Department of Energy
Washington, DC 20585

March 9, 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:

Section 316(b) of the Atomic Energy Act of 1954 (42 U.S.C. 2286e(b)) requires the Department of Energy to submit a written report annually to Congress concerning the Department's activities with regard to Recommendations received from the Defense Nuclear Facilities Safety Board. We are pleased to enclose for your information the Department's annual report for calendar year 1993.

The Department is committed to cooperate fully with the Board and provide ready access to each defense nuclear facility. We recognize the important role the Board has played in identifying significant safety related issues at our defense nuclear facilities.

We believe that the Department has begun to improve its level of performance during 1993. Nevertheless, we recognize that a need for significant improvement remains. I am determined that the Department develop a more disciplined approach to making commitments to the Board and coordinate the many corrective actions within the Department more effectively. We also recognize that the Department must more effectively evaluate our outstanding commitments to the Board in terms of management focus and expenditure of resources required. The Annual Report describes specific initiatives underway within the Department to address these matters.

An important area where our progress has been unsatisfactory in 1993 involves implementation of the Board's Recommendation 90-2 concerning Codes and Standards. We began a renewed initiative in early 1994 to develop a consistent and effective approach to Recommendation 90-2 in a timely manner.

In calendar year 1993, the Board issued six Recommendations, five of which the Department accepted. The Department accepted the sixth Recommendation on February 2, 1994. The Department is implementing corrective action or is developing Implementation Plans for each of these six Recommendations. Progress continues within the Department in completing actions required under the Implementation Plans for the eleven outstanding Recommendations issued prior to 1993. Completion of the Implementation Plans for certain Recommendations will require multi-year efforts. In addition, the Department concluded all actions necessary to implement two Recommendations in 1993.

Sincerely,

Hazel R. O'Leary

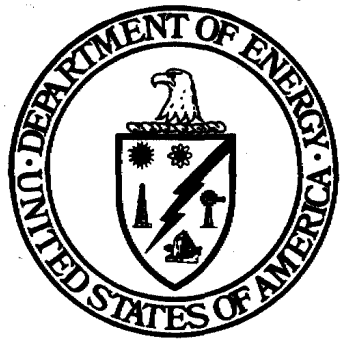
Enclosure

DOE/EH-0368

ANNUAL REPORT TO CONGRESS

DEPARTMENT OF ENERGY ACTIVITIES RELATING TO THE DEFENSE NUCLEAR FACILITIES SAFETY BOARD

CALENDAR YEAR 1993



WASHINGTON, D.C. 20585

FEBRUARY 1994

TABLE OF CONTENTS

Department of Energy
Washington, DC 20585

March 9, 1994

The Honorable Albert Gore, Jr.
President of the Senate
Washington, D.C. 20510

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Hazel R. O'Leary

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EXECUTIVE SUMMARY

This report for calendar year 1993 is the fourth Annual Report to Congress by the United States Department of Energy (Department) of the activities of the Department in response to the Defense Nuclear Facilities Safety Board (Board). The Annual Report is required by Section 316(b) of the Atomic Energy Act of 1954, as amended (the Act), 42 U.S.C. 2286e(b).

The Board, an independent body within the executive branch, was established under Section 311 of the Act. The Board provides advice to the Secretary of Energy on issues which the Board considers necessary to ensure adequate protection of public health and safety. Such advice is provided in Recommendations to the Secretary of Energy which are based on the Board's independent review of design, construction, operations, and decommissioning activities at the Department's defense nuclear facilities. A Recommendation may consist of a set of individual topics or recommendations from the Board concerning a particular issue.

Since its formation in 1989, the Board has issued twenty-six (26) Recommendations to the Secretary. The Department's commitments and schedules are documented to the Board in Implementation Plans for each respective Recommendation. At the end of calendar year 1993, seventeen (17) Recommendations remain open with activity underway to complete the Department's commitments. Nine (9) Recommendations have been closed in the period from 1990 through December 1993, including two (2) closed during calendar year 1993.

Six (6) Recommendations were issued by the Board in 1993. These include:

- Recommendation 93-1, Standards Utilization in Defense Nuclear Facilities;
- Recommendation 93-2, The Need for Critical Experiment Capability;
- Recommendation 93-3, Improving Technical Capability in Defense Nuclear Programs;
- Recommendation 93-4, Environmental Restoration Management Contracts;
- Recommendation 93-5, Hanford Waste Tanks Characterization Studies; and
- Recommendation 93-6, Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Facilities Complex.

