94-0006950

Department of Energy
Washington, DC 20585

December 29, 1994

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

Dear Mr. Chairman:

On July 5, 1994, the Department of Energy (DOE) issued its Implementation Plan (IP) for Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 93-6. The IP focused on ensuring that the Department maintains the capability to conduct safe dismantlement, modification, assembly, and testing operations. This document contains deliverables and explanations for commitments as required by the 93-6 Implementation Plan.

Commitment 1.1 (Enclosure 1) - Identify critical functional areas that support safe dismantlement and modification procedures, including the performance of relevant safety analyses at Pantex. Currently defined functional areas for assembly, disassembly, modification, retrofit, and stockpile evaluation programs will be reviewed and selected based on their applicability to development of safe dismantlement and modification procedures.

Commitment 1.2 (Enclosure 2) - Using the list of critical functional areas developed in Commitment 1.1, the Albuquerque Operations Office (AL) will specify the critical functional areas, including the ability to perform relevant safety analyses, in a tasking letter to the design agencies and Pantex. The tasking letter will require them to identify skills and knowledge required to perform the specified functional areas and to document the approach used. Although different approaches may be used due to the inherent differences in personnel management systems used by the design and production agencies, the tasking letter will specify criteria for matching skills and knowledge to functional areas and the format for the report so that the reports will have a basis for comparison review and be readily compiled. The DOE Headquarters and AL will identify functional skills associated with program direction, guidance, and management related to the specified, critical functional areas.

Commitment 6.2 (Enclosure 3) - The Albuquerque Operations Office shall review and revise, if necessary, the current weapon dismantlement schedule. This prioritized schedule will then be used to support implementation of the final information gathering process that will maximize use of identified personnel while they are readily available. Safety will remain the primary consideration for developing schedule priorities.

Commitment 6.3 (Enclosure 4) - Consistent with the intent of the Stockpile Management Plan, update and formalize the dismantlement and modification procedure development process. The formalized process will integrate the results of Integrated Safety Skills and Knowledge Platform (ISSKP) 5 (critical safety hazard information) with all other safety hazard information into the disassembly procedure development process. The process will cause current dismantlement and modification procedures (either nonenduring stockpile disassembly or enduring Disassembly and Inspection (D&I) procedures) to be validated and updated. The process shall include a review of these documents by the original design teams, Stockpile Evaluation Program (SEP) teams, and original production teams, as available, and specify how the process will be accomplished. The process shall specify participants by expertise (including those identified in ISSKP 3), criteria to meet the objectives, documentation to be reviewed (including that documented by ISSKP 5, accelerated aging analysis and SEP sample analysis reports), and the process deliverable (final disassembly or revised D&I procedures).

Commitment 9.1 (Enclosure 5) - The Y-12 Plant will review its existing list of critical functional areas and the associated skills and knowledge requirements related to disassembly of all weapons and will document the methods used in preparation of this listing. These will be submitted to the design laboratories for review and for their determination of whether there are key positions at the laboratories associated with these critical functional areas. If so determined, these critical areas will be incorporated into the ISSKP by the laboratories.

Several of the enclosures delineate expected completion dates of the deliverables. The remainder of the deliverable due dates are being revised, and changes to the dates will be forwarded under separate correspondence.

Should you have any questions, please contact Mr. Richard C. Crowe, Office of Research, Development, and Testing Facilities, on (301) 903-6214.

Sincerely,

Everet H. Beckner
Principal Deputy Assistant Secretary
for Defense Programs

5 Enclosures

Enclosure 1

1. Major Task Initiative 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. Identify Disassembly Skills and Knowledge

A. Responsibility

The Albuquerque Operations Office (DOE/AL) is responsible for the implementation of this section, subject to approval from the Deputy Assistant Secretary for Military Application and Stockpile Support. Relevant Albuquerque Management and Operating contractors and the national weapons laboratories will provide assistance as required.

B. Commitment 1.1

Identify critical functional areas that support safe dismantlement and modification procedure, including the performance of relevant safety analyses at Pantex. Currently defined functional areas for assembly, disassembly, modification, retrofit, and stockpile evaluation programs will be reviewed and selected based on their applicability to development of safe dismantlement and modification procedures.

* Deliverable: List of critical functional areas.

* Due Date: August 1994

3. Status:

Nine currently defined functional areas for assembly, disassembly, modification, retrofit, and stockpile evaluation programs were reviewed by Albuquerque Operations Office using an integrated review element matrix. This matrix lists each functional area and their supporting elements, their criteria (DOE order or other supporting documentation), and review method (Qualification Evaluation for Dismantlement, Nuclear Explosive Safety Study, Nuclear Explosive Risk Analysis, Operational Readiness Review, etc.).

After Albuquerque Operations Offices' (AL) review, a draft list of functional areas and applicable DOE orders was developed and transmitted to the national laboratories, Pantex, and Y-12 for their review and comment. After this review process, DOE/AL forwarded the critical functional areas list to DOE Headquarters for review and acceptance.

A list of Critical Functional Areas (CFAs) was submitted to the Board in August 1994; however, this submittal was rejected. The primary reason for rejection cited in the September 14, 1994, letter concerned Critical Safety Elements (CSEs) of Recommendation 93-1 were not identified or addressed in the Commitment 1.1 deliverable.

Reviews indicate that revisions to this deliverable are required to facilitate tracking between CSEs and applicable CFAs. In short, the CSEs support safe operations in the facilities, whereas the CFAs support the development of dismantlement procedures and tooling.

A matrix "crosswalk" is being prepared which explicitly indicates which CSEs are included in each of the CFAs. In addition, background material is being prepared that describes the relationship between CSEs and CFAs in narrative form. The intent of these documents is to provide a clear tracking between CSEs and applicable CFAs. Completion of the "crosswalk" is expected by the end of January 1995.

SAFE MODIFICATION/DISASSEMBLY OPERATIONS
CRITICAL FUNCTIONAL AREAS
and
APPLICABLE DOE ORDERS

1. NUCLEAR EXPLOSIVE SAFETY

CRITERIA:
DOE Order 5610.10, Nuclear Explosive and Weapon Safety Program
DOE Order 5610.11, Nuclear Explosive Safety
AL Supplemental Directive AL 5610.11

OBJECTIVE: To perform and approve a nuclear explosive safety study or survey before nuclear explosive operations begin. A complete explanation of the nuclear explosive components, capabilities, vulnerabilities, and operations is required for review by the NESS Group in the form of written input documentation and briefings. Documentation and briefings should present clear nuclear explosive safety design features, identify and evaluate any and all threats to nuclear explosive safety, and present a clear discussion of the positive measures in place to minimize the possibility of these undesired events. Technical information to be considered, evaluated and documented include:

(a) System-safety design features and safety theme;
(b) One-point safety evaluation;
(c) HE deterioration over stockpile life;
(d) HE compatibility with other materials;
(e) Criticality evaluation;
(f) Tooling and handling equipment;
(g) Results of the operational risk analysis;
(h) Nuclear design agency input documents; and
(i) Single Integrated Input Document.

2. EXPLOSIVE SAFETY- High and electro-explosives

CRITERIA:
DOE Explosives Safety Manual

OBJECTIVES: To comprehensively address, resolve and document the following:

(a) Personnel protection for assembly/disassembly operations;
(b) Extrudable explosives operations;
(c) Bonding and grounding of equipment;
(d) Bonding of personnel;
(e) Drop heights;
(f) Sensitivity;
(g) Deterioration.

3. CRITICALITY SAFETY

CRITERIA:
DOE Order 5480.24, Nuclear Criticality Safety

OBJECTIVES: To comprehensively address, resolve and document the following:

(a) Mass and Geometric arrangement of fissionable materials;
(b) Size, shape, and the materials comprising containment vessels;
(c) Liquids that could act as neutron-moderating materials;
(d) Administrative controls;
(e) Independent criticality safety review (plant and lab);
(f) Monitoring and surveillance program to prevent accumulations of fissionable materials in process equipment, and in storage, pipe, and ventilation systems.

4. INDUSTRIAL SAFETY AND HYGIENE

CRITERIA:
DOE Order 5483.1A Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities
DOE Order 5480.4 Environmental Protection, Safety and Health Protection Standards
DOE Order 5480.10 Contractor Industrial Hygiene Program

OBJECTIVE: To identify all potential industrial safety and health hazard issues/concerns and address, resolve and document them in the design package or safety procedural documents.

5. RADIOLOGICAL PROTECTION and HEALTH PHYSICS

CRITERIA:
DOE Order 5480.11, Radiation Protection for Occupational Workers

OBJECTIVE: To ensure that exposure of personnel to ionizing radiation associated with the subject activities is as low as reasonably achievable (ALARA) and that established limits meet DOE Order requirements. Topics to be addressed include:

(a) Limit establishment;
(b) Routine personnel monitoring and records;
(c) Contaminated property cleaning;
(d) Physical controls such as confinement, ventilation, remote handling, and shielding;
(e) Sign, label and symbol design per ANSI requirements;
(f) Entry control program; and
(g) Internal audits.

6. ENVIRONMENTAL PROTECTION

CRITERIA:
DOE Order 5400.1, General Environmental Protection Program
DOE Order 5480.1B, Environment, Safety, and Health Program for the Department of Energy Operations

OBJECTIVE: To identify mandatory environmental standards that are relevant to the subject activities; establish the notification and follow-up requirements for environmental occurrences and periodic routine reporting of significant environmental-protection information; and establish the environmental monitoring requirements for effluent, meteorological data, radioactive materials, air emission, and water in compliance with applicable DOE Orders.

