94-0004840

Department of Energy
Washington, DC 20585

August 31, 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 December 10, 1993, the Defense Nuclear Facilities Safety Board (DNFSB) transmitted Recommendation 93-6 to the Department of Energy, which addresses maintaining access to nuclear weapons expertise. On July 5, 1994, the Department provided an Implementation Plan (IP) responding to 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 the August deliverables 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 2.1.1 (Enclosure 2) - Identify key positions associated with the critical safety activities, functions, and operations, with emphasis on the skills and knowledge to conduct operations safely such as assembly, onsite transportation, insertion/emplacement, arming and firing, timing and control, and post-shot operations for preparation of an underground nuclear test.

Commitment 3.1 (Enclosure 3) - To address the DNFSB letter of May 27, 1994, Defense Programs will conduct an immediate review to determine the effect of the recent loss of Headquarters personnel. This review will be a qualitative assessment to determine the current status of Defense Programs staffing and the need for additional, technically competent personnel within Defense Programs.

The deliverable for Commitment 3.1 is an executive summary. The full report is available upon request. If you need further information, please contact Colonel Harold J. Harris, U.S. Air Force, DP-12, at 301-903-3441.

Sincerely,

Everet H. Beckner
Principal Deputy Assistant Secretary
for Defense Programs

3 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. ISSKP 1 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 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.

* Deliverable: List of critical functional areas.

* Due Date: August 1994

(1) Description of Deliverable

The deliverable is the Safe Modification/Disassembly Operations Critical Functional Areas and Applicable DOE Orders list consisting of the nine functional areas for assembly, disassembly, modification, retrofit, and stockpile evaluation programs (Enclosure #1).

(2) Discussion

Nine currently defined functional areas for assembly, disassembly, modification, retrofit, and stockpile evaluation programs were reviewed by DOE/AL 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 DOE/AL's 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.

(3) Next Action: Commitment closed

C. Commitment 1.2: Due September 1994

D. Commitment 1.3: Due November 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 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.

ENCLOSURE 2

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

2. ISSKP 2 Identify Testing Skills and Knowledge

A. Responsibility

The Nevada Operations Office is responsible for the implementation of this section, subject to approval from the Deputy Assistant Secretary for Research and Development. Relevant Nevada Management and Operating contractors and the national weapons laboratories will provide assistance as required.

B. Commitment 2.1.1

Identify key positions associated with the critical safety activities, functions, and operations, with emphasis on the skills and knowledge to conduct operations safely such as assembly, onsite transportation, insertion/emplacement, arming and firing, timing and control, and post-shot operations for preparation of an underground nuclear test.

* Deliverable: List of key positions critical to the safe conduct of nuclear weapons testing.

* Due Date: August 1994

(1) Description of Deliverable

The deliverable is the Key Positions for the Safe Execution of Nuclear Test Activities list consisting of 7 functional areas with 39 positions (Enclosure #2).

(2) Discussion

The Key Positions for the Safe Execution of Nuclear Test Activities list identifies the key positions associated with the critical safety activities, functions, and operations for preparation and execution of an underground nuclear test. This list identifies 7 functional areas with 39 positions. The functional areas (corresponding positions are in parenthesis) are device assembly (3), convoy (1), emplacement/stemming (7), test execution (16), trailer park reentry (3), postshot drilling (4), and other (5). This list was developed by the Nevada Operations Office in conjunction with the national laboratories, relevant Nevada Management and Operating contractors, and DOE Headquarters.

