOE to meet the qualification agreements contained in the TIM; and

- Some of the guidance outlined in the TDAG is not being followed. For example, Section III.H. requires that a Qualification Checklist be maintained for each facility position identified for qualification; that a hard copy of the qualification records associated with each facility is maintained for each trainee by the trainee's supervisor; and that qualification records are entered into TMS by the FMO Training Department.

3.5 HEALTH, SAFETY, ENVIRONMENT, AND ACCOUNTABILITY (HSEA)

The Training and Qualification Programs for the Health, Safety, Environment, and Accountability Organization were assessed by reviewing the training processes, sampling records and interviewing selected management and staff personnel in the following Departments: Nuclear Criticality Safety (NCS), Radiological Control (RC), Facility Safety (FS) including Fire Protection (FP), Industrial Hygiene (IH), Industrial Safety (IS), and Nuclear Material Control and Accountability (NMC&A). A portion of a practical exercise in radiological controls in the requalification training evaluation of personnel qualified as Radiation Workers II was observed. The maturity of the training programs, their compliance with requirements of external directives and internal procedures, the effectiveness of qualification procedure requirements, and the self-assessment of these training processes were evaluated by sampling records and conducting interviews with HSEA personnel.

There have been significant and major efforts to develop a formalized, systematic approach to training and qualification in the HSEA Organization in the recent past. The programs in the NCS, RC, NMC&A, and FP Departments are satisfactory. IH and IS Department's technical job specific qualification requirements are weak. These weaknesses are:

- IH technician training was generally limited to Procedure Document Checklists (PDCs) related to sampling equipment operations and did not provide for the technical industrial hygiene training of personnel entering into IH qualification.

- IS qualification requirements were limited to compliance-type training such as General Employee Training and Rad Worker II training. No OSH requirements were specified for the training of personnel entering a qualification program as is appropriate, especially for new hires without IS

experience. OSH courses were included in continuing training.

Self-assessment of the HSEA Training Program was ineffective. The routine involvement of HSEA management and senior training personnel in this assessment process is not evident.

Facility or process specific training is not required in most of the organization's training and qualification programs reviewed.

Training and Qualification records maintained at Central Records were sampled and found to be incomplete. Departmental Qualification records were more complete than those maintained at Central Records.

Various student course assessment forms appear to be in use, but they are different from the forms specified for use in Training Procedure 90-70.

Conclusion: Additional effort is required to bring HSEA into compliance with DOE 5480.20A using a graded approach, as appropriate.

Amplifying detail and additional comments are provided as follows:

- The "Training and Qualification Implementation Guide for the Y-12 Plant - Health, Safety, Environment, and Accountability Organization" requires that Medical Documentation and signed resumes be contained in the qualification records maintained at Central Records. This was not done for any of the seven HSEA records reviewed at Central Records. Additionally, the completion of qualification was not recorded at Central Records for these people in their specialty, such as RC Technician (RCT). When these RCT records were reviewed for these personnel in RC training offices, completion of this qualification was recorded. It is noted that qualification records were maintained at both Central Records and at Radiological Control and Industrial Hygiene Offices. Other local departmental qualification records were not reviewed.

- During the review of training records at Central Records, it was noted that the periodic retraining or requalification dates for compliance training had been missed in several instances. This observation plus reports during interviews indicate that the Training Management System (TMS) is not being used effectively as a management tool to help insure required retraining/requalification efforts are being accomplished on time. Additionally, one mid-level manager reported he did not have access to TMS when such access could actually help him do his job.

• Although there is some self-assessment effort of the training in HSEA, these efforts were not very extensive. They were programmatic in nature rather than assessing the actual effectiveness of training provided. An undated and unsigned RC self-assessment reviewed was purely programmatic in that it only compared the requirements of DOE 5480.20A with Y-12 documentation. A separate HSEA management self-assessment was conducted, but the status of promulgation of the results of that assessment are not known and the depth of the assessment was limited. In June of 1995, a self-assessment of NMC&A was conducted. Sixteen concerns were identified. Corrective action plans for these concerns were not promulgated until March 1996.

• In order to assess the use of Energy System Action Management System (ESAMS) in managing training issues at Y-12, it was requested that a printout of ESAMS training issues be provided. Two days after this request was made, no printout could be provided, although efforts to do so were reported ongoing. This indicates that ESAMS is not an effective management tool for use in the training area since senior training personnel are not able to access and sort the type of information that should be useful to them in working to improve the training at Y-12.

• Although the continuing training program for Radiological Controls did not meet the prescribed time requirements (40 hours) for 1995, a program to recoup the missed time is ongoing. More importantly, the content of this continuing training program appeared well balanced and included fundamentals training, equipment specific training, and lessons learned amongst other topics. It is also appropriate to positively note that the Manager, Radiological Controls has, himself, conducted technical training for his staff.

• Training is scheduled according to training availability rather than by scheduling training based on prioritization by job schedules and job-task analysis.

• Minimum entry-level requirements for students are not based on job analysis.

• It was reported by the HSEA Training Coordinator that there is a shortage of manpower for training.

• There is a lack of developed training material.

• Feedback such as ORPS, Lessons-Learned, Weekly DOE Safety Bulletins, is not routinely fed into the courses.

• There is no central listing of training activities to aid in coordinating training.

- Continuing training schedules are not available for all departments.

- There is a lack of training in fundamentals specific to each job.

- NCS plans to establish an intermediate level of criticality training for Operations to be able to recognize trivial occurrences and correct them without having to call NCS. This is worthwhile but must be carefully done to maintain a satisfactory level of safety.