7. WASTE MANAGEMENT

CRITERIA:
DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Program
DOE Order 5820.2A, Radioactive Waste Management

OBJECTIVE: To develop and implement a formal waste management program applicable to the subject activities that addresses the handling, transporting, treating, storing, or disposing of hazardous, radioactive and mixed wastes generated.

8. FACILITY

CRITERIA:
DOE Order 5480.23, Nuclear Safety Analysis Reports
DOE Order 5480.22, Technical Safety Requirements
DOE Order 5480.21, Unreviewed Safety Questions

OBJECTIVE: To ensure for the subject operation: (1) that the facility scheduled for the subject activity provides a safe working environment and contains all the necessary support elements within its safety envelope as defined by the currently approved safety analysis report; (2) to establish and measure technical safety requirements to ensure that the subject operations are conducted within the analyzed envelope; and (3) to ensure that the determination of unreviewed safety questions is accurate and that the proper follow-up actions have been taken.

9. EMERGENCY PREPAREDNESS

CRITERIA:

DOE Order 5500.3A, Planning and preparedness for Occupational Emergencies

DOE Order 5500.10, Emergency Readiness Assurance program

DOE Order 5500.1B, Emergency Management System

OBJECTIVE: To ensure the emergency readiness assurance program requirements, with respect to planning and preparedness for operational emergencies associated with the subject operation are developed and implemented.

Enclosure 2

1. Major Task Initiative 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. Identify Disassembly Skills and Knowledge

A. Responsibility

The Albuquerque Operations Office (DOE/AL) is responsible for the implementation of this section, subject to approval from the Deputy Assistant Secretary for Military Application and Stockpile Support. Relevant Albuquerque Management and Operating contractors and the national weapons laboratories will provide assistance as required.

B. Commitment 1.2

Using the list of critical functional areas developed in Commitment 1.1, the Albuquerque Operations Office will specify the critical functional areas, including the ability to perform relevant safety analyses, in a tasking letter to the design agencies and Pantex. The tasking letter will require them to identify skills and knowledge required to perform the specified functional areas and to document the approach used. Although different approaches may be used due to the inherent differences in personnel management systems used by the design and production agencies, the tasking letter will specify criteria for matching skills and knowledge to functional areas and the format for the report so that the reports will have a basis for comparison review and be readily compiled. DOE Headquarters and Albuquerque will identify functional skills associated with program direction, guidance, and management related to the specified, critical functional areas.

* Deliverable: A tasking letter from the Albuquerque Operations Office to the design agencies and Pantex and from DOE Headquarters to Headquarters staff and the Albuquerque Operations Office to identify skills and knowledge and document the approach.

* Due Date: September 1994

3. Status:

The tasking letters from DOE Headquarters and from the Albuquerque Operations Office were issued on August 19, 1994 and August 23, 1994, respectively. These tasking letters are attached for reference. In response to the initial tasking letters, a group led by the Albuquerque Operations Office met on September 29, 1994. Organizations represented were DOE-Albuquerque, Los Alamos National Laboratory, Mason & Hanger - Pantex, Sandia National Laboratories and Lawrence Livermore National Laboratory. Additional guidance will be promulgated by this group and

address the following issues:

- Include Recommendation 93-1 CSEs in a revised Commitment 1.1 deliverable,
- Ensure that skills and knowledge required to perform the functional areas are included, not just skills and knowledge existing within the organization,
- Ensure that undocumented or anecdotal skills and knowledge are included, not just formal training or education,
- Clarify purpose of "Criteria" and "Objectives",
- Consider key roles and responsibilities and other applicable requirements for criteria to match functional areas to skill and knowledge,
- Standardize "Sample" format to facilitate comparison and compilation,
- Ensure that each weapon system identified as "retired, inactive, reserve, and enduring" is addressed, and
- Explain use of the "sample competency model".

The group agreed on a list of disciplines/specialties and a common matrix format for summarizing the data. It should be noted that this matrix is intended to capture all disciplines and specialties required to support safe dismantlement, not just those which currently exist. Use of this common format would facilitate analysis by each organization of any existing shortfalls in skills and knowledge to support the functional areas. Ultimately, it facilitates analysis by DOE of any shortfalls across all organizations so that personnel with the required skills may be acquired.

In addition to the matrix, each organization was to provide:

- A narrative explanation of the skills and knowledge that support each of the Discipline/Specialties within a Functional Area identified in the matrix,
- A description of the methodology used to prepare the matrix and background information, and
- An analysis of any potential shortfalls identified in the analysis, primarily due to downsizing or retirements. An example of this analysis is attached. (Mason & Hanger - Pantex)

A follow-on meeting was held on October 12 at the Albuquerque Operations Office, with DOE Headquarters in attendance, to review progress and to refine the data-gathering process. All organizations submitted their results to the Albuquerque Operations Office by October 19. The next meeting on this project will be held in January 1995, in conjunction with

a DOE Executive Management Team for Dismantlement (EMTD) meeting.

Final guidance will be promulgated by the working group by the end of February 1995 and this will be forwarded to the DNFSB.

EFG (07-90)

United States Government **Department of Energy**

memorandum

DATE: AUG 19 1994

Y TO
N OF: DP-22

SUBJECT: DEFENSE NUCLEAR FACILITIES SAFETY BOARD (DNFSB) RECOMMENDATION 93-6, MAINTAINING ACCESS TO NUCLEAR WEAPONS EXPERTISE

TO: RADM C. J. Beers, Deputy Assistant Secretary for Military Application and Stockpile Support, DP-20
B. G. Twining, Manager, Albuquerque Operations Office

The DNFSB accepted the Department of Energy's (DOE) Implementation Plan (IP) on August 2, 1994, for Board Recommendation 93-6. The Board Recommendation 93-6 is entitled "Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Complex."

The IP addresses each of the Recommendation 93-6 nine items. An Integrated Safety Skills and Knowledge Platform (ISSKP), which relates to the first five items, is a life-cycle process. The purpose of ISSKP is to identify personnel of the national weapons laboratories, relevant Management and Operating contractors, and Federal staff of DOE who have critical and unique skills and knowledge essential to the safe dismantlement or modification of nuclear weapons and the safe conduct of nuclear testing operations. The ISSKP also ensures access to these individuals and their experiences and knowledge through the establishment of a formal program to capture and document these skills and knowledge. This includes the skills and knowledge to conduct relevant safety analyses.

Step 1, Commitment 1.1 of ISSKP resulted in the identification of critical functional areas that support safe dismantlement and modification procedures, including the performance of relevant safety analysis, at the Pantex Plant. A copy of these critical functional areas is provided at attachment 1.

Step 1, Commitment 1.2 of ISSKP requires identification of critical and unique skills and knowledge needed to develop and verify safe dismantlement and modification procedures, as well as those necessary to conduct relevant safety analyses, such as Nuclear Explosive Safety Studies. Emphasis is on the skills and knowledge necessary to identify potential hazards, whether inherent in the design or dismantlement or modification processes, or from known or anticipated stockpile degradation.

Please review the critical functional areas and identify those skills and knowledge for each functional area that prevail in your office. The skills and knowledge should be related to either procedure development or conducting relevant safety analyses. They can be formal education (degree or certificate), technical or vocational trade schools, or documented on the job training or experiences. Where appropriate, identify any critical job positions within your organization associated with each functional area. A sample model and format are provided in attachment 2.

To enable compilation and a comparison review of the data, please provide a description of the methodology used to develop your response. Your timely reply by October 28, 1994, is appreciated.

If you have additional questions or need additional information on this, please contact me or have your staff contact CDR Marty Schoenbauer (301-903-3489) of my staff.

Victor H. Reis
Assistant Secretary
for Defense Programs

2 Attachments

United States Government | Department of Energy

Memorandum

Albuquerque Operations Office

DATE: AUG 2 3 1994

REPLY TO ATTN OF: WPD

SUBJECT: Defense Nuclear Facility Safety Board Recommendation 93-6, Maintaining Access to Nuclear Weapons Expertise

TO: W. Weinreich, M&H
R. Clough, L-125, LLNL
R. Hagengruber, MS 0463, SNL/NM
L. Salazar, ESA-1, LANL

On July 5, 1994, the Secretary of Energy signed the DOE Implementation Plan (IP) in response to the subject DNFSB recommendation. The focus of this recommendation is the safety of nuclear weapons testing, modifications and dismantlement procedures considering the loss of uniquely experienced personnel. A copy of the IP is included as Attachment 1.

The Albuquerque Operations Office has lead field responsibility for Integrated Safety Skills and Knowledge (ISSKP) 1 and Task 6 in the IP. ISSKP 1 is the focus of this message, Task 6 will be addressed separately.

ISSKP 1 requires identification of critical and unique skills and knowledge needed to develop and verify safe dismantlement and modification procedures, as well as those necessary to conduct relevant safety analyses such as Qualification Evaluation for Dismantlement reviews and Nuclear Explosive Safety Studies. Emphasis is on the skills and knowledge necessary to identify potential hazards, whether inherent in the design of dismantlement/modification processes, or from known or anticipated stockpile degradation.

Based on Chapter 3.7, Qualification Evaluation Weapon Assembly/Disassembly Safety, of the Development and Production Manual, AL Appendix 56XB, the functional areas critical to safe weapon operations are listed in Attachment 2. Please review this list and identify the required skills and knowledge for each functional area existing at your facility related to either procedure development or conducting relevant safety analyses. Skills and knowledge can be formal education (degree or certificate), technical/vocational trade schools, or formal, documented on the job training or experience. Also when appropriate, identify any critical job positions within your organization associated with each functional area.

In addition, please provide a description of the methodology used to develop your response. A Sample Competency Model and format are included in Attachment 3 for your guidance.