(3) Next Action: Commitment closed

C. Commitment 2.1.2: Due November 1994

KEY POSITIONS FOR THE SAFE EXECUTION OF NUCLEAR TEST ACTIVITIES

DEVICE ASSEMBLY

- DEVICE ENGINEER (LLNL, LANL)
- NUCLEAR EXPLOSIVES ASSEMBLY FACILITY COORDINATOR (LLNL, LANL)
- ASSEMBLY TECHNICIAN (LLNL, LANL)

CONVOY--WSI CONVOY COMMANDER

EMPLACEMENT/STEMMING

- TEST DIRECTOR (LLNL, LANL, DNA)*
- TIMING AND FIRING ENGINEER (LLNL, LANL)
- ARMING AND FIRING TECHNICIAN (SNL)
- CONSTRUCTION ENGINEER (LLNL, LANL, DNA)
- REECo DOWNHOLE SUPERINTENDENT
- REECo DOWNHOLE CRANE OPERATOR

* THESE POSITIONS HAVE MULTIPLE RESPONSIBILITIES AS INDICATED ABOVE

KEY POSITIONS FOR THE SAFE EXECUTION OF NUCLEAR TEST ACTIVITIES (CONTINUED)

- HEALTH PHYSICIST/HEALTH AND SAFETY TECHNICIAN (LLNL, LANL, DNA, [SNL])*

TEST EXECUTION

- DOE TEST CONTROLLER*
- SCIENTIFIC ADVISORY PANEL MEMBER
  - -- SCIENTIFIC ADVISOR (CHAIRMAN) (LLNL, LANL)
  - -- EPA OFF-SITE RADIOLOGICAL SAFETY OFFICER
  - -- WSNSO METEOROLOGICAL ADVISOR
  - -- MEDICAL ADVISOR (REECo CONSULTANT)
  - -- DOE HEALTH PHYSICS ADVISOR
- TEST DIRECTOR (LLNL, LANL, DNA)*
- CONTAINMENT SCIENTIST (LLNL, LANL, DNA)
- TIMING AND FIRING ENGINEER (LLNL, LANL)*
- EG&G/EM CONTROL ROOM TECHNICIANS

* THESE POSITIONS HAVE MULTIPLE RESPONSIBILITIES AS INDICATED ABOVE

KEY POSITIONS FOR THE SAFE EXECUTION OF NUCLEAR TEST ACTIVITIES (CONTINUED)

- EG&G/EM RED SHACK TECHNICIANS
- USAF LIAISON OFFICER
- DOE TEST OPERATIONS OFFICER
- DOE AIR OPERATIONS OFFICER
- DOE RADIOLOGICAL OPERATIONS OFFICER
- DOE SECURITY ADVISOR
- WSNSO EVENT SUPPORT METEOROLOGIST
- WSNSO EVENT RADIATION FALLOUT SUPPORT SPECIALIST
- EPA OFF-SITE RADIOLOGICAL SAFETY PROGRAM PROJECT OFFICER
- WSI EVENT LIEUTENANT

* THESE POSITIONS HAVE MULTIPLE RESPONSIBILITIES AS INDICATED ABOVE

KEY POSITIONS FOR THE SAFE EXECUTION OF NUCLEAR TEST ACTIVITIES (CONTINUED)

TRAILER PARK REENTRY

- DOE TEST CONTROLLER
- TEST DIRECTOR (LLNL, LANL, DNA)*
- HEALTH PHYSICIST/HEALTH AND SAFETY TECHNICIAN (LLNL, LANL, DNA, [SNL])*

POSTSHOT DRILLING

- TEST DIRECTOR (LLNL, LANL, DNA)*
- DRILLING ENGINEER (LLNL, LANL)
- HEALTH PHYSICIST/HEALTH AND SAFETY TECHNICIAN (LLNL, LANL, DNA [SNL])*
- REECo DRILLING SUPERINTENDENT/ RIG SUPERINTENDENT

* THESE POSITIONS HAVE MULTIPLE RESPONSIBILITIES AS INDICATED ABOVE

KEY POSITIONS FOR THE SAFE EXECUTION OF NUCLEAR TEST ACTIVITIES (CONTINUED)