- Currently there is no systematic method for assuring that regulatory changes and technological changes are incorporated in training.

- One IH Technician reported qualification to sample asbestos and lead contamination. The qualification record did not support completion of the lead monitoring instrument PDC. IH training management personnel stated the individual was not qualified for lead sampling.

- IPP Milestone 1.3.3 in the TIM specifies that qualified personnel are to requalify every two years. "Training and Qualification Implementation Guides for the Y-12 Plant - HSEA Organization" (4/29/96 - paragraph VIII. B.) states, "In HSEA, requalification is required only for Radiological Control Technicians and their supervisors." The HSEA implementation guide is not in compliance with the TIM.

- The posted dress-out requirements used in Rad Worker II practical training are different from those posted in the Y-12 nuclear facilities.

3.6 CENTER FOR CONTINUING EDUCATION

Interviews and document reviews were conducted to determine whether the CCE organization had the requisite knowledge, skills and abilities to perform its assigned functions and to ensure effective implementation and control of training activities. Fifteen interviews were conducted with CCE core staff and other selected team members. Documents reviewed included the operating plan, the strategic plan, records management procedures, 38 staff resumes and training histories, lesson plans, assessment/evaluation criteria and training catalogs. The review included attendance at the CCE Performance Measurement Team meeting, demonstration of expert training and records management systems and a visit to the Learning Center.

CCE is organized into Institutes which manage direct service to Y-12, K-25, and the Corporate organizations. Communication between the CCE and sites is maintained by a Site Training

Coordinator responsible for interfacing with Division Training Managers to identify training needs, and to resolve issues and concerns. The CCE Y-12 Site Training Coordinator attends the Y-12 Training Working Group meetings. An additional CCE staff member supports the Y-12 Plant Training Manager as the TIM scheduler. This level of communication appears to be adequate to resolve most process-related training issues at the working level.

CCE personnel have adequate education and experience to perform their current duties. CCE has a broad range of expertise and experience due to the integration of four separate training groups in 1994. Academically, the staff possess 16 Masters degrees, 65 Bachelors degrees and 8 Associates degrees. Four staff members are pursuing Doctorates. Over one third of the staff has commercial or navy nuclear experience in operations and/or training. There is an on-going instructor's training program to maintain and improve instructor qualifications. Over one-third of the staff are "Q" cleared and available to conduct training or provide other services on-site. CCE has demonstrated expertise in the development and delivery of "generic" training. The staff are under-utilized in such areas as the application of the graded approach, procedures writing, site/facility specific training, benchmarking and "Just-in-Time" training.

CCE has developed a systematic approach to control of training activities, training materials and assessment. The Operating Manual (Y/CCE-0041) clearly delineates roles and responsibilities within the Center and provides internal operating procedures in support of personnel training, work processes, document keeping and a Core Team Charter. The Charter establishes CCE as the central training policy maker, coordinator of DNFSB related training activities and provider of technical expertise in design of programs. The manual links the Center's Strategic Plan, the Training Plan and Critical Success Factors. The TMS records system has been designed with several safety checks to ensure records are accurate and controlled. The TMS Configuration Board also provides advice and guidance concerning improvements to the system. Y-12 has a representative on this Board. Critical Success Factors developed to measure trainee evaluation of training materials, content, and instructor performance are reported monthly. At Y-12's request, CCE has provided two assessments using the LMES Nuclear Facility Training Program Self-Assessment criteria.

For the period 10/1/95-4/26/96, each institute has provided the following person hours of training to Y-12:

Leadership Training- 7,637
Health, Safety and Environmental Training- 74,732
Skills Training- 5,526
Technical Assistance- 5,949

CCE and Y-12 management have several unresolved issues related to the scheduling of training, the timeliness of training records input, and the CCE services available to Y-12. Scheduling difficulties appear to be caused by the lack of attention to staff qualification expiration dates and Y-12 staff availability for training. Records management issues revolve around the timeliness of entry of records into the system and the ability to use TMS effectively.

Observations

- Senior CCE management and Y-12 senior line management have not been aggressive in resolving training issues.

- Additional expertise within CCE is under-utilized in such areas as dissemination of lessons-learned regarding application of the graded approach, implementation of the graded approach, assistance with training program development, procedures writing, benchmarking of training programs, job/task analysis and "Just-in-Time" training.

- CCE has not formalized a process to collect Senior management comments on performance.

- Y-12 has not fully utilized the CCE Self-Assessment Program.

- Positive Comments

  (1) CCE's LMES Nuclear Facility Training Self-Assessment Program and guidelines is a useful product;
  (2) CCE's Performance Measurement program is more advanced than many within the DOE complex; and
  (3) CCE has received several Awards of Excellence from industry peers recognizing excellence in program content, operations and Computer Based Training.

3.7 SITE SHIFT OPERATIONS AND EMERGENCY MANAGEMENT/ENERGY SYSTEMS PROTECTIVE SERVICES

The training and qualification program for the Plant Shift Operations, Emergency Management analysts, and Fire Protection personnel was reviewed against the requirements of DOE Order 5480.20A and the guidance contained in DOE Standard DOE-STD-1070-94, Guidelines for Evaluation of Nuclear Facility Training Programs. The review focused on training program content as it relates to the safe operation of the Y-12 plant and consisted of record review, interviews with the respective managers, interviews of qualified Plant Shift Superintendents, and observation of Fire Department personnel conducting an Operational Safety Requirement (OSR) related surveillance.

Site Shift Operations

The Plant Shift Superintendents are responsible for conducting surveillances on the Criticality Accident Alarm System (CAAS) (OSR related equipment) to determine operability of the systems.