An interim status meeting will be held Thursday, September 15, 1994, at AL in Building 383, Room 315 starting at 8:30 a.m. The goal of this meeting will be to discuss the various approaches being utilized to assure consistency, and provide additional guidance if necessary.

Your full response is due to this office by October 14, 1994. In addition, monthly progress statements are due August 31, 1994, and September 30, 1994.

The AL point of contact for this effort is Deborah Monette who can be reached at 505-845-5292 and FAX 505-845-6459.

Rush O. Inlow
Acting Assistant Manager
for National Defense Programs

Attachments:
1. Implementation Plan
2. Critical Functional Areas
3. Sample Format

cc w/attachments:
W. Fiebig, DP-22, HQ
M. Schoenbauer, DP-22, HQ
R. Ferry, DP-12, HQ
G. Johnson, AAO
J. Drummond, M&H
T. Vaeth, OAK
J. Dow, L-125, LLNL
K. Carlson, KAO
P. Longmire, MS 0560, SNL/NM
E. Bean, LAAO
R. Taylor, ESA-DO, LANL
M. Harrison, OMD, AL
W. Garland, QTD, AL

ATTACHMENT 2

SAFE MODIFICATION/DISASSEMBLY OPERATIONS
CRITICAL FUNCTIONAL AREAS
and
APPLICABLE DOE ORDERS

1. **NUCLEAR EXPLOSIVE SAFETY**

CRITERIA:
DOE Order 5610.10, Nuclear Explosive and Weapon Safety Program
DOE Order 5610.11, Nuclear Explosive Safety
AL Supplemental Directive AL 5610.11

OBJECTIVE: To perform and approve a nuclear explosive safety study or survey before nuclear explosive operations begin. A complete explanation of the nuclear explosive components, capabilities, vulnerabilities, and operations is required for review by the NESS Group in the form of written input documentation and briefings. Documentation and briefings should present clear nuclear explosive safety design features, identify and evaluate any and all threats to nuclear explosive safety, and present a clear discussion of the positive measures in place to minimize the possibility of these undesired events. Technical information to be considered, evaluated and documented include:

(a) System-safety design features and safety theme;
(b) One-point safety evaluation;
(c) HE deterioration over stockpile life;
(d) HE compatibility with other materials;
(e) Criticality evaluation;
(f) Tooling and handling equipment;
(g) Results of the operational risk analysis;
(h) Nuclear design agency input documents; and
(i) Single Integrated Input Document.

2. EXPLOSIVE SAFETY- High and electro-explosives

CRITERIA:
DOE Explosives Safety Manual

OBJECTIVES: To comprehensively address, resolve, and document the following:

(a) Personnel protection for assembly/disassembly operations;
(b) Extrudable explosives operations;
(c) Bonding and grounding of equipment;
(d) Bonding of personnel;
(e) Drop heights;
(f) Sensitivity;
(g) Deterioration.

3. CRITICALITY SAFETY

CRITERIA:
DOE Order 5480.24, Nuclear Criticality Safety

OBJECTIVES: To comprehensively address, resolve and document the following:

(a) Mass and Geometric arrangement of fissionable materials;
(b) Size, shape, and the materials comprising containment vessels;
(c) Liquids that could act as neutron-moderating materials;
(d) Administrative controls;
(e) Independent criticality safety review (plant and lab);
(f) Monitoring and surveillance program to prevent accumulations of fissionable materials in process equipment, and in storage, pipe, and ventilation systems.

4. INDUSTRIAL SAFETY AND HYGIENE

CRITERIA:
DOE Order 5483.1A Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities
DOE Order 5480.4 Environmental Protection, Safety and Health Protection Standards
DOE Order 5480.10 Contractor Industrial Hygiene Program

OBJECTIVE: To identify all potential industrial safety and health hazard issues/concerns and address, resolve and document them in the design package or safety procedural documents.

5. RADIOLOGICAL PROTECTION and HEALTH PHYSICS

CRITERIA:
DOE Order 5480.11, Radiation Protection for Occupational Workers

OBJECTIVE: To ensure that exposure of personnel to ionizing radiation associated with the subject activities is as low as reasonably achievable (ALARA) and that established limits meet DOE Order requirements. Topics to be addressed include:

(a) Limit establishment;
(b) Routine personnel monitoring and records;
(c) Contaminated property cleaning;
(d) Physical controls such as confinement, ventilation, remote handling, and shielding;
(e) Sign, label and symbol design per ANSI requirements;
(f) Entry control program; and
(g) Internal audits.

6. ENVIRONMENTAL PROTECTION

CRITERIA:
DOE Order 5400.1, General Environmental Protection Program
DOE Order 5480.1B, Environment, Safety, and Health Program for the Department of Energy Operations

OBJECTIVE: To identify mandatory environmental standards that are relevant to the subject activities; establish the notification and follow-up requirements for environmental occurrences and periodic routine reporting of significant environmental-protection information; and establish the environmental monitoring requirements for effluent, meteorological data, radioactive materials, air emission, and water in compliance with applicable DOE Orders.

7. WASTE MANAGEMENT

CRITERIA:
DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Program
DOE Order 5820.2A, Radioactive Waste Management

OBJECTIVE: To develop and implement a formal waste management program applicable to the subject activities that addresses the handling, transporting, treating, storing, or disposing of hazardous, radioactive and mixed wastes generated.

8. FACILITY

CRITERIA:
DOE Order 5480.23, Nuclear Safety Analysis Reports
DOE Order 5480.22, Technical Safety Requirements
DOE Order 5480.21, Unreviewed Safety Questions

OBJECTIVE: To ensure for the subject operation: (1) that the facility scheduled for the subject activity provides a safe working environment and contains all the necessary support elements within its safety envelope as defined by the currently approved safety analysis report; (2) to establish and measure technical safety requirements to ensure that the subject operations are conducted within the analyzed envelope; and (3) to ensure that the determination of unreviewed safety questions is complete and that the proper follow-up actions have been taken.

9. EMERGENCY PREPAREDNESS

CRITERIA:

DOE Order 5500.3A, Planning and preparedness for Occupational Emergencies

DOE Order 5500.10, Emergency Readiness Assurance program

DOE Order 5500.1B, Emergency Management System

OBJECTIVE: To ensure the emergency readiness assurance program requirements, with respect to planning and preparedness for operational emergencies associated with the subject operation are developed and implemented.

ATTACHMENT 3

SAMPLE FORMAT

FUNCTIONAL AREA	DELIVERABLE	SKILL/KNOWLEDGE	POSITION

Enclosure 3

1. Major Task Initiative 6. That a program be developed to ensure all applicable safety hazard information and known experiences and knowledge are considered when developing weapon dismantlement or modification procedures. Accomplishment of this task will have the added benefit of further strengthening and formalizing the participation of design laboratory experts in concert with production and evaluation experts in the safety aspects of weapons dismantlement and modification.

2. Development of Weapons Disassembly Procedures and Laboratory Support to Pantex

   A. Responsibility

   The Albuquerque Operations Office is responsible for the implementation of this task, subject to the final approval and acceptance from the Deputy Assistant Secretary for Military Application and Stockpile Support. Relevant Management and Operating contractors and the nuclear design and engineering laboratories will be integral to the implementation of this task.

   B. Commitment 6.2

   The Albuquerque Operations Office shall review and revise, if necessary, the current weapon dismantlement schedule. This prioritized schedule will then be used to support implementation of the final information gathering process that will maximize use of identified personnel while they are readily available. Safety will remain the primary consideration for developing schedule priorities.

   * Deliverable: Dismantlement schedule for all weapon systems that depicts when the First Dismantlement Unit is planned for the retired systems and when the D&I review is planned for the enduring systems.

   * Due Date: September 1994

3. Status:

   The deliverable for this Commitment is a dismantlement schedule that depicts the First Dismantlement Unit (FDU) date for the retired systems and the Disassembly and Inspection (D&I) review date for the enduring systems. This schedule is attached for reference. Additionally, DOE-Headquarters tasked Albuquerque Operations Office in the attached memorandum to provide information on how safety and maximized use of identified personnel were factored into setting dismantlement schedule priorities. The information requested should be available by the end of January 1995 and will be forwarded to the DNFSB.

United States Government | Department of Energy

memorandum

DATE: December 22, 1994

REPLY TO ATTN OF: DP-24:Mitchell:3-3085

SUBJECT: DEPARTMENT OF ENERGY IMPLEMENTATION PLAN COMMITMENT 6.2 FOR DEFENSE NUCLEAR FACILITIES SAFETY BOARD RECOMMENDATION 93-6

TO:

Manager, Albuquerque Operations Office

On August 2, 1994, the Defense Nuclear Facilities Safety Board (DNFSB) accepted the Department of Energy Implementation Plan which was prepared in response to the subject Recommendation. Tasks 1 through 5 describe a process where critical and unique skills and knowledge are to be captured and documented from personnel involved in weapon dismantlement, modification, assembly, and testing. Task 6, specifies requirements for the weapon dismantlement schedule. Specifically, Commitment 6.2 of that Task requires:

> "The Albuquerque Operations Office shall review and revise, if necessary, the current weapon dismantlement schedule. This prioritized schedule will then be used to support implementation of the final information gathering process that will maximize use of identified personnel while they are readily available. Safety will remain the primary consideration for developing schedule priorities."

A draft schedule for all weapon systems was provided to the DNFSB staff in September 1994. The schedule depicted when the first dismantlement unit is planned for the retired systems and when the disassembly and inspection review is planned for the enduring systems. No description was provided, however, of the rationale or process by which the schedule was developed.

In order to fully meet the implementation plan and address comments from the DNFSB, I am requesting the most current schedule along with documentation which provides a description of how the schedule was developed. This description needs to include: how the prioritization was developed; safety issues which were considered (weapon or personnel related); consideration of personnel currently available; and any other information used in deriving the schedule.