Implementation Plans have been submitted to the Board for the first four (4) of these Recommendations. Each of these Implementation Plans has been accepted as responsive and adequate by the Board. The Department's activities are underway in accordance with commitments made in each respective Implementation Plan. These specific activities are described in the Annual Report.

Recommendation 93-5, Hanford Waste Tanks Characterization Studies, has been accepted by the Secretary of Energy. The Implementation Plan for this Recommendation was submitted to the Board in January 1994. Recommendation

93-6, Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Facilities Complex, was received on December 23, 1993. The Department's response is due to the Board in February 1994. There is a close working relationship between the staffs of the Department and the Board, and it is expected that the Department's Implementation Plans and commitments in relation to Recommendations 93-5 and 93-6 also will be acceptable to the Board.

There are eleven (11) Recommendations issued prior to 1993 which are still active. Activities during 1993 in accordance with the respective Implementation Plans for these eleven (11) Recommendations are described in the Annual Report.

Two (2) Recommendations were closed by the Board in 1993. These are:

- Recommendation 91-5, Savannah River K-Reactor Power Limits; and

- Recommendation 92-7, Training and Qualification, which was superseded by Recommendation 93-3. Recommendation 93-3 concerns Improving Technical Capability in Defense Nuclear Programs.

The Board's continuing emphasis in the Department's standards identification, utilization, and compliance activities is in accordance with the congressional mandate in Section 312 of the Act which directs the Board to review and evaluate the content and implementation of DOE standards and to recommend to the Secretary of Energy specific measures that should be adopted to ensure that public health and safety are adequately protected.

Likewise, the Board's continuing emphasis in the Department's training and qualifications activities to raise the level of technical expertise within the Department is in response to the congressional mandate in Section 312 to make Recommendations to the Secretary of Energy associated with the defense nuclear facilities, including the operations of the facilities, as the Board determines are necessary to ensure adequate protection of public health and safety.

The Department's interaction with and response to the Board have improved significantly during 1993. This progress results from the Department-wide emphasis on cooperation with the Board and the dedicated emphasis within the Office of the Assistant Secretary of Environment, Safety and Health and the Office of the Departmental Representative to the Board (Departmental Representative) to ensure quality, timeliness, and responsiveness throughout each interaction which the Department has with the Board.

In addition to the Department's activities in response to Board Recommendations, the Department also has responded to other written communications from the Board including Trip Reports and letters requiring responses.

The Department has participated in meetings and effective person-to-person interfaces with the Board and its staff in many venues such as Public Meetings, meetings with several Assistant Secretaries of Energy and Office

Directors, site visits by the Board and its staff, as well as other less formal or less structured interactions. During 1993, the Department supported more than 170 site visits by the DNFSB and its staff. Effective and timely exchanges of information have taken place to provide the Board and the Department a better understanding of the concerns, priorities, and limitations of each organization. As examples, interactions between the Board and the Department have included visits by individual Board members to the Department of Energy Offices to meet with several Assistant Secretaries on specific issues. The Departmental Representative accompanies the Board on each Board visit to Department of Energy facilities. Department of Energy Headquarters personnel participate in each site visit by the Board staff. As a final example, representatives from the Board's staff participated in the strategic planning sessions conducted by the Offices of Defense Programs, Environment, Safety and Health, and Environmental Restoration and Waste Management in which the future directions for these Offices were evaluated.

In 1993, the Department's proactive approach in interactions with the Board was the culmination of several initiatives which are described in the following paragraphs:

- The Secretary of Energy's May 17, 1993, policy statement stipulating that Department personnel are to cooperate fully with and be responsive to the Board to enhance and improve public health and safety.

- The emphasis of the Assistant Secretary of Environment, Safety and Health through the Office of the Departmental Representative to ensure quality, timeliness, and responsiveness in the Department's interaction with and response to the Board. This specific emphasis has ensured that the Department communicates effectively with the Board and its staff to understand fully the Board's interests and concerns. This understanding is essential in the Department's development of an effective and prudent Implementation Plan which meets the Board's expectations and provides a workable plan of action within the Department.