A task analysis was available for review for the Plant Shift Superintendents. The analysis had been drafted several years earlier but was never validated. Tasks concerning operation and surveillance of the Criticality Accident Alarm System (CAAS) were not included in the task analysis. The task-to-training matrix to support the analysis was incomplete. A draft qualification standard was available for review. However, the relationship to the task analysis was unclear. Many items included in the qualification standards could not be related to the task analysis. The qualification matrix presented for review consisted of a list of completed courses, most of which are general training and radiological controls training. The training that had been conducted on OSRs and OSR related systems consisted of training on the procedures associated with conducting the surveillances and did not include training on the systems.

Some OJT is conducted during the PSS qualification process. Documentation of the completed OJT and its relationship to the job analysis requires improvement.

A final oral board is conducted for PSS candidates.

Two PSSs were interviewed to determine the effectiveness of the training program. Both could describe the basic operation of the CAAS. Both had significant weaknesses in applying radiological controls aspects to their duties. Examples include:

Neither PSS was aware of the isotope or strength of the source used to conduct the CAAS surveillance;

One PSS did not know the annual limit for whole body exposure;

Neither PSS knew the definition of a radiation area or contamination area.

Observations:

The training and qualification program for the Plant Shift Superintendents has not been fully implemented in accordance with DOE Order 5480.20A. Most identified training is general in nature and does not include sufficient OSR related system training.

Fire Department

The Fire Department is responsible for conducting surveillances on Fire Protection systems identified as OSR related systems to determine operability of the systems.

A task analysis was available for the Fire Department personnel. However, it was drafted several years ago and has not been validated. Tasks concerning operation and surveillance of the OSR related fire protection systems were not included. A task-to-training matrix was not available. Qualification standards and qualifications cards were not available. A detailed plan to develop these items was reviewed. Completion of this plan should result in a qualification program that meets the DOE Order 5480.20A requirements. Scheduled completion is December 1996. This should be easily achievable if efforts concentrate on those aspects that affect the safe operation of Nuclear Facilities as described in DOE Order 5480.20A.

A Training Assist Team member observed the Fire Department conduct an annual surveillance of an OSR related fire protection system. The surveillance was conducted in accordance with Y50-51-FO-005. The pre-evolution brief was adequate. Some weaknesses were noted:

> Not all personnel participating in the evolution attended the briefing. Specifically, the PSS was not in attendance.
>
> The operation of the system and the impact on the affected facilities was not discussed in adequate detail.
>
> A checklist was not utilized to ensure appropriate topics were discussed at the briefing.

The procedure was completed satisfactorily. A significant delay occurred because of confusion with the PSS about whether the facilities would actually be evacuated when the alarm activated. The confusion may have been avoided had the PSS attended the briefing. The procedure was completed, and appropriate procedure compliance was observed during the surveillance.

One problem was noted with the procedure. Step VII.D.15 requires measuring the length of time it takes for the solenoid operated valves (SOV) to open to allow flow of priming water. Two SOVs are installed. It is unclear whether both SOVs must operate in the required time or whether one is acceptable. This was discussed with the Fire Chief who stated he would pursue the issue. Detailed training on the system could aid in identifying similar problems during the procedure review and approval process.

The training and qualification program for Fire Department

personnel has not been implemented in accordance with DOE Order 5480.20A. Most training currently identified is general in nature and does not include sufficient training on operation of OSR related systems.

Emergency Management

A review of the training program for Emergency Management analysts was conducted. The training program consisted of basic job analyses for the analysts and the knowledge, skills, and abilities necessary to conduct their assignments. Inclusion of the analysts in the 5480.20A training and qualification may be inappropriate since the analysts do not appear to conduct operations that affect the safety of nuclear facilities. The checklist included in the appendix to the Y-12 TIM was reviewed to determine how the analysts were included. The reviewer had determined that the analysts provided technical support to operations personnel in Step 8 of the checklist. The Training Assist Team believes this interpretation of DOE Order 5480.20A requirements needs further review to preclude excessive numbers of personnel being included in the nuclear operations training and qualification program. Excessive numbers of qualified/certified positions dilute the training effectiveness and diminish the resources available to train and qualify personnel that do affect the safe operation of nuclear facilities.

3.8 DEVELOPMENT/DISASSEMBLY AND STORAGE/DEPLETED URANIUM OPERATIONS

The Training and Qualification Programs of the Development Group (DEV), the Quality Evaluation (Q/E) area of the Disassembly and Storage Organization (DSO), and the Depleted Uranium Organization (DUO) were reviewed in company with the respective training coordinators. Selected qualification records and Training Management System (TMS) printouts were examined to assess the completeness of the qualification process. Interviews with Division Managers, process operators, and technical support personnel were conducted to determine understanding of the training processes and to assess the level of competence. A training lecture on Conduct of Operations was attended to evaluate the effectiveness of classroom training.

DSO training programs were the most complete as they have been thoroughly scrutinized during two past Readiness Assessments for Receipt, Storage, and Shipment (RSS) and Disassembly/Assembly (D/A). The Q/E Organization has not yet undergone a readiness assessment, however they have taken the lessons learned from the remainder of the DSO readiness assessments and incorporated them within their training and qualification programs. The training and qualification programs for Q/E are effective. Discussions

with Q/E personnel responsible for ensuring the proficiency of certified positions revealed that they had not yet developed administrative procedures to document the completion of proficiency. A classroom lecture on the emergency preparedness aspects of conduct of operations for selected DSO personnel was attended. The lecture was formally conducted and had good training benefit. Attendees were interested and participated extensively in the training.