Please have your staff contact Tom Staker at (301) 903-3165 to coordinate the response.

Charles J. Beers, Jr.
Rear Admiral, U.S. Navy
Deputy Assistant Secretary for
Military Application and
Stockpile Support
Defense Programs

cc:
Dr. C. Tarter, Director, LLNL
Dr. S. Hecker, Director, LANL
J. Crawford, Director, SNLL

DOE F 1325.8

United States Government | Department of Energy

Memorandum

Albuquerque Operations Office

DATE: OCT 31 1994

REPLY TO ATTN OF: WQD:WEB:RJL

SUBJECT: DNFSB Recommendation 93-6, Commitment 6.2

TO: Martin J. Schoenbauer, DP-222, HQ

In our response to you on Commitment 6.2 of the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 93-6 dated September 26, 1994, we indicated that the D&I reviews or the Quality Evaluations for Surveillance (QES) schedule would be available by the end of October 1994. That schedule is attached to this memorandum. Please note that this schedule is based on the latest schedule of disassemblies and inspections (D&I) and will have to be revised if those schedules are affected by unplanned maintenance activities.

As the schedule indicates we have been conducting and will be continuing to conduct a QES for each enduring stockpile system. The requirements for Chapter 3.7 of AL's Development and Production Manual (Appendix 56XB) has been evolving and the QES that have been completed to date reflect that evolution. This schedule also reflects our plans to meet the latest requirements set forth in Chapter 3.7, dated 9/23/94.

QES differ from other Quality Evaluations (QE) in that QES will be conducted as on-line reviews only rather than conducting a review on a trainer configuration prior to the on-line review. D&Is of the enduring stockpile systems have been accomplished on an annual basis for a number of years and represents a continual process. The on-line review will be conducted with a number of units at different stages of disassembly. This approach will be documented in the QE Plan-Of-Action as required by paragraph 9.4.1 and also in the QE Planning Document in accordance with paragraph 9.3.1.

Please contact me at FTS 505 845-5081 or Robert J. Lopez at FTS 505-845-5069 if you have any further questions regarding the DOE's New Material and Stockpile Evaluation Program.

for Ralph Levine, Program Manager
Weapons Evaluation Program
Weapons Quality Division

Attachment

cc w/o attachment:
S. J. Guidice, QNDP, AL
D. Monette, WPD, AL

Qualification Evaluation for Surveillance(QES)
Schedule (10/31/94)

SYSTEM	QES REVIEW	REMARKS
B53	OCT 94	QES started and still in progress
B61-3,4,10	OCT 95	To be conducted per D&P Manual Chapter 3.7 dated 9/23/94
B61-7	OCT 95	To be conducted per D&P Manual Chapter 3.7 dated 9/23/94
W62	FEB 94	Second phase of QES still to be completed.
W76	JAN 94	QES completed
W78	SEP 94	QES completed
W80	AUG 95	To be conducted per D&P Manual Chapter 3.7 dated 9/23/94
B83	OCT 93	QES completed
W84	AUG 95	To be conducted per D&P Manual Chapter 3.7 dated 9/23/94
W87	APR 95	To be conducted per D&P Manual Chapter 3.7 dated 9/23/94
W88	DEC 94	To be completed per D&P Manual Chapter 3.7 dated 2/14/94.

Weapon Dismantlement Program

First Dismantlement Unit (FDU)
Disassembly and Inspection (D & I) Review

Weapon System	FDU (Notes 1 & 7)	D & I Review (Notes 2 & 8)
W48	November 1994 (restart)	N/A
B53	N/A	October 1994 (Note 3)
W55	December 1994 (restart)	N/A
W56	August 1995	N/A
B57	July 1994 (restart)	N/A
B61	February 1995	October 1995 (Note 4)
W62	January 1996	February 1994 (Note 5)
W68	June 1994 (restart)	N/A
W69	October 1996	N/A
W70	June 1994 (restart)	N/A
W71	August 1994	N/A
W76	October 2000	January 1994 (Note 6)
W78	October 2003	September 1994 (Note 6)
W79	January 1995	N/A
W80	February 2004	N/A
B83	N/A	October 1993
W84	N/A	August 1995 (Note 4)
W87	N/A	April 1995 (Note 4)
W88	N/A	December 1994 (Note 4)

Notes:

1. Reference: Program Control Document (PCD) Version 19 of September 12, 1994
2. Reference: DOE/AL WQD memorandum of October 31, 1994
3. D & I started and still in progress
4. Conducted per D & P Manual Chapter 3.7 of September 23, 1994
5. Second phase of D & I still to be completed
6. D & I completed
7. A First Disassembly Unit is only performed on those systems which are scheduled for retirement within the next 10 years.
8. A Quality Evaluation for Surveillance is performed whenever a D & I review is done. A Disassembly and Inspection review is performed on enduring stockpile weapons only.

Enclosure 4

1. Major Task Initiative 6. That a program be developed to ensure all applicable safety hazard information and known experiences and knowledge are considered when developing weapon dismantlement or modification procedures. Accomplishment of this task will have the added benefit of further strengthening and formalizing the participation of design laboratory experts in concert with production and evaluation experts in the safety aspects of weapons dismantlement and modification.

2. Development of Weapons Disassembly Procedures and Laboratory Support to Pantex

   A. Responsibility

   The Albuquerque Operations Office is responsible for the implementation of this task, subject to the final approval and acceptance from the Deputy Assistant Secretary for Military Application and Stockpile Support. Relevant Management and Operating contractors and the nuclear design and engineering laboratories will be integral to the implementation of this task.

   B. Commitment 6.3

   Consistent with the intent of the Stockpile Management Plan, update and formalize the dismantlement and modification procedure development process. The formalized process will integrate the results of ISSKP 5 (critical safety hazard information) with all other safety hazard information into the disassembly procedure development process. The process will cause current dismantlement and modification procedures (either non-enduring stockpile disassembly or enduring D&I procedures) to be validated and updated. The process shall include a review of these documents by the original design teams, SEP teams, and original production teams, as available, and specify how the process will be accomplished. The process shall specify participants by expertise (including those identified in ISSKP 3), criteria to meet the objectives, documentation to be reviewed (including that documented by ISSKP 5, accelerated aging analysis and SEP sample analysis reports), and the process deliverable (final disassembly or revised D&I procedures).

   * Deliverable: Documented process for developing safe dismantlement and modification procedures. The process will be formalized by its incorporation in the Development and Production Manual.

   * Due Date: October 1994

3. Status:

   Attached is a revision to AL 56XB, Development and Production Manual, Chapter 3.7 in partial fulfillment of this requirement. In addition, an Interagency Engineering Procedure, EP401110, "Integrated Safety Process for Assembly and Disassembly of Nuclear Weapons", has been issued in draft form. Recent efforts by DOE Albuquerque Operations Office to formalize this process are also applicable to this Commitment.

The Albuquerque Operations Office is adopting a new approach to the weapon readiness review process in order to ensure the "technical safety" of weapon operations at the Pantex Plant. The plan is intended to integrate:

- Nuclear facility standards (DNFSB 93-1),
- SS-21 process design requirements, and
- Readiness review and appraisal processes which are more rigorously designed and documented.

The intent of this approach is to provide a "single thread" of clear requirements for all nuclear weapons readiness reviews and appraisals. DOE/AL's proposed implementation of this approach is by rewriting AL SD 5610.10 and AL SD 5610.11.

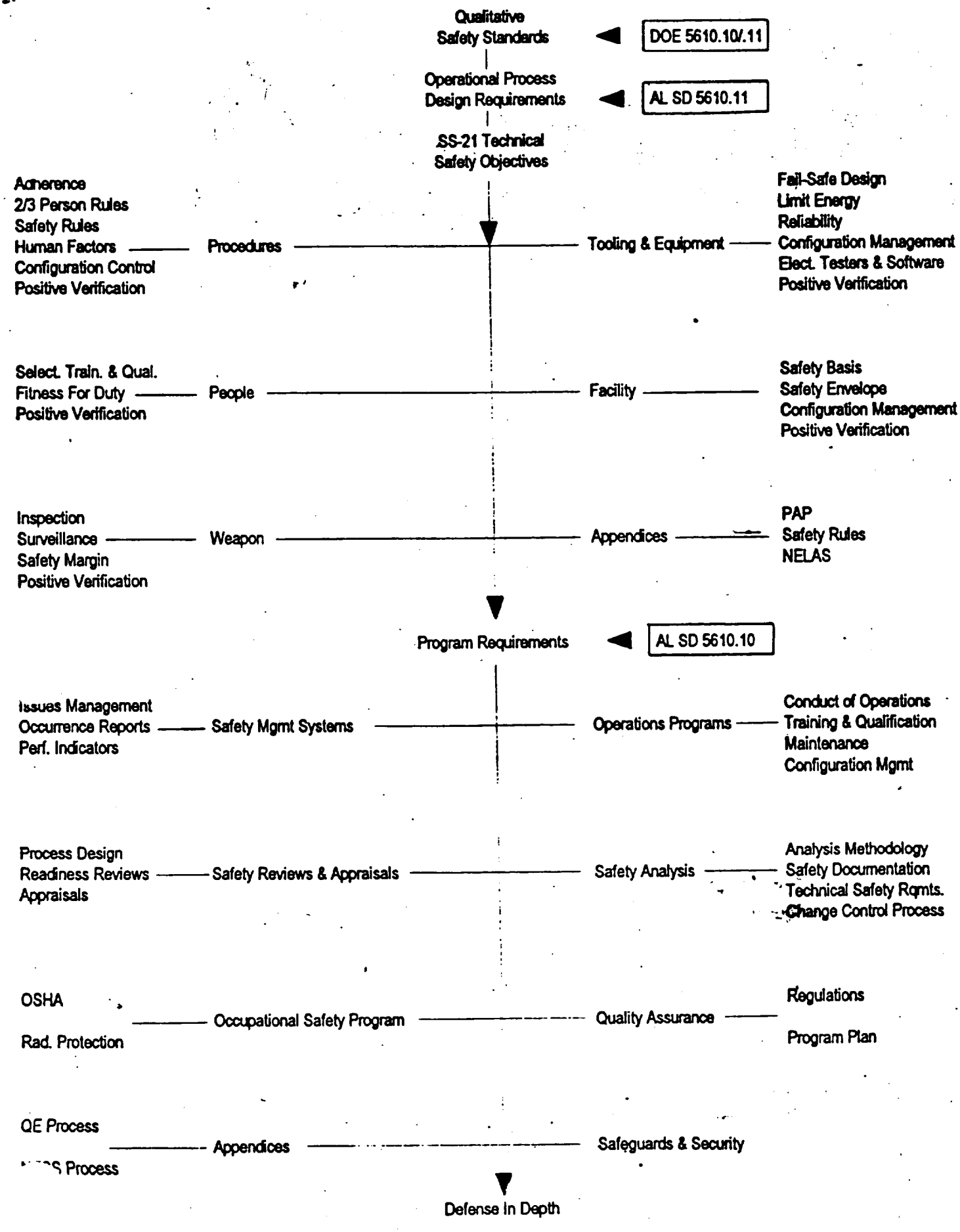
The revised AL SD 5610.10, Nuclear Explosive and Weapon Safety Program Requirements, will contain the following features:

- Uses the DNFSB 93-1 analysis to incorporate nuclear facility standards as program requirements,
- Highlights key requirements in nuclear facility standards relative to weapons safety, and
- Integrates unique weapon safety standards with nuclear facility standards.

The revised 5610.11, Nuclear Explosive and Weapon Safety Process Design Requirements, will contain the following features:

- Incorporates SS-21 process design requirements, and
- Provide linkage back to program requirements described in the new AL SD 5610.10.

As shown in the attached diagram, these procedures will provide a "single thread" of clear requirements for all readiness reviews and appraisals. Beginning November 6, 1994, this program will be reviewed by affected agencies such as DOE Albuquerque Operations Office, DOE/Amarillo Area Office, Mason & Hanger/Pantex, DOE Headquarters and the design laboratories. The schedule for revision of the SD's and an implementation plan will be provided to the Board in the next quarterly report.


Qualitative
Safety Standards
DOE 5610.10/.11
Operational Process
Design Requirements
AL SD 5610.11
SS-21 Technical
Safety Objectives
Adherence
2/3 Person Rules
Safety Rules
Human Factors
Configuration Control
Positive Verification
Procedures
Tooling & Equipment
Fail-Safe Design
Limit Energy
Reliability
Configuration Management
Elect. Testers & Software
Positive Verification
Select. Train. & Qual.
Fitness For Duty
Positive Verification
People
Facility
Safety Basis
Safety Envelope
Configuration Management
Positive Verification
Inspection
Surveillance
Safety Margin
Positive Verification
Weapon
Appendices
PAP
Safety Rules
NELAS
Program Requirements
AL SD 5610.10
Issues Management
Occurrence Reports
Perf. Indicators
Safety Mgmt Systems
Operations Programs
Conduct of Operations
Training & Qualification
Maintenance
Configuration Mgmt
Process Design
Readiness Reviews
Appraisals
Safety Reviews & Appraisals
Safety Analysis
Analysis Methodology
Safety Documentation
Technical Safety Rqmts.
Change Control Process
OSHA
Rad. Protection
Occupational Safety Program
Quality Assurance
Regulations
Program Plan
QE Process
Appendices
Safeguards & Security
Defense In Depth

Contents

1.0 PURPOSE

This chapter describes the Qualification Evaluation (QE) process and defines requirements for determining readiness to startup, restart, or continue weapon assembly/disassembly operations at the Pantex Plant. The primary purpose of the QE process is to formalize design agency (DA) independent review of the technical safety aspects of weapon processes and procedures.

2.0 CANCELLATION

None.

3.0 SCOPE

The scope of the Qualification Evaluation is described by the breadth and depth of the requirements in paragraph 9.0.

This chapter is intended to complement the Nuclear Explosive and Weapon Safety Programs directed by AL Supplemental Directives (SDs) 5610.10 and 5610.11. All changes to weapon assembly/disassembly operations resulting from this evaluation must also be reviewed and approved as specified in AL SD 5610.11 Chapter IV.

This chapter is also intended to complement AL SD 5480.31, "Startup and Restart of AL Facilities, Activities and Operations," with regard to weapon assembly or disassembly. In some cases, as warranted by unique conditions, other provisions of AL SD 5480.31 may also be invoked to determine readiness.

This chapter is not intended to replace qualification evaluation procedures to produce mark quality product as defined in EPs 401011, 401100, 401056 and EPs referenced therein.

4.0 APPLICABILITY

This chapter applies to all DOE/AL organizations, design agencies (DAs), and the operating contractor of the Pantex Plant. This chapter is applicable to the following situations:

- Start-up of all new production, retrofit, or dismantlement programs;
- Cyclic surveillance programs as specifically directed by DOE/AL;
- Restart of a weapon operation after an extended shutdown (one year or more);
- Restart following changes in weapon operations that impacted the safety basis (Safety Analysis Documentation);
- Restart following a significant modification in the operation as defined in Paragraph 6.0;
- Restart of a weapon operation following an unplanned shutdown due to significant safety concerns; or
- When directed by DOE/AL.

5.0 EXCLUSIONS

None.

6.0 DEFINITIONS

Qualification Evaluation (QE): A formal, systematic, performance-based examination of tooling, testers, equipment, procedures, personnel and facility controls to ensure that nuclear weapon assembly/disassembly operations will be performed in a safe and predictable manner.

Subsets of the QE are:

QED - Qualification Evaluation for Dismantlement
QEP - Qualification Evaluation for Production
QES - Qualification Evaluation for Surveillance

Qualification Evaluation Release (QER): A DA (Sandia National Laboratories [SNL], Los Alamos National Laboratory [LANL], Lawrence Livermore National Laboratory [LLNL]) engineering release that issues the results of a QE of the process.

Subsets of the QER are:

QER/D - Qualification Evaluation Release for Dismantlement
QER/P - Qualification Evaluation Release for Production
QER/S - Qualification Evaluation Release for Surveillance

Significant Safety Incident: Potential incidents that will cause serious injury or abnormal radiation exposure to personnel, initiation of any explosive or pyrotechnic, rupture of a high pressure vessel, or abnormal release of radiological contamination. This list is not meant to be all inclusive and reasonable judgment is expected.

Significant Modification: Changes to facilities, systems, components, or operations that result in a significant increase in the risk from a hazard beyond that previously analyzed and reviewed, or significant reduction in reliability of any item for which credit has been taken for reduction or control of a hazard. These changes may include introduction of a new hazard, application of new regulations, or receipt of new information indicating an increased hazard associated with an existing operation.

Safety Basis: The combination of information relating to the control of hazards of a weapon operation that DOE/AL depends on for its conclusion that operations can be conducted safely within the facility (Safety Analysis Documentation such as, but not limited to, the SAR, BIO, and CSSM).

Breadth: The set of core requirements that will be evaluated by the QE review team.

Core Requirements: The minimum standards for operation that must be met to ensure operations will be performed in a safe and predictable manner.

Depth: The actions necessary to evaluate an applicable core requirement.

Graded Approach: All core requirements must be evaluated against the minimum criteria specified herein. Depth may be varied for the specific operation being evaluated, however, it must be technically justified in the QE planning document.

On-Line Review: An evaluation of the War Reserve (WR) nuclear weapon, its major assemblies, or components.

Observation: An item identified during the QE review that, in the opinion of the reviewer, is noteworthy. Observations can be positive or negative and should be categorized as operational, procedural, or documentation.

Finding: An observation or group of observations identified by the QE Core Team and ranked as prestart (i.e., suspend or desist startup/restart of operations immediately pending further review), poststart (i.e., continue or startup/restart operations with approved corrective action plan), or enhancement (i.e., best management practice).

7.0 ASSISTANCE

Questions concerning this chapter should be addressed to the Director, Weapon Programs Division, DOE/AL.

8.0 POLICY

It is the policy of DOE/AL that nuclear weapon assembly/disassembly operations require an acceptable or conditional QER as described in Paragraphs 4.0 and 9.0.

9.0 REQUIREMENTS

Weapon assembly/disassembly readiness reviews shall be performed using the QE process. The QE is used to verify the readiness of personnel, procedures, processes, tooling, equipment, and facilities. It requires preplanning, planning, and determining readiness.

9.1 Core Requirements for Evaluation

The five core requirements for evaluation are as follows:

9.1.1 Procedures

Procedures adequately address the potential for significant safety incidents (see definition in Paragraph 6.0).

9.1.2 Tooling, Testers, and Equipment

Tooling, testers, and equipment have been adequately designed relative to the potential for significant safety incidents (see definition in Paragraph 6.0).

9.1.3 Personnel

Nuclear weapon direct operating and direct support personnel are adequately trained and qualified to perform the operations evaluated.

9.1.4 Facility

Facility controls are adequate for the operations evaluated.

9.1.5 Weapon

Weapon-specific hazards are clearly understood relative to the operations evaluated.