  In the development of each Implementation Plan, the Departmental Representative facilitates interactions between the Department staff and the Board staff to accomplish these objectives. Periodic meetings are held with the Board's staff to monitor the Department's progress in the completion of activities and schedules as presented in each respective Implementation Plan.

  A significant role of the Departmental Representative involves encouragement of a level of performance, within both the Department's senior management and line management, which results in a proactive posture throughout the Department's infrastructure. This includes efforts to fully involve each appropriate departmental organization in the Department's interactions with or responses to the Board. The Departmental Representative chairs scheduled weekly Defense Nuclear Facilities Safety Board Issues Meetings which are attended by appropriate Deputy Secretary, Under Secretary, and Assistant Secretary level personnel or their representatives. These weekly meetings focus on maintaining the emphasis throughout the Department's infrastructure

on effective and timely interactions with the Board. In this regard, the Secretary of Energy also has emphasized the necessity of the Department senior management's early and direct involvement in departmental activities related to the Board.

The Departmental Representative's role, which is implemented through a single position of responsibility, is instrumental in coordinating the development of a consensus in the Department's position, strategy, and response to the Board. This coordination and consensus are essential in each response to the Board and in the development and performance of each respective Implementation Plan.

Key initiatives within the Department during 1993 have brought significant improvements in the coordination, cohesiveness, and effectiveness of the Department's interactions with the Board. These initiatives include:

- An improved process for assessment of the Board's Recommendations and development of Implementation Plans: The Department has implemented a significantly improved process for assessment of the Board's Recommendations and development of the respective Implementation Plans. This process resulted from meetings of the Departmental Assistant Secretaries in July 1993 in which directions were provided to the Department staff for an initial methodology and schedule of milestones for assessment of the Board's Recommendations. These directions subsequently have been developed into departmental guidelines as discussed below.

  A standard departmental format for Implementation Plans, which is modelled after the Implementation Plan for Recommendation 93-3, Improving Technical Capability in Defense Nuclear Programs, serves as the model for this process. Implementation Plans for Recommendations 92-4, Multi-Function Waste Tank Facility at Hanford, and 93-5, Hanford Waste Tanks Characterization Studies, were being developed at the end of calendar year 1993 using this approach.

- Guidelines for interface with the Board: At the direction of the Assistant Secretary of Environment, Safety and Health, the Office of the Departmental Representative has developed Guidelines for the Department's interface with the Board. These Interface Guidelines will help in achieving uniform and coordinated responses to and interfaces with the Board throughout the Department. The Guidelines inject the Departmental Representative into the role of ensuring the quality, timeliness, and responsiveness of the Department's response to and interface with the Board. Both Department of Energy Field and Headquarters personnel participated in the development and review of the Guidelines.

- Commitment identification and management: Also as directed by the Assistant Secretary of Environment, Safety and Health, the Departmental Representative's Office has interfaced extensively with the Board's staff to identify and assemble the formal communications which have been transmitted between the two organizations. They have also interfaced

in regard to items which either organization considers as commitments to the Board.

The Office of the Departmental Representative has reviewed the Implementation Plans submitted for Board Recommendations and has identified approximately 1150 items that the Department believes to be commitments to the Board. These identified items have been grouped into a manageable set of "consolidated commitments." The Office of the Departmental Representative is negotiating with the responsible Departmental Elements and the Board to obtain their concurrence with the consolidated commitments.

In 1993, the Department has aggressively:

- Reemphasized, throughout the Department, the Secretary's intent to cooperate fully with and be responsive to the Board.
- Established the Department-wide leadership role in Office of the Departmental Representative to coordinate departmental activities to ensure quality, timeliness, and responsiveness in each interaction with the Board.
- Participated in the definition and determination of the status of a manageable set of the Department's commitments to the Board and the associated schedules. These negotiations will be finalized concurrently within the Department and with the Board.
- Developed Interface Guidelines to ensure the effectiveness of the Department's response to and interface with the Board.