Training and qualification programs for DUO have undergone recent reviews in support of a contractor readiness assessment and this area has resumed operations. There are a number of activities in DUO which are not yet operational. A provisional qualification program has been completed for most positions within DUO. However, the qualification records lack the signature of the Qualification Verification Official documenting completion of this provisional qualification program. Training and qualification programs in DEV are still being developed. Job and Task analyses are planned in the near future. Training support personnel in DEV have a good understanding of the requirements they are soon to implement.

The following observations are made concerning the state of qualification and training programs for the DSO, DEV, and DUO Organizations at the Y-12 Plant:

- There are no procedures for maintaining proficiency for persons certified in Quality Evaluation (Q/E)

- The Development Organization has a good way of keeping track of recurring training requirements. Their administrative matrix is a good technique for use throughout other departments at Y-12.

- Q/E training and qualification records are maintained in an excellent manner and fully support the documentation of the attainment of qualification and certification.

- DUO qualification records are incomplete because the Qualification Verification Official has not signed qualification records indicating that personnel have completed provisional qualification.

- The continuing training programs in DEV and DUO are not effective. They only require that personnel participate in recurring safety/radcon training, attend pre-job briefs, and do required reading. There is no evidence that the continuing training programs are used to document training on new procedures, lessons learned, or other operating experiences. The limited use of the continuing training program will not

support requalification as permitted by the training orders.

4.0 RECOMMENDATIONS

General

- Training programs should be revised from a procedure based system to a system which emphasizes system knowledge, interactions, and relationship to safety related processes.

- Management should quickly revise the training directives to more effectively provide sufficient guidance to implement the training programs at Y-12. This will allow standardization of training programs at the Y-12 Plant. The development of the training directives should have line management involvement and be approved by Senior Line Management.

- Include facility and process specific training at the appropriate level for those personnel who work in Y-12 nuclear facilities.

- Review the process to establish qualified and certified positions listed in the TIM. Ensure that the decision process includes a critical review of the job and task analyses associated with the position so that an accurate determination of qualified/certified positions results. It should be recognized that decisions made directly impact the safe operation of the facilities and also dictate the costs associated with the qualification and certification process.

- Establish a system to ensure senior managers are informed and line managers are held accountable for achieving TIM IPP milestones.

- Training self-assessments should include more performance based evaluations and focus on level of knowledge.

- Establish effective continuing training and proficiency programs. Some organizations currently have credible programs. Benchmark the best programs for use in other areas of the site.

EUO

- Develop a comprehensive training and qualification plan. This plan should include:

  defining the level of knowledge and skill requirements for operating personnel,

defining a certification process in accordance with DOE Order 5480.20A,

assembling technical documents to support development of training materials, and

defining instructional staff qualification requirements.

- Evaluate the current number of operator positions to determine which operators handle fissionable materials in significant quantities to require certification.

- Develop a method to improve retention of radiological controls knowledge.

- Evaluate staffing levels against requirements to determine if sufficient competent resources are currently available. In addition, sufficient time must be made available for operators to participate in required training.

FMO

- Training Requirements for FMO supervisory positions should be established and the TIM should be revised accordingly.

- Complete the development of training materials and implement training to meet the requirements of maintenance organization positions.

HSEA

- Include basic Industrial Hygiene and Industrial Safety training in the qualification programs for IH and IS personnel, especially at the technician level.

- Provide the capability for training managers to access and sort the ESAMS data base to facilitate the management of training issues which have been entered into ESAMS.

CCE

- The Y-12 Training Manager should regularly provide training requirements and issues to CCE Senior Management. CCE Senior Management must be proactive in meeting the needs of the Y-12 Plant.

SSO/EM/ESPS

- Develop and conduct training for PSS and Fire Department personnel on the attributes necessary to safely operate OSR

related systems.

DEV/DSO/DUO

- Complete the provisional qualification process for DUO personnel by obtaining the Qualification Verification Official signature in the qualification records.

APPENDIX A PERSONNEL INTERVIEW LIST

EUO Manager
HSEA Deputy Manager
EUO Training Coordinator
Quality Manager
Y-12 Site Office Manager
Y-12 Plant Manager
Director, Center for Continuing Education (CCE)
Y-12 Training Manager
TIM Coordinator
Criticality Safety Engineer
EUO Management Mentor
Vice President Defense and Manufacturing
Facility Management Manager
Y-12 Plant Manger
Facility Safety Manager
Radiological Controls Manager
Industrial Hygiene Manager
Industrial Safety Manger
Nuclear Safety Manger
SAR Review Manager
Nuclear Material Control and Accountability Manager
HSEA Training Coordinator
RADCON Manager
RADCON Technician Training Supervisor
RADCON Technician
Fire Protection Engineer
Industrial Hygienist
Engineering Assistant
FMO Manager
Defense Programs Maintenance Manager
FMO Training Manager
FMO Front Line Supervisor (4)
FMO Procedures Manager
FMO Staff Engineer (Safety Systems)
FMO Training Analyst
FMO Craftspersons:
Outside Machinist
Pipefitter
Electrician
Stationary Engineer
Quality Organization, Deputy Division Manager
Quality Organization, Training Manager
Quality Organization, Training and Procedures Department Manager
Quality Organization, Materials and Testing Laboratories Supervisor
Quality Organization, Dimensional Metrology Department Manager