9.2 Depth of Evaluation

The minimum depth of evaluation is defined as all bay and cell operations involving the assembly or disassembly of a nuclear weapon. This includes the bay or cell processing, packaging and staging of radioactive and hazardous components. It encompasses all aspects of safe nuclear weapon operations in the bays and cells:

- Nuclear Explosive Safety;
- High Explosive Safety;
- Electro-explosive Device (EED) Safety and Electrostatic Discharge Threat Mitigation;

- Criticality Safety;
- Industrial Safety and Hygiene;
- Radiological Protection and Health Physics;
- Environmental Protection and Waste Management.

9.3 Criteria and Review Approach for Evaluation

9.3.1 Procedures

As a minimum, procedures must be evaluated against the following criteria:

- Hazards are appropriately identified from all potential sources such as:

  a) those inherent in the original design;
  b) those introduced through aging;
  c) those associated with the normal assembly/disassembly process; and
  d) those associated with credible deviations (e.g., expected occasional damage of parts).

- An appropriate layered defense philosophy has been utilized relative to the hazards identified. This means "prevention" of a significant safety incident, "detection" of abnormal conditions that may lead to the incident and/or appropriate "protection" of personnel if the incident occurs.

- Procedures are written commensurate with the level of training and qualification of personnel performing the operations.

- Human factors principles are adequately utilized such that procedures can be skillfully adhered to, and simple human errors that can lead to a significant safety incident have been eliminated.

- Procedures appropriately treat potentially competing safety characteristics relative to incident consequences, e.g., high explosive safety vs. radiation safety.

The review approach is by team observation and evaluation of all bay and cell operations conducted by trained and qualified Pantex personnel. The required normal process is to first view these operations on a trainer configuration without fissile materials, tritium or main charge high explosives. This evaluation must be followed up by an "on-line review" of the first nuclear weapon; more than one weapon may be evaluated. Document reviews and personnel interviews are considered a supplement to, but not a substitute for, direct observation of operations. Justification for deviations from the normal process must be addressed in the QE Planning Document.

9.3.2 Tooling, Testers, and Equipment

As a minimum, tooling, testers, and equipment must be evaluated against the following criteria:

- Single point failures have been adequately minimized or eliminated.
- Appropriate calibration, maintenance and quality assurance programs are in place to maintain safety features.
- The design adequately considers human factors principles and ALARA radiation exposure to personnel.
- The probability of free-fall of main charge high-explosives leading to deflagration or detonation has been adequately minimized.

The review approach is the same as defined in Paragraph 9.3.1.

9.3.3 Personnel

As a minimum, personnel are to be evaluated against the following criteria:

- Personnel are knowledgeable of the procedures.
- Personnel adhere to the procedures.
- Personnel are skillful in performing the procedures.
- Personnel exhibit safety awareness commensurate with the hazards involved.
- Individual responsibilities and reporting relationships are clearly understood.

The review approach is by the same as defined in Paragraph 9.3.1.

9.3.4 Facility

As a minimum, the facility controls must be evaluated against the following criteria:

- Bay and cell pre-op checks are adequate to confirm the status and operability of safety systems in the Critical Safety Systems Manual (CSSM).
- Controls on bay and cell utility services (electrical power, vacuum, water, etc.) are appropriate for the safe operation of tooling, testers, and equipment. Safety limits have been identified where appropriate.
- Impacts of the operation on the bay or cell and vice-versa have been adequately considered relative to the potential for significant safety incidents.

- The need for a routine or abnormal event drill program for the operations evaluated.

The review approach is the same as defined in Paragraph 9.3.1.

9.3.5 Weapon

As a minimum, the weapon must be evaluated against the following criteria:

- Historical weapon surveillance data have been reviewed for safety-related information that may affect operations evaluated.
- Incoming or outgoing weapon inspection requirements (e.g., radiography, etc.) are adequate.

As a minimum, the historical surveillance data base on SNL and LANL/LLNL components must be reviewed. The requirements of Paragraph 9.3 apply to inspections.

9.4 Qualification Evaluation (QE) Process

9.4.1 QE Plan-of-Action

DOE/AL ONDP will prepare a QE Plan-of-Action that provides the following information:

- Definition of the basic activity to be evaluated and the reason for conducting the QE
- Definition of any prerequisites to conducting the QE.
- Definition of any nuclear explosive safety requirements.
- Definition of any AL SD 5480.31 requirements.
- An integrated schedule for completing the requirements.

DOE/AL OOM will authorize the QE Plan-of-Action.

9.4.2 Pantex Statement of Readiness

The Pantex Plant operating contractor shall issue, from the Plant Manager, a letter of readiness to proceed with the QE to the DOE/AAO Area Manager. For the operations to be evaluated, it must include:

- A certification that weapons direct and direct support personnel have been trained and qualified.

- A certification that all procedures, tooling, testers, and equipment have been formally approved.
- A certification that the facility (bays and cells) safety basis documentation has been reviewed and that planned operations are within the safety envelope so described.
- A certification that all other applicable Environmental, Safety and Health (ES&H) and Waste Management requirements have been met.
- A description of the activities the operating contractor performed to assure readiness to proceed. The documentation provided to DOE/AAO should specifically address the provisions of Pantex Plant STD-7301, Operational Readiness Procedure.

After review of the above documentation, investigation of any suspected shortcomings, and consultation with the QE cognizant DOE/AL Division, the DOE/AAO Manager will forward a recommendation to the DOE/AL Manager on readiness to proceed. In particular the DOE/AAO must confirm that planned operations are within the facility safety basis as defined by the safety analysis documentation. DOE/AAO may request assistance from DOE/AL in making this determination.

9.4.3 QE Team Membership

9.4.3.1 Core Team Membership

A QE Core Team shall be established prior to each QE. The minimum QE Core Team consists of the following members:

- LANL or LLNL Team Leader;
- SNL Team Leader;
- Pantex Operating Contractor (ad hoc member);
- DOE/AAO (ad hoc member); and
- DOE/AL (ad hoc member).

The SNL and LANL or LLNL Team Leaders are responsible for technical judgements on components and assemblies designed and controlled by their laboratory. The DA Team Leaders will establish DA technical teams with qualified members to fulfill the requirements of the QE process. The DAs are considered to be independent of the Pantex operating contractor with the condition that no DA Team Leader or technical team member will be responsible for reviewing what is substantially their own work product. The DAs may utilize their own outside experts at their discretion.

The Pantex operating contractor ad-hoc member to the Core Team coordinates and facilitates the QE process at the plant site and followup closure on findings. Further explanation of DOE roles and responsibilities is provided in paragraph 10.0.

9.4.3.2 Membership Qualifications.

- DA Core Team and technical team members must be independent of the Pantex operating contractor as defined in 9.4.3.1. In the unusual case where DA personnel may be performing the actual operations at the Pantex site, the DAs will form teams independent from those directly responsible for the operations.
- Core Team and other technical team members should have adequate technical qualifications (knowledge, training, and experience) and be familiar with the type of operations being evaluated.

9.4.4 QE Planning Document

The QE Core Team formulates and issues the QE Planning Document prior to conducting the evaluation. Minimum contents shall be as follows:

- Description of the weapon, major assembly, or component that is the subject of the evaluation;
- Process description, including a flow diagram;
- The team members, their technical qualifications and areas of responsibility (abridged version, biographies included in final report);
- The minimum criteria and review approach defined in Paragraph 9.3;
- Additional criteria and review approaches developed by the QE Core Team.
- Reference and utilize the definitions provided in Paragraph 6.0; and
- Schedules for the evaluation, issuance of the QER, and final report.

The Director, DOE/AL WPD or WQD authorizes the QE Planning Document.

9.4.5 Conduct of the QE

9.4.5.1 Findings/Observations

- At the conclusion of each day's QE activities, observations shall be critiqued and categorized individually or collectively by the QE Core

Team and ranked into one of three categories of findings: prestart, poststart, or enhancement.

- Prestart findings shall be closed prior to startup, restart, or continuation of weapon assembly/disassembly operations. Poststart findings do not have to be closed prior to startup, restart, or continuation. However, corrective action plans, including schedules, shall be written and approved by the DAs prior to startup, restart, or continuation. Findings categorized as enhancements are considered best management practices and need to be evaluated by the Pantex Plant for possible implementation.

9.4.5.2 Close-out Meeting

Upon completion of the evaluation, the DAs shall conduct a close-out meeting with the Pantex Plant Manager or his designated alternate, DOE/AAO, and DOE/AL to discuss the QE findings and observations. The DAs shall then issue a QER, which is a signed and controlled document summarizing the results of the evaluation.

9.4.5.3 Issuance of a QER.

A QER status is assigned to indicate the results of the evaluation as follows:

- A QER status of Acceptable is assigned when the QE Core Team concurs that the criteria specified in Paragraph 9.3. have been met and only after an "on-line review" of operations has been completed.

- A QER status of Conditional is assigned when the QE Core Team determines that criteria specified in Paragraph 9.3 have been met, but poststart findings have been identified that must be corrected in order to revise the status to Acceptable. A conditional QER is required to proceed with an "on-line review."

- A QER status of Unacceptable is assigned when the QE Core Team determines that the criteria specified in Paragraph 9.3 have not been adequately met (i.e., prestart findings exist) and that corrective action is required before startup, restart, or continuation of operations.

- A QER status of Expired is assigned when the QE Core Team determines that there was a failure to complete corrective action(s) required by the Conditional QER.

A conditional or acceptable QER must stand on its own in identifying *all* prestart issues, poststart issues with approved corrective action plans, and enhancements. In addition, it must explicitly state that "no findings were identified, either

individually or collectively, that warrant suspension or non startup of the operations evaluated.* The status of a QER may be revised any time conditions warrant such a revision. All participating organizations must be on distribution for the QER and its revisions.