ANNUAL REPORT TO CONGRESS

DEPARTMENT OF ENERGY ACTIVITIES RELATING TO THE DEFENSE NUCLEAR FACILITIES SAFETY BOARD Calendar Year 1993

I. INTRODUCTION

A. Background

This is the fourth Annual Report to the Congress by the United States Department of Energy, hereafter referred to as the "Department" or "DOE," on its activities in interacting with the Defense Nuclear Facilities Safety Board, hereafter referred to as the "DNFSB" or the "Board." This report is required to be submitted to the Committees on Armed Services and Appropriations of the Senate and to the Speaker of the House of Representatives each year when the President's budget is submitted to Congress. The statutory reference for this requirement is Section 316(b) of the Atomic Energy Act of 1954, as amended (the Act), 42 U.S.C. 2286e(b).

In November 1991, the Department established the Office of the Departmental Representative to the Defense Nuclear Facilities Safety Board, hereafter referred to as the "Office of the Departmental Representative," to provide a central communication link and liaison from the Department to the Board. The Departmental Representative originally reported directly to the Secretary of Energy. After a realignment of the Department in early 1993, the Departmental Representative now reports to the Assistant Secretary of Environment, Safety and Health.

The Department firmly believes the relationships and interactions with the Board have improved as a result of the Secretary of Energy's emphasis to cooperate fully with and be responsive to the Board, and are more effectively coordinated and controlled through the concentrated efforts of the Office of the Departmental Representative.

This report covers Calendar Year 1993 Departmental interactions with the Board and provides an updated status on all Board Recommendations.

B. Overview of Department Activities in Response to the Board's Focus Areas

Since 1990, the Board's Recommendations to the Secretary have emphasized specific areas which are important to the safe and efficient operations of defense nuclear facilities. The Recommendations have focused on:

- Standards. This includes the identification of applicable standards and requirements, assessment of their adequacy, and determination of the extent to which they have been implemented.

- o Training and Qualifications. This includes selection, training, qualification, and retention of operations, maintenance, technical, and other personnel in the civil service ranks or employed by the Department's contractors to make available to the Department a sufficient number of highly qualified technical and management personnel.

- o Operational Readiness Reviews and Conduct of Operation. This includes development and implementation of systematic approaches to evaluating and upgrading existing facilities and programs to ensure the capability to safely startup or restart operations.

- o Criticality. This includes the need to address criticality issues to ensure that a criticality accident will not occur and the need to ensure maintenance of an appropriate level of criticality expertise in the Department. The Board's concerns involve the potential accumulation of fissile material in an amount or configuration that would sustain a nuclear chain reaction.

- o Departmental and Contract Management. This includes development, implementation, and control of effective management relationships with contractors to ensure safe and efficient operations.

Rarely did a Recommendation address only one of these focus areas. Typically, the Board incorporated elements from more than one of these focus areas into a comprehensive Recommendation for enhancement of the safe operation of the Department's defense nuclear facilities. The principal focus areas addressed in the Recommendations are discussed below.

1. Standards.

DOE recognizes that much still remains to be accomplished in ensuring that DOE and Management and Operating contractor personnel implement the health and safety standards and Orders.

Recommendation 90-2, Standards Compliance, is the cornerstone of the standards Recommendations. Recommendation 91-1 concerning the adequacy of the content and implementation of applicable nuclear safety standards and Recommendation 91-6 concerning radiation safety are also significant in recommending that applicable nuclear safety standards be reviewed for adequacy.

The standards issue is a common thread through many of the Recommendations as it cuts across the various issues of concern to the Board including the Hanford Waste Tanks, operational readiness reviews, the systematic evaluation process, radiation protection, operations, maintenance, training, personnel, and management. Recommendation 93-1 concerns those standards used at facilities that assemble, disassemble, and test nuclear weapons. Although Recommendation 93-3 concerns improving the Department's technical capability, the successful implementation of Recommendation 93-3

will depend heavily upon applying government and commercial standards in determining appropriate qualification and training requirements for Department personnel.