Quality Organization, Dimensional Inspection Front-line Supervisor
Quality Organization, Materials and Equipment Department Manager
Quality Organization, Materials and Testing Laboratories Engineering Support Staff Technician
Quality Organization, Waste Management Supervisor
Quality Organization, Procedures Supervisor
Quality Organization, Engineering Support Staff
Quality Organization, Dimensional Inspection Technician
Quality Organization, Radiography Front-line Supervisor
Quality Organization, Radiography Technician
Quality Organization, Engineering Support Staff
Training Coordinator, Development Organization
Training Coordinator, DSO Organization
Lead Instructor DSO
Quality Evaluation Shift Manager
Quality Evaluation Assembly Persons (2)
Quality Evaluation Program Manager
Development Organization Division Manager
DUO Process Operator
DUO Casting Unit Manager/Supervisor
DUO Foundry Supervisor
DUO Process Engineer
DUO Arc Melt/Press Area Unit Manager/Supervisor
Manager, SSO&EM
Manager, Emergency Management
Manger, Site Operations
PSS/CAAS SME
PSS (2)
Systems Manager
Fire Chief
Y-12 Manufacture Sector Program Manger
EUO Training Department Manager
Operations Manager Building 9212
Accountability Team Manager
EUO Shift Manager
EUO Shift Technical Advisor
EUO Conduct of Operations Manager
EUO Chemical Operator
EUO Training System Analyst
EUO Machinists
DOE Facility Representative
Deputy Restart Manager
EUO Instructional Technologist
EUO Technical Training Supervisor

APPENDIX B REFERENCE DOCUMENT LIST

Organization Charts
Organization Descriptions/Mission Statements
Training Assistance Team Handbook
DNFSB Recommendation 94-4
DOE Implementation Plan for DNFSB Recommendation 94-4, dated 2/95
Y/AD-622 - Type C Investigation of the Y-12 Plant Criticality Safety Approval Infractions Event at Building 9204-2E on September 22, 1994, dated 10/14/94
Y/AD-623 - Plan for Continuing and Resuming Operations, dated 10/94
Y/AD-627, Rev. 1 - Mentor Program Description for Y-12 Resumption, dated 1/12/96
DOE Standard - DOE-STD-1070-94 - Guidance for Evaluation of Nuclear Facility Training Programs, dated 6/94
DOE Order 5480.20A - Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities, dated 11/15/94
DOE Implementation Plan for DNFSB Recommendations 93-3 and 92-7, dated 11/4/93
Y-12 90 Series - Training Procedures
Nuclear Operations Conduct of Training Manual for Enriched Uranium Organization
LMES Training & Qualification Standards/Requirements
Identification Documents (S/RIDs) for 5480.20 and 5480.20A
Y-12 Site Office (YSO) Documentation
   a. Organization Charts
   b. DNFSB Recommendation 94-4, Task 5 TAT Report & Response
   c. YSO Assessments
   d. YSORT Surveillances
DOE-ORO Training & Development Division Handbook for Oversight Activities
Training Development Administrative Guides (TDAGS)
   a. Depleted Uranium Operations
   b. Facilities Management Organization
   c. Health, Safety, Environment, and Accountability
   d. Quality
Integrated Project Plan (IPP)
LMES Management Self-Assessments
Facility Management Organization (FMO) Training and Administrative Guide
FMO Training Needs Analysis
Y-12 Plant Training Implementation Matrix for DOE Order 5480.20A (Y/GA-66/R5)
Addendum to Y-12 Plant Training Implementation Matrix (Revision 5) (Y/GA-66, Dated November 1995)
Thirty Training Records for FMO Personnel
Sixteen General Requirements for Qualification Training

Management Systems (TMS) Printouts.
Maintenance Management Program, DOE Order 4330.4B
LMES Administrative Procedure 10-023 "Plant Training Program"
CCE Catalog
ESH Training Requirements
Critical Success Factors—FY 1995 and First Quarter FY 1996
Project Management Course Evaluation Plan
Tennessee Quality Award-Level 3 Application
TMS Customer Survey Results
Performance Improvement Feedback Survey
Quality Plan—Latest Revision
CCE Annual Report
Resumes of CCE Staff
Basic Foundations Skills Level 1 Data
Strategic Plan 1995—2000
Tennessee Quality Report Feedback 1995
OJT BIT Instructions Training TMS Reports
HSE Management Institute Lock Out/Tag Out Test Training Analysis
CCE Critical Success Factors—March 1996
HSE Management Institute RWII Test Training Analysis
Environmental Management Transportation Operations Training Evaluation Report
LMES Self-Assessment Program and Guide
LMES DPR ORR Report
LMES ORR Report K/ER-285
LMES D&A RA Report
CCE Operating Manual
OJT Lesson Plans
TMS Materials/Procedures/Job Aids
Educator-newsletter
Hours/Training/Institute/Y-12—FY 1995 and First Quarter FY 1996
OJT Training Data—1992-1995
Y-12 RCT Continuing Training Requirements
Field Training Log
NCSD Training and Qualification Program
Environmental Management Department MSA for Training and Qualification
Y-12 Plant Training Working Group Charter Meeting Minutes
Y-12 Training and Qualification Program Management Self-Assessment Plan
HSEA Training and Qualification Implementation Guide for the Y-12 Plant
Workplace Health Hazards Assessment and Risk Management Program
NCSD List of Qualified Personnel
NCSD Guidance for the Development of Continuing Technical Training
Training Implementation Plan, HSEA Organization
Management Self-Assessment of the Y-12 Quality Training Program, Report No. Y-96-1