OTHER

- DOE/HQ DEPUTY ASSISTANT SECRETARY FOR MILITARY APPLICATION AND STOCKPILE SUPPORT (NUCLEAR EXPLOSIVE SAFETY SURVEY APPROVAL)
- DOE/HQ DEPUTY ASSISTANT SECRETARY FOR RESEARCH AND DEVELOPMENT (DETONATION AUTHORITY REQUEST APPROVALS)
- NUCLEAR EXPLOSIVE SAFETY GROUP
- CONTAINMENT ADVISORS (LLNL, LANL, SNL)
- CONTAINMENT EVALUATION PANEL MEMBER (CEP REPRESENTATION)

* THESE POSITIONS HAVE MULTIPLE RESPONSIBILITIES AS INDICATED ABOVE

ENCLOSURE 3

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

2. ISSKP 3 Identify Personnel Resources

A. Responsibility

The Deputy Assistant Secretary for Resource Management is responsible for the implementation of this section. All operations offices, management and operating contractors, and the national weapons laboratories will provide assistance as required.

B. Commitment 3.1

To address the DNFSB letter of May 27, 1994, Defense Programs will conduct an immediate review to determine the effect of the recent loss of Headquarters personnel. This review will be a qualitative assessment to determine the current status of Defense Programs staffing and the need for additional, technically competent personnel within Defense Programs.

* Deliverable: Letter to the DNFSB stating current status of Defense Programs staffing and recommendations for additional staff.

* Due Date: August 1994

(1) Description of Deliverable

The deliverable is a report on Staffing Needs and Impact of VERIP on Defense Programs Headquarters (Enclosure #3).

(2) Discussion

An independent assessment is being conducted by the Pacific Northwest Laboratory (PNL), with technical assistance from the Sandia National Laboratories (SNL), to determine the effect of recent and anticipated losses of Defense Programs Headquarters personnel. The assessment is a qualitative assessment to determine the current status of Defense Programs staffing and address the potential need for additional, technically competent personnel within Defense Programs. The assessment will be conducted in two parts. The first part is an assessment of pressing losses due to VERIPs conducted during the month of August 1994. This first assessment evaluated DP's vulnerability to losing core technical knowledge and skills and provided recommendations for mitigating any projected impacts. The second assessment is an in-depth evaluation of DP's vulnerability to technical losses to be conducted from September 1994 to January 1995 with recommendations concerning staffing levels within Defense Programs Headquarters.

The methodology used by PNL/SNL to develop findings and make recommendations was as follows. PNL and SNL reviewed a list of DP personnel who had applied for and were pending for early retirement within FY94 or who had applied for retirement during FY95. In addition, a subset of seven individuals, who held technical and not administrative positions, were selected to be interviewed about their jobs and the knowledge, skills/abilities, and experiences they perceived as crucial for performing the jobs. A structured interview format was used to elicit job requirements information. The questions were intended to gather information on the following topics: how their jobs are performed; The level and extent to which technical skills are required in their jobs; how they obtained the necessary technical skills for their jobs; the perceived availability in DP of equivalent technical skills to accomplish their work; recommendations concerning how technical expertise is being retained or can be retained in DP; and perceptions on the loss of technical skills in DP.

(3) Next Action: Formal letter to the DNFSB stating current status of Defense Programs staffing and recommendations for additional staff. Due January 1995.

C. Commitment 2.1.2: Due November 1994

Staffing Needs and Impact of VERIP on Defense Programs Headquarters
Executive Summary of Interviews with Headquarters and Field Staff

Statement of Work and Purpose

Pacific Northwest Laboratory, with assistance from Sandia National Laboratory, conducted a review of Defense Programs (DP) staffing levels to determine the effect of recent and anticipated losses of DP personnel. The information generated by this review will be used by Defense Programs to address the Defense Nuclear Facilities Safety Board's concern regarding real-time loss of technically competent personnel from DP staff. Structured interviews were conducted with Headquarters and field staff who held technical (not administrative) positions in DP.