2. Training and Qualifications.

Recommendation 93-3 expresses the Board's assessment that the single most serious and far-reaching problem affecting the safety of defense nuclear facilities is the insufficient number of highly qualified technical and management personnel available to the Department. Recommendation 90-1, Savannah River Operator Training, expresses the Board's concern about the Department's standards for training reactor plant operators and supervisors. Recommendations on operational readiness reviews, including Recommendation 90-4 concerning plutonium operations at Rocky Flats and Recommendation 92-3 concerning the HB-Line at Savannah River, express concern about the training and qualifications of operational readiness review team members. Recommendation 91-6 concerning radiation protection emphasizes the training and competency of key radiation protection personnel. Recommendation 92-2 concerning Facility Representatives recommends that the Department establish a formal program to select, train, and assign Department of Energy Facility Representatives at defense nuclear facilities. Recommendation 92-7, Training and Qualification, expresses the Board's assessment that there is a need for the Department to further strengthen the training of technical personnel at defense nuclear facilities. Recommendation 93-6 concerns maintaining access to nuclear weapons expertise in the defense nuclear facilities complex. This Recommendation expresses the Board's concerns in relation to the need to retain access to the capability and to capture the unique knowledge of individuals who have been engaged for many years in certain critical defense nuclear activities, in order to avoid future safety problems in these and related areas.

The Department has fully accepted the Board's Recommendations concerning training and qualifications. The 93-3 Implementation Plan has been developed in a comprehensive manner to also address Recommendation 92-7 and the training-related aspects of other Recommendations. The Board has acknowledged that Recommendation 92-7 has been superseded by the Department's Implementation Plan for Recommendation 93-3.

Where the Department has been able to focus resources and management attention, the Department has made significant training and qualification improvements. These improvements have been noted by the Board at Savannah River and Rocky Flats. The Department will capitalize on the lessons learned from these successful programs in implementing the complex-wide training and qualification program detailed in the 93-3 Implementation Plan.

3. Operational Readiness Reviews and Conduct of Operations.

The first Recommendation which specifically called for comprehensive assessment of the capability to safely startup or restart facility plutonium operations was Recommendation 90-4, Rocky Flats Operational Readiness Reviews. Other Recommendations which specifically recommend operational readiness reviews include:

- o Recommendation 91-3, Waste Isolation Pilot Project.
- o Recommendation 91-4, Rocky Flats Building 559 Operational Readiness Review.
- o Recommendations 92-1 and 92-3 concerning the HB-Line at the Savannah River Site.
- o Recommendation 92-5, Discipline of Operations during Changes, concerning conduct of operations across the complex.
- o Recommendation 92-6 concerning Orders, procedures, directives, and other requirements to govern the safety aspects of operational readiness reviews.

The operational readiness review process has provided a consistent framework by which the Department can assess the readiness of a facility to safely startup or restart operations. The Department has demonstrated its ability to successfully complete operational readiness reviews at defense nuclear facilities across the complex. Based on this experience, the Department issued DOE Order 5480.31, "Startup and Restart of Nuclear Facilities," formalizing the startup and restart requirements for nuclear facilities. Along with the Order, the Department distributed DOE standard DOE-STD-3006-93, "Planning and Conduct of Operational Readiness Reviews," which provided guidelines for performing operational readiness reviews. Both the Order and the standard were closely scrutinized by the Board and were found to be responsive to the concepts identified in previous Board Recommendations on operational readiness reviews. Additionally, based on the success of the operational review process for defense nuclear facilities, the Department is evaluating the approach for use at facilities which test, assemble, and disassemble nuclear weapons.

4. Criticality.

The Board has expressed increasing concern over the potential for accidental criticality incidents as the result of potential accumulation of fissile material in an amount or configuration that would sustain a nuclear chain reaction. The Board's concerns have included facilities where, if the operations are not

adequately reviewed and controlled or upgraded, degradation of the facility or its operations potentially could result in a criticality incident. The Board's concerns have involved a number of Departmental activities including:

- o Hanford Waste Tanks.
- o Ventilation ducts at Rocky Flats.
- o Storage of special nuclear materials at selected defense nuclear facilities.
- o Activities involved with the assembly, disassembly, and testing of nuclear weapons.

As a consequence, the Board has placed increased attention on the Pantex Plant, Oak Ridge Y-12 Plant, Los Alamos National Laboratory, Sandia National Laboratories at Albuquerque and Livermore, the Nevada Test Site, and Rocky Flats. Recommendation 90-6 concerning plutonium in the ventilation ducts at Rocky Flats has a short-term objective of ensuring that a criticality accident will not take place and that the presence of fissile and other materials in the ventilation ducts will not result in an undue risk to the health and safety of the public. Most recently, Recommendation 93-2, The Need for Critical Experiment Capability, recommends that the Department retain its program of general purpose criticality experiments.