Training Management System (TMS) Printouts
Y-12 Quality Organization Training and Administrative Guide (TDAG)
A Graded Approach to Training and Qualification for the EUO Process Based Restart (Draft)
Conduct of Training Manual for Y-12 Nuclear Operations
General Area Operator Enriched Uranium Organization Training and Qualification Program Descriptions
Job Analysis Data for EUO General Area Operator
Job Analysis Data for General Area Machinist
Task to Training Matrix for EUO General Area Operator
EUO Shift Technical Advisor Enriched Uranium Operation Training and Qualification Program Description (Draft)

Appendix C BIOGRAPHICAL SUMMARIES OF ASSESSMENT TEAM

Christopher I. Chisholm has a BS in naval science from the United States Naval Academy and over 25 years of experience in the nuclear field. He served in a number of positions of increasing responsibility in the naval submarine force and nuclear power program including engineering department division officer, chief engineer, executive officer, and commanding officer of a fleet ballistic missile submarine. Additionally, he served in several training positions including instructor and Director of Officer Training at Naval Submarine School and Director of Enlisted Training at Naval Nuclear Power School. Mr. Chisholm has been a principal analyst for Sonalysts, Inc since 1992. During the past year, he has provided technical and management support to Westinghouse Hanford Company at the Plutonium Finishing Plant (PFP) on the DOE Hanford Site. This support has included: Conduct of Operations assessments and evaluation; monitoring and evaluation of on-shift operations, evolutions, and drills; technical assistance in upgrading the PFP Conduct of Operations directives to comply with DOE Order 5480.19 and mentoring of PFP Operations managers and shift supervisory personnel.

Ralph Fullwood is a Nuclear Engineer in the Department of Advanced Technology, Brookhaven National Laboratory. He holds a PhD from Rensselaer Polytechnic Institute in Nuclear Engineering and Science (1965), an AM from Harvard University in physics (1954), a BS from Texas Technological College in physics (1952), 3 years in advanced study at the University of Pennsylvania. He is a professional engineer, and a Fellow of the American Nuclear Society. In the Army (1954-56), he calculated neutron, gamma and light transport for various battle situations and invented the reciprocity method for shielding measurement. At KAPL (1956-57) he measured eta for U-233 using the 100 MeV betatron. At the University of Pa. (1957-1960) he helped design the Princeton-Penn proton synchrotron. At RPI (1960-65) he was the supervisor and in charge of startup of the Linac and supervisor of instrumentation. He performed many neutron cross section measurements and investigated the slowing down of neutrons in beryllium. As Associate Professor, he taught nuclear physics. At LANL (1965-72), he designed the instrumentation for weapons diagnostics and physics experiments. He started WNR, a beam line off of LAMPF for weapons and material related work. At SAIC (1972-85) he was an Assistant Vice-President. He was an original participant in the Rasmussen Study of light water reactor safety. He has participated in safety analysis of: PWRs, BWRs, reprocessing, transportation, fuel fabrication, LMFBRs, waste disposal, thermoelectric radioactive generators, and the Galileo launch. At Brookhaven National Laboratory (1985 - present) he co-authored the book Probabilisitic Risk Assessment of the Nuclear Power Industry, he has written interactive computer codes for modeling nuclear plants to optimize inspection and to analyze

aging. He was the editor of the DOE Risk Management Quarterly. He has taught courses to the DOE in nuclear physics, criticality, nuclear instrumentation, process instrumentation, and HVAC. In response to DNFSB, he prepared 24 documents relating courses to requirements, and solicited the input for the data base of training catalogues from major DOE facilities. Currently he is working on the Training Guides to answer the requirements. For 8 years he has been working on the book, Natural Philosophy: Physics with a Personal Computer.

Helen Horn is a Program Analyst for the Assistant Manager for Environmental Management (AMEM) at the DOE Chicago Operations Office (CH). She is responsible for management of the technical excellence program for AMEM which includes job/task analysis, studies of qualifications, vendor selection, needs assessment data, and the development and design of training materials. Ms. Horn's job responsibilities also include conduct of studies regarding bench-marking of various aspects of the environmental program at CH. She is also the federal advisor to the TRADE Environmental Special Interest Group.

Prior to this current position, Ms. Horn held positions at the Chicago Operations Office and Headquarters where she was responsible for oversight of contractor training programs, development of environmental restoration project Technical Training Programs, and coordination of the Department's interagency agreement with the National Institute of Environmental Health Sciences Hazardous Materials Handling Training Program.

Ms. Horn has a BS degree in Behavioral Science from the University of Maryland and a MAS degree in Business Administration from John Hopkins University

Theodore Lewin has over 36 years of operational and technical management experience in the U. S. Navy. That experience included extensive involvement in performance based training and operations, training, material, and management assessment. He is currently employed as a Vice President, Nuclear Operations, Sonalysts, Inc. Mr. Lewin, a nuclear trained submarine officer, retired from the Navy as a Rear Admiral. During his naval service, he served on four nuclear powered fleet ballistic submarines, as an Engineering Department division officer, as Engineer Officer of a new construction submarine with responsibilities for conducting the reactor plant test program and training the crew for certification in reactor plant operations, and as Executive Officer and Commanding Officer. Additionally, he served as an instructor, operator, and training officer at a naval reactor plant prototype, on the staff at Naval Reactors, DOE, with responsibilities for managing the training and staffing for all of the Navy's enlisted reactor plant

operators, and as the Commanding Officer of a Naval Nuclear Power Training Unit (NPTU) at which nearly half of all new Navy nuclear reactor plant operators received their initial operational training. In the NPTU assignment, he was responsible for monitoring and assessing the effectiveness of the training, the operations of four reactor plants, and the execution of the contractor's responsibilities. Other tours included responsibilities for managing and monitoring all aspects for performance in two different nuclear submarine squadrons while assigned as Deputy Commander for Readiness and Training in one squadron, and as Squadron Commander in the other.