9.4.5.4 Approval of the QER

The DAs shall identify a single organization within each DA, and the specific personnel by name and title that are authorized to approve QERs. The weapon system engineering organizations in each DA shall be assigned this responsibility. The head of the organization will approve and sign the initial issue of the QER and will be responsible for the qualifications of the person or persons formally designated to approve revisions.

9.4.5.5 Final Report

A QE Final Report shall be issued for each QE. The QE Final Report shall include items such as descriptions of observations and findings, actions taken, change documentation, lessons learned, and engineering releases. Minority opinions shall appear verbatim in the report. The QE Final Report shall also include a comprehensive history of the evaluation and shall be published as soon as possible after the close-out briefing at the Pantex Plant.

9.4.5.6 Closure of Findings

When prestart or poststart findings require corrective actions by the Pantex Plant operating contractor, the closure packages will be submitted to the DAs for review and approval. The QER will be formally revised to document closure.

10.0 RESPONSIBILITIES

10.1 DOE/AL Office of the Manager (OOM)

The OOM authorizes the QE Plan-of-Action and the startup, restart, or continuation of weapon assembly/disassembly operations.

10.2 DOE/AL Office of National Defense Programs (ONDP)

The ONDP provides overall management direction of the QE program. The ONDP prepares the QE Plan-of-Action and recommends authorization to the OOM for the startup, restart, or continuation of weapon assembly/disassembly operations.

10.3 DOE/AL Weapon Programs Division (WPD)

The WPD ensures that the QED or QEP process is followed and participates as an ad hoc member of the Core Team. The WPD authorizes the QED or QEP Planning Document and ensures a QER/D or QER/P has been issued prior to the startup, restart, or continuation of weapon

assembly/disassembly operations. The WPD acts to ensure that the DAs, the Pantex Plant, and various DOE/AL divisions commit adequate resources for the day-to-day resolution of QED and QEP problems.

10.4 DOE/AL Weapons Quality Division (WQD)

The WQD ensures that the QES process is followed and participates as an ad hoc member of the Core Team. The WQD authorizes the QES Planning Document and ensures a QER/S has been issued prior to the startup, restart, or continuation of a surveillance disassembly and rebuild assembly, if required. The WQD acts to ensure that the DAs, the Pantex Plant, and various DOE/AL divisions commit adequate resources for the day-to-day resolution of QES problems.

10.5 DOE/AL Nuclear Explosive Safety Division (NESD)

The NESD reviews the QE findings and recommended changes and assures that the requirements of AL SD 5610.11, Chapter IV are met.

10.6 Design Agencies (DA)

Conduct QEs per the requirements of this chapter.

10.7 DOE/Amarillo Area Office (AAO)

The AAO participates as an ad hoc member of the QE Core Team. The AAO Manager complies with the provisions of paragraph 9.4.2.

10.8 Pantex Plant

- The operating contractor must comply with the requirements of this chapter.
- The operating contractor must provide adequate support to the DAs during conduct of the QE.
- The operating contractor must assess the corrective actions required for prestart and poststart findings for root cause/lessons learned and provide a report to DOE/AL and DOE/AAO within 90 days of the closeout meeting. It must also describe its course of action with regard to recommended enhancements.
- The QE process does not absolve the operating contractor from ultimate responsibility for safe nuclear weapon operating processes and procedures, procedural adherence, proper training and certification of operators.

Enclosure 5

1. Major Task Initiative 9. Review and upgrade, as required, programs that preserve processing, assembly, and disassembly capabilities at the Oak Ridge Y-12 Plant. Accomplishment of this task will ensure consistency, throughout the Department, in maintaining access to capabilities and capturing the unique skills and knowledge of individuals who have been engaged in critical defense nuclear activities.

2. Preservation of Assembly and Disassembly Skills at Oak Ridge

   A. Responsibility

   The Oak Ridge Operations Office is responsible for the implementation of this task, subject to the final approval and acceptance from the Deputy Assistant Secretary for Military Application and Stockpile Support. Relevant Management and Operating contractors and the national weapons laboratories will be integral to the implementation of this task.

   B. Commitment 9.1

   The Y-12 Plant will review its existing list of critical functional areas and the associated skills and knowledge requirements related to disassembly of all weapons and will document the methods used in preparation of this listing. These will be submitted to the design laboratories for review and for their determination of whether there are key positions at the laboratories associated with these critical functional areas. If so determined, these critical areas will be incorporated into the ISSKP by the laboratories.

   * Deliverable: Y-12 list of critical functional areas and associated skills and knowledge requirements and methods used in preparation of the list.

   * Due Date: November 1994

3. Status:

   The methodology for critical knowledge preservation at Oak Ridge Y-12 plant is attached. The list of critical functional areas and associated skills and knowledge requirements will be provided by the end of January 1995.

Attachment 2 to Letter,
Bostock to Spence,
Dated: October 18, 1994

METHODOLOGY FOR CRITICAL KNOWLEDGE PRESERVATION

AT THE OAK RIDGE Y-12 PLANT

I. INTRODUCTION

The Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 93-6 is concerned with mitigating the loss of expertise and safe operations knowledge during the present downsizing of the Nuclear Weapons Complex (NWC), specifically in the areas of weapons testing at the Nevada Test Site and teardown/disassembly at Pantex and Y-12. Each affected site has been directed to work with the Department of Energy (DOE) to come up with a coordinated plan that can be applied across the NWC as appropriate.

Approximately 90 percent of process knowledge at Y-12, especially the disassembly operations and criticality safety aspects, is already written down in the form of process development reports and process operating procedures (see the attachment for supporting data). The objective of the present project will be to capture as much as possible of the remaining 10 percent of anecdotal, historical, diagnostic sorts of knowledge that is held informally by individuals. Also, the Process Capabilities Assurance Program (PCAP), as a part of its program, performed a functional analysis of production operations at Y-12 which is a good overview of the production environment that forms the backdrop of the present knowledge preservation project. A copy (Official Use Only) of the PCAP study is available in an unnumbered report from W. D. Babb of the Y-12 Development Division, or from the Department of Energy, Albuquerque Operations Office, that coordinated the NWC PCAP project.

Staff workers at Sandia National Laboratory (SNL) have developed an effective videotaping methodology for interviewing weapons designers, testing engineers, and others with broad technical knowledge. We strongly agree with their approach for their population of experts. However, at Y-12, the expertise occurs in small, well-defined domains, such as the details of how to machine a particular part, or how to safely take apart a certain canned subassembly. There is usually only one individual for each small domain. We propose a personal interview technique for the Y-12 environment which is a simpler variation of the SNL methodology, one that can economically handle most of the production-related knowledge. If technical generalists are encountered, then the SNL videotaping methodology will be used.

II. SELECTION OF CANDIDATES

At the Y-12 Plant, the PCAP task force has already done a complete functional analysis of Y-12 operations and has produced a list of essential facilities, processes, and skills, including disassembly. The existing training programs identify people with essential skills or with a need to work with nuclear materials. Additionally, the managers in each major area will be asked to put key personnel names with each functional area. Skills associated with weapons testing and teardown/disassembly will be given first priority in order to meet the intent of DNFSB Recommendation 93-6. Retiring or at-risk individuals will be processed first.

For other sites that have not done something comparable to a PCAP functional analysis, a good technique for selection of candidates is to take the site organization chart and work down from the level of major processing areas. At each level, ask the managers for their most difficult and trouble-prone processes, and ask them to name their key individuals. The appendix includes a sample questionnaire for a process area manager. Once you have worked down to the individual shop manager level, most of the key people will be identified. As you talk to the identified individuals, ask them to name other key individuals. This technique works very well; any given manager or experienced technical person will instantly name three or four key, experienced people.

III. DECIDING UPON A RECORDING MEDIUM

Initial experience indicates that the bulk of the knowledge to be covered is held in small, well-defined pockets by separate individuals, and that these can be captured in short personal interviews. Accordingly, the typical recording medium will be a text file on a computer. Some cases, such as subassembly teardown, will be recorded on videotape, with audio commentary. The SNL videotaping methodology will be used for any broadly based technical expert.

IV. CONDUCTING INTERVIEWS

An interviewer will conduct a one-to-two-hour personal interview with the subject expert. In some cases, a peer of the subject expert may also be invited (taking a cue from the SNL videotaping methodology). Brief hand notes will be taken by the interviewer, just enough to allow memory recall and reconstruction of the conversation. If the subject expert has key knowledge in more than one domain, for example, several different key processes, then a separate interview should be done for each domain.

The interview process is pivotal to success in the project. Good interpersonal techniques must be used. Remember that we are dealing with skilled individuals who may feel threatened by downsizing. One must elicit information in a concerned, interactive, conversational way. If we are too aloof, interrogative, and demanding, then nothing useful will be forthcoming. On the other hand, an accomplished person is eager to tell his or her story, and absolutely lights up while doing so, if approached with genuine interest and appreciation. In all cases, give the interviewee all opportunity to talk.

Keeping in mind that approximately 90 percent of the most significant process and criticality safety knowledge is already written down in formal reports and operating procedures, the interviewer will concentrate upon those items of knowledge and experience that are outside and beyond the existing documentation. Some examples are:

* Unusual/difficult nuclear safety issues
* Unusual/difficult work with toxic, hazardous materials
* Work requiring great skill, precaution, insight, experience
* Exception handling not fully specified in procedures
* Subjective areas not covered by procedures

* Common mistakes, omissions, commissions

* Significant previous problems and how solved

* Reasons for choosing current methods

A questionnaire will be used to stimulate the subject's thinking (see examples in the appendix), and will be used as a loose guide only. The subject will be allowed to take the interview into areas that he/she thinks are important. The interviewer merely tries to keep the discussion within the general domain of interest.