Findings

Technical Knowledge and Skills/Abilities:

Technical personnel, in the field and at Headquarters, voiced the opinion that most DP Headquarters jobs are not highly technical and, consequently, do not require a high level of technical knowledge, skills, or abilities. A basic core of technical knowledge, however, is helpful. Headquarters staff interviewed for this study have a wide variety of degree backgrounds, from the social sciences to nuclear science.

Technical Background and Experience:

Technical field experience is more important for DP Headquarters staff than an advanced degree or specific area of expertise, in the opinion of both HQ and field staff. Field staff especially felt that field experience (in the laboratories, production facilities, or field offices) is crucial to the experience base of HQ staff.

Other Job Requirements:

Experience with and knowledge of nuclear weapons systems and applications and the nuclear weapons production complex is necessary. Many interviewees noted their concern that a traditional recruiting ground for DP, the nuclear military, is not as attractive as previously, possibly because of the cessation of nuclear weapons development and testing and general downsizings in the military.

Strong interpersonal skills are seen as contributing to DP Headquarters personnel ability to deal with all of the varied stakeholders in the nuclear weapons complex. The ability to communicate technical laboratory and field issues to non-technical people is perceived as critically important.

Management and program management skills acquired through formal training and hands-on experience are also critical to effective performance in many DP jobs.

Field Perspectives on Skills and Roles in DP:

Field personnel believe DP Headquarters should: provide oversight and coordination for research and field operations; establish long term goals and direction for DP and set policy; obtain the resources needed by the field to accomplish its work; communicate field issues to non-technical stakeholders; and, defend the field's activities to Congress.

Field personnel split into two camps with respect to their views of skills losses at DP Headquarters. The first believes that HQ has not had highly skilled technical people--that

technical skills are lost from the field, not HQ. Technical skill losses in DP, they contend, occur in individual cases due to a lack of succession planning, but are not part of a general trend of skills loss at HQ.

Others, however, believe technical skills losses have occurred at Headquarters continuously over many years due to HQ's inability to recruit and retain personnel with field experience. For these interviewees, issues include the level of politics perceived in HQ jobs and the lack of technically challenging work at HQ.

Other Issues:
Maintaining technical currency at Headquarters is problematic--most training available to HQ personnel is management/human resources training (diversity, sexual harassment training, etc.), not technical training. The inability of HQ personnel to keep up with basic issues and advances in the technical fields is perceived to hamper their ability to judge the quality and innovativeness of field work.

The internship program is a crucial supply resource for adequately trained and field-experienced personnel--yet, this program is suffering from downsizings and budget pressures. Fewer interns are put into the program each year and HQ will experience difficulty finding individuals with the broad experiences needed to staff HQ positions

Key historical, corporate, and technical knowledge are being lost throughout DP, but especially at HQ--these losses are due to the loss of individuals who have deep experience in the field and/or in military nuclear weapons programs. No attempts are being made to systematically capture the historical, corporate, and technical knowledge these personnel have for future use.

Recommendations

Revitalize the internship program; specifically, revitalize DP's program that provided technically-oriented field experience and training to individuals who could later bring that knowledge level to HQ.

Mandate technical training for Headquarters' personnel to ensure currency of technical skills. Regardless of degree area or level, DP personnel need to be knowledgeable of basic advances in the field so they can better judge the quality of field work. Mandated training sessions, provided by field and laboratory staff, would provide the time needed to keep HQ staff updated.

Institute a succession planning program that will ensure that unique knowledge and skills at all levels within the organization are preserved for future use. Opportunities for obtaining nuclear weapons experience are declining. It is critical that the body of knowledge present in DP be captured for future generations of managers. Most interviewees believed that a strong succession plan, including training and mentoring, is critical to retaining this knowledge.

Require a minimum of field technical experience for DP HQ positions and regular "sabbaticals" for HQ personnel to the field to maintain their currency.

Transfer more of the current HQ responsibilities for work requiring a strong technical background to the field and laboratory personnel. Rather than slowly increase the level of technical expertise at Headquarters, this option would utilize the high level of technical expertise that already exists within DP.