In addition to several other senior management assignments as a Navy Flag Officer, he led a team of about 100 technical experts in assessing the material condition and quality of all Navy ships, including assessment of the acceptability of new ships prior to their delivery from the shipbuilder to the Navy. In his association with Sonalysts, Inc. Mr Lewin has participated at the senior management level in evaluating the state of training at five DOE sites in support of the Ad Hoc committee's efforts in developing the implementation plan for Defense Nuclear Facilities Safety Board (DNFSB) Recommendations 92-7 and 93-3 concerning training. He has provided independent oversight to the DOE staff conducting a review of and evaluating the effectiveness of DOE directives concerning the assembly, disassembly, and testing of nuclear explosives when compared to high level nuclear industry standards and other DOE standards used for reactor and non-reactor nuclear facilities. He is currently providing management assistance for a portion of the DOE Defense Programs staff and the Y-12 Site Office at Oak Ridge. He has participated in a number of Operational Readiness Reviews (ORRs) at the Savannah River Site. These ORRS included the F-Canyon 2nd Plutonium Cycle ORR in the areas of management and the DOE Area Office and the FB-Line, ITP, F-Canyon Phase II Restart and DWPF ORRs as a Senior Advisor.

Edwards S. Little has over 30 years of operational and technical management experience in the U. S. Navy. His experience included extensive involvement in the management, supervision, performance based training, material, and management assessment of naval nuclear reactors. As a nuclear trained submarine officer, he served on 5 nuclear powered submarines. His submarine shipboard assignments included responsibilities as an Engineering Department Division Officer, Engineer Officer, Executive Officer, and Commanding Officer. Significant navy staff assignments included duties as a member of the Atlantic Fleet Navy Nuclear Power Examining Board, as a member of the staff of ADM H.G. Rickover, and as a Deputy Squadron Commander. He served as Commanding Officer of a nuclear submarine repair ship and was responsible for the resupply and repair of a squadron of ten nuclear powered submarines. Since December 1992, he has served

as a Principal Analyst with Sonalysts, Inc. providing support to Defense Programs of the Department of Energy. He has participated in the evaluation of training readiness during five DOE Operational Readiness Examinations (ORRs)/ Readiness Assessments (RAs). These include: two ORRs at the Savannah River Site (Defense Waste Process Facility and F-Canyon), two RAs at the Oak Ridge Y-12 Plant (Receipt, Storage, and Shipment, and Disassembly/Assembly) and one ORR at the Rocky Flats Plant (Building 771). Additionally, he has participated in the evaluation of the state of training at four DOE sites in response to Defense Nuclear Facilities Safety Board (DNFSB) Recommendations 92-7 and 93-3; and the review and evaluation of the effectiveness of DOE directives concerning the assembly, disassembly, and testing of nuclear weapons in response to DNFSB Recommendation 93-1.

Wayne Rickman has more than 30 years of operational experience in the Naval Nuclear Propulsion (submarine) Program, achieving the rank of Rear Admiral. Mr. Rickman was involved in the training and qualification of personnel in the Naval Nuclear Propulsion and the Naval Nuclear Weapons Programs. He served as Commanding Officer of two submarines, including a Trident submarine with the largest and newest submerged power reactor and the Trident C-4 weapons system. In addition, Mr. Rickman served as a Deputy Commander for training for a submarine squadron, where he directed, monitored, and evaluated training and qualification of submarine crews in operations of nuclear reactors and nuclear weapons. He also served as special assistant to the Director, Naval Nuclear Propulsion Program, where he was responsible for the selection, qualification, training, and assignment of personnel who supervise, operate, and maintain naval nuclear propulsion plants. Mr. Rickman's last assignment as a Rear Admiral was as a Flag Officer responsible for training in the Atlantic Fleet. He was responsible for 14 diverse training organizations with 2,000 instructors in more than 650 courses and a throughput of 175,000 students per year.

Mr. Rickman is presently employed as a Principal Analyst and Senior Vice President of Nuclear Operations for Sonalysts, Inc. He has supported DOE by testing and providing certification for K-Reactor operators at the Savannah River Site. He assisted in the DOE ORR of Rocky Flats Building 559 by developing the training and acceptance criteria for that review. Mr. Rickman participated as the Team Leader for the Management and Training group of experts for the Building 559 ORR. He participated as a Senior Nuclear Safety Expert on follow-up visits to Building 559. He participated in both ORRs for Building 707 at Rocky Flats as a Senior Nuclear Safety Expert. He was also a member of the HB-Line ORR and participated in the replacement Tritium Facility, F-Canyon, FB-Line, ITP, and DWPF ORRs as a Senior Safety Advisor at the Savannah River Site.