The disassembly operations are and have been routinely videotaped as a standard operating procedure. Written disassembly procedures are available. Some representative cases of the disassembly operations will be commented by a subject expert as videotaping proceeds.

V. TRANSCRIBING AND VERIFICATION OF DATA

The handwritten notes from a personal interview will be used by the interviewer to reconstruct the main content of the conversation. An ASCII text file will be constructed for each interview. The subject expert will review, comment, correct, and supplement the information in the file.

Initial experience indicates that, for a production environment, the notes for a typical interview will occupy only two to ten pages of text, giving succinct and specific details. Moreover, we estimate that only 75 individuals will need to be interviewed, resulting in a manageably sized collection of files and other materials.

VI. DATA ARCHIVING FOR ACCESSIBILITY

A first option for long-term archiving is to take the text material, which is expected to be the bulk of all that is collected, and publish it in a few hard copy reports arranged by technology areas.

For long-term preservation of the text files, the ASCII text format will be used. This will provide a data format that will be the most likely to be supported by the widest range of future computer technologies (current word processing formats have a lifetime of only a few years).

Keeping the interviews in separate text files will provide a means to organize by subject (by use of subdirectories), to quickly access or print any interview, and to easily update any interview by means of a simple text editor.

The Weapons Laboratories have indicated that they will use a Mosaic User Interface with a Wide-Area Information Server (WAIS) text search module. The text files that will be produced here are compatible with WAIS and Mosaic. We will provide a Unix workstation with a Mosaic interface in a secure area of the Y-12 Plant. Current computer security rules may or may not allow NWCwide network access.

VIII. APPENDIX

A. Previously-Completed Knowledge Capture Projects

Dr. J. M. Googin (recently deceased) was a chemist/metallurgist who came to Y-12 during its start-up in the 1940s, and who was involved in every significant plant-level technical problem since that time. Most of the key production processes were either devised outright by him, or had a major contribution from him. He was the premier technical expert on Y-12 operations. Before he died, a series of videotapes were made by him in three major subject areas: weapons physics, weapons materials, and enriched uranium processing. He gives much historical data and insights into why things were done the way they were. There are approximately ten tapes.

Herman Butler, a long-term employee in the enriched uranium area, was brought back from retirement on a consulting basis to record as much as possible of his technical expertise and experience. The information from a series of interviews was organized by topic in a hypertext medium.

Several expert systems that have already been done on Y-12 operations that not only capture expertise, but make it available to less-trained workers:

APM (Automatically Programmed Metrology) - Given a machined part, such as a hemishell, that must be inspected to close tolerances on the contour, APM is an expert system that takes the dimensional data, analyzes the part shape for its similarity to known cases, and produces a set of instructions on how to inspect the part. Captured knowledge is used to decide how many points to take and in what locations. Expert knowledge is applied in deciding how to handle unusual features of the machined part, such as slots, grooves, and holes. The output of the program can be fed to other programs that produce downloadable inspection machine code.

RIGS (Rolling Information Generation System) - An expert system that generates rolling mill instructions for producing plate and part-blank stock from uranium and uranium-alloy billets. The billet temperature, the amount of flattening per pass, the positioning of the billet on succeeding passes, and other factors must be carefully controlled to produce a plate or blank with the desired metallurgical properties. This is a highly specialized activity in uranium operations, performed until recently by a single planning expert (now retired). The RIGS program captures a large part of his knowledge and makes it available to less-experienced planners. Additionally, metallurgical engineering knowledge was incorporated into the program such that it is now considered more skilled than even the subject expert.

TOCA (Traced Oralloy Casting Advisor) - An expert system that produces instructions for making Oralloy castings with uniform loadings of trace elements. It selects the material types, forms, and amounts; specifies the furnace type and temperature profile; selects the form for pouring the billet; and specifies the quenching and cooling conditions. This activity was previously handled by a single experienced engineer, using heuristic knowledge accumulated over a forty-year time period.

HTDA (Hydroforming Tool Design Advisor) - An expert system for generating instructions on how to fabricate large (up to 32-inch diameter) metal forms and mandrels for use in hydroforming metal parts operations. Selects the forms material or alloy and its metallurgical preparation; specifies the fabrication process (machining, forging, etc.); and lists the fabrication parameters (temperature profile, quenching, etc.). This program captures the practical knowledge accumulated by relatively few engineers over a forty-year time period.

MIG (Maintenance Importance Generator) - An expert system for advising maintenance planners on the order of working the extensive backlog of Y-12 jobs (approximately 20,000). It incorporates knowledge of DOE and local policy, and captures the expertise and best practices of many individuals, both in maintenance and on the customer side. The MIG program is a formal part of the Y-12 Conduct of Facilities Operations procedures and has been used to answer many auditors demands for a systematic, consistently applied method for prioritizing work.

B. Questionnaire for an Area Manager

NAME:

PHONE:

WORK AREA:

What does your area do?

What are the input materials, and what is the product?

Name any processes that involve unusual or demanding nuclear safety issues.

Name any processes that involve unusual or demanding safety considerations.

What are your most hazardous processes with regard to toxic/hazardous materials?

Describe any near misses that your area has had in nuclear safety or health and safety categories. How were they handled?

Name the three or four most important processes, from a plant standpoint, in your area.

Name the three or four most difficult processes in your area.

Name your three or four most knowledgeable/experienced workers.

Do you have any jobs that require great skill, precaution, insight, or experience?

Are there any individuals that you cannot do without?

If you had to start up a new program, who would do the planning and/or provide key input?

Think of the most difficult process in your area. Why is it difficult? (anything - materials, scheduling, people skills, etc.)

Name the most breakdown-prone process in your area.

Tell me a war story. What was the most difficult weapons part that you had to do in this area?

Go down the list of the processes in this area and tell me who does the planning for each process.
Name some significant previous problems or challenges handled by your work area.

C. Questionnaire for a Process Operations Expert

NAME:

PHONE:

SUPERVISOR:

What is the name of your process?

What does your process do?

What are the input materials, and what is the product?

Does your process involve unusual or demanding nuclear safety issues? Describe.

Does your process involve unusual or demanding safety considerations? Describe.

Does your process involve toxic/hazardous materials? Describe.

Describe any near misses that your process (including other workers) has had in nuclear safety or health and safety categories. How were they handled?

Tell me a war story. Pick one where people did not know at first know how to handle the problems.

What sort of routine problems do you encounter?

What is the fix for them?

What is the most difficult problem that you have worked on?

How did you solve the problem?

Are there written procedures for the recent jobs/parts/projects that you have worked? What are their report numbers?

Pick a difficult part/project that you have worked on. Walk me through the procedure.

Are there areas where you have to use judgement in ways not mentioned in the procedure?

Have you learned any unusual techniques for handling parts of your job? Describe.

What sort of mistakes, forgetfulness, or poor practices do you see people commonly doing?

If you were asked to train your replacement when you retire, what kinds of warnings and job tips would you give him/her?

D. Questionnaire for a Technical Subject Expert

NAME:

PHONE:

TECHNICAL SUBJECT(S):

What educational degrees and other training do you have?

Give me a brief synopsis of your job assignments since you were hired.

Name some other individuals who have worked in your specialty.

What special skills and personality traits does it take to work successfully in your subject area?

Do you have technical reports that you or others have done in this area?

Have you had to solve problems involving nuclear safety issues? Describe.

Have you had to solve problems involving toxic or hazardous materials? Describe.

Name some jobs that required your greatest skill, insight, and experience. (Note to interviewer: explore each job.)

Pick one of your tougher jobs and tell how you solved it and why you chose the approach that you used.

Have you handled work that is outside classical, "school" methods, that you had to devise some unusual, one-of-a-kind approach? Describe.

Have you ever had people say or imply that you wouldn't be able to solve a problem, but then you actually did? Describe.

Name some typical mistakes, omissions, commissions, or assumptions that you see others commonly making in your subject area.

Have you learned any unusual techniques for handling parts of your job? Describe.

If you were asked to train your replacement when you retire, what kinds of warnings and job tips would you give him/her?

EXISTING RECORDS AT Y-12 THAT PRESERVE PROCESS KNOWLEDGE AND ENSURE SAFE OPERATION:

The concerns expressed in Recommendation 93-6 are already, to a high degree, addressed by existing Y-12 records, policies and procedures. The knowledge preservation project should be viewed as adding additional value to an already-extensive program. The following items are offered in support of the above statements:

When any new process is developed for Y-12 production, a Process Development Report is written. Before the process is actually put on-line, it goes through a formal Test and Evaluation phase, and a report is written. A formal Safety Assessment is made and recorded. A Criticality Safety Assessment study is made and recorded. A formal Process Operations Procedure is written for the process, and a copy is kept in Plant Records. Before any worker can operate the process, they go through a formal training program and are periodically tested and certified. Boundary-controlled Material Access Areas prevent casual access of untrained personnel to nuclear materials.

Specifically for the disassembly operations, there are additional supporting factors. Historically, when the Weapons Laboratories designed a weapon, they also designed an assembly process *and a disassembly process* at the same time. The disassembly process is required because the stockpile of each weapon is subjected to a program of statistical sampling and teardown of units for quality evaluation and stockpile life projections. A few units each year of each Y-12-produced assembly come back to Y-12 and are disassembled. The disassembly operations are videotaped on a sampling basis for some programs and for all units on others. The disassembly knowledge is written down, formal procedures are in place, people are formally trained and certified, and the process continues to be exercised.

Taken altogether, the above indicates that the essential process and criticality safety knowledge is already recorded and is being used in training and daily operations. What is left is anecdotal information, philosophy, diagnostic techniques, odd insights, historical background, and the like, all of which can add some value and insight to safety and process operations.