Jeff Roberson is a Nuclear Engineer with the Department of Energy Defense Programs. He holds a BS in Nuclear Engineering from the Georgia Institute of Technology. He has 14 years experience in the nuclear field. He spent the first years of his career at the E. I. Hatch, Nuclear Generating Facility of the Georgia Power Company, in Baxley, Georgia, in the Reactor Controls Division, conducting fuel transfer operations during two refueling outages. He then served in the Navy's Nuclear Power Program where he served as Assistant Engineer on a nuclear submarine. He was certified as a Chief Nuclear Engineer by the Naval Reactors Branch of the Department of Energy. As a result of his Navy and civilian experience, he has significant expertise in many areas including nuclear operations, maintenance, health physics, and nuclear design. Mr. Roberson separated from the Navy in 1990 and spent one year as a Programs Manager for a major acquisition program for the Department of the Navy. Mr. Roberson joined the Department of Energy in 1991. Mr. Roberson initially worked in the Defense Programs' Office of Inspections as a Team Leader for the 1992 Defense Programs Technical Safety Appraisal(TSA) at the Lawrence Livermore National Laboratory and Functional Area Leader on several other TSAs. Mr. Roberson then moved to the Operations Support Group and has been a primary contributor to the Defense Programs Operational Readiness Review (ORR) program. He was a primary author of the DOE Order, standard, and handbook governing the conduct of ORRs. He served on the ORR of the Replacement Tritium Facility at the Savannah River Site in the Conduct of Operations area. He also served on the Pantex Zone 4 Operational Readiness Review as the Area Leader for Conduct of Operations. He was the Assistant Team Leader for the 1994 Operational Readiness Review of Building 707, Rocky Flats. During the F-Canyon Operational Readiness Review he evaluated the Maintenance and Safety Envelope functional areas. He was the operations group leader for the ORRs of FB-Line, In-Tank Precipitation (ITP) facility, and the Defense Waste Processing Facility (DWPF), both at SRS. Mr. Roberson led the Readiness Assessment of the Receipt, Storage, and Shipment restart and was the Senior Advisor for the Disassembly/Assembly Readiness Assessment, both at the Y-12 Site in Oak Ridge, Tennessee.

Roy Schepens, DOE, TEAM LEADER is the Deputy Assistant Manager for High Level Waste at the DOE Savannah River Operations Office (SR). He has been with SR for six years and has had direct experience with the hands-on, oversight of contractor nuclear activities. He has 20 years experience in the nuclear field.

Mr. Schepens served initially at the SR site as Senior EH Representative, responsible for identifying and evaluating safety issues and concerns, diagnosing root causes and recommending both short-term compensatory measures and ultimate solutions. Subsequently, he was promoted to Director, Safety Oversight Division and was responsible for the independent safety oversight of restart activities at K, L, and P Reactors. Additional recent

assignments included Director, Reactor Operations Division and Director, High Level Waste Operations Division followed by his current assignment.

Previously, Mr. Schepens served four years with the NRC as resident inspector at the Vogtle Electric Generation Plant during the construction, pre-operational testing, licensing startup testing, low power testing, and full power operation of Unit No. 1. Earlier he worked in the nuclear field at Ingalls Nuclear Shipbuilding and General Electric where he managed various construction, startup, and maintenance/refueling projects for commercial nuclear and fossil plants.

Mr. Schepens has a BS degree in Marine Engineering from the Marine Maritime Academy.

James Smith is the facility manager at the Consolidated Incerator Facility (CIF) at the Savannah River Site (SRS). He has had 18 years of nuclear operations experience at SRS. Mr. Smith, in his current assignment, is responsible for completion of startup activities and readiness of the CIF facility for radioactive operations in 1996.

Prior to his assignment at CIF, Mr. Smith was the training and procedure manager for H Tank Farm, F Tank Farm, In Tank Precipitation and Effluent Treatment Facility from 1992 to 1995. In late 1994 and early 1995, both DOE and Westinghouse operational readiness reviews were completed at ITP in preparation for radioactive operation.

Mr. Smith has a BS in Nuclear Engineering (BSNE) from the University of Tennessee and a Masters in Business Administration (MBA) from the University of South Carolina.

Zack Smith is a Senior Facility Representative for DOE High Level Waste Operations Division at Savannah River Site. Mr. Smith has 9 years of nuclear experience and is a fully qualified DOE Facility Representative. He has held Facility Representative positions at the In-Tank Processing (ITP) Facility and the High Level Waste Tank Farms at Savannah River Site. Mr. Smith was a sub-team leader for the West Valley Demonstration Project ORR and a DOE validation team member for the ITP Facility. As a Senior Facility Representative for DOE he coordinated the oversight for the successful startup of the New Waste Transfer Facility. His routine responsibilities have also included the oversight of the resumption of operations for the 242-16H Evaporator.

Prior to joining DOE, Mr. Smith held positions in nuclear reactor refueling operations for naval reactors at Charleston Naval Shipyard.

Mr. Smith has a BS degree in Marine Engineering from the U. S.

Merchant Marine Academy.

Mike Thomas is the Senior Facility Representative assigned to the Defense Waste Processing Facility (DWPF) at the Savannah River Site. He has been assigned to DWPF for five years and has been directly involved in the oversight of contractor operations during start-up of the DWPF. He has 25 years experience in the nuclear field.

Mr. Thomas has 20 years experience in the operation of U. S. Navy nuclear propulsion plants. He completed various assignments as both an operator and supervisor, including Engineer Officer during a refueling overhaul. He also served in training positions at a Nuclear Power Training Unit and the Submarine Training Facility.

Mr. Thomas has a BS in Electrical Engineering from the University of Missouri.

Dave Zimmerman is the Training Manager at the Defense Waste Processing Facility (DWPF) at the Savannah River Site. He has had 14 years of nuclear operations experience at SRS. Mr. Zimmerman, in his current assignment, has led the training and qualification programs at DWPF since late 1993. In late 1995, both DOE and WSRC Operational Readiness Reviews were completed in preparation for radioactive operations.

Prior to his assignment at DWPF, Mr. Zimmerman was the Operations Training Manager at K Reactor from 1990 to 1993. He held operational assignments at SRS prior to 1990.

Mr. Zimmerman has a BS in Electrical Engineering (BSEE) and a Masters in Business Administration (MBA) from the University of South Carolina.