The Department has organized a nuclear criticality experiments steering committee. The committee is chartered with identifying the criticality needs (material storage, criticality training, criticality safety, research, etc.) of the Department and ensuring that resource requirements are identified to senior Department management. The committee is tasked with integrating the criticality needs of the Department into a single program which will ensure maintenance of a criticality expertise in the Department well into the future.

5. Departmental and Contract Management.

A common thread through many of the Recommendations is the management process and structure. Specifically, the Board has expressed concern at many of its meetings with Department personnel and contractors about line accountability for safety responsibilities from the Secretary to the lowest line manager, including contractor personnel. The specific relationship between contractors and the government is of concern in Recommendations pertaining to operational readiness reviews and in Recommendation 92-4, Multi-Function Waste Tank Facility at Hanford. Most recently, Recommendation 93-4, Environmental Restoration Management Contracts, expresses concern regarding the Department's

ability to manage technical contracts for environmental remediation efforts.

C. Recommendations Issued in 1993

Six (6) Board Recommendations were issued during 1993. These Recommendations include:

- Recommendation 93-1 which concerns the level of safety assurance at those facilities that assemble, disassemble, and test nuclear weapons with special emphasis on Pantex.

- Recommendation 93-2 which concerns the Board's assessment that the Department should retain its program of general purpose criticality experiments.

- Recommendation 93-3 which addresses the Board's concern that the Department has an insufficient number of qualified technical and management personnel within the Department's work force.

- Recommendation 93-4 which expresses the Board's concern about the strength of the Department's technical management of environmental restoration management contracts.

- Recommendation 93-5 which recommends that the Department reevaluate its program of characterizing the contents of the Hanford high level waste tanks.

- Recommendation 93-6 which expresses the Board's concern about the need to retain access to the capability and to capture the unique knowledge of experts who have been engaged for many years in critical defense nuclear activities including disassembly of nuclear weapons at Pantex and testing of nuclear weapons at the Nevada Test Site.

Appendix A contains the six (6) Recommendations issued by the Board in 1993.

D. Summary Status of Recommendations

Table 1, Summary Status of DNFSB Recommendations, provides the status of each Recommendation which has been issued to the Secretary. Five (5) of the seven (7) Recommendations issued in 1990, one (1) of the six (6) Recommendations issued in 1991, five (5) of the seven (7) Recommendations issued in 1992, and all six (6) of the Recommendations issued in 1993 remain active at the end of 1993.

The Board considered the following two (2) Recommendations to be closed in 1993:

- Recommendation 91-5, Savannah River K-Reactor Power Limits.

- Recommendation 92-7, Training and Qualification. This Recommendation was superseded by Recommendation 93-3, Improving Technical Capability in Defense Nuclear Programs.

Table 2, Status of Active Implementation Plans Requiring Greater Than One (1) Year to Complete, provides the status for eleven (11) active Implementation Plans which have required or are anticipated to require greater than one (1) year to complete. Further information on the status of these eleven (11) Implementation Plans is provided in the discussions of the associated DNFSB Recommendations in Sections III through VI.

TABLE 1

SUMMARY STATUS OF DNFSB RECOMMENDATIONS

RECOMMENDATION	SUBJECT	STATUS		
		OPEN	CLOSED	
			1992	1993
90-1	Savannah River Operator Training		•	
90-2	Standards Compliance	•		
90-3	Hanford Waste Tanks		•	
90-4	Rocky Flats Operational Readiness Reviews (ORRs)	•		
90-5	Systematic Evaluation Plans	•		
90-6	Rocky Flats, Plutonium in the Ventilation Ducts	•		
90-7	Hanford Waste Tanks	•		
91-1	Department of Energy Safety Standards Program		•	
91-2	Reactor Operations and Management Plan		•	
91-3	Waste Isolation Pilot Plant (WIPP)		•	
91-4	Rocky Flats, Building 559 Operational Readiness Review (ORR)		•	
91-5	Savannah River K Reactor Power Limits			•
91-6	Radiation Protection	•		
92-1	Operational Readiness of the HB-Line at Savannah River		•	
92-2	Facility Representatives	•		
92-3	HB-Line Operational Readiness Reviews (ORRs)	•		
92-4	Multi-Function Waste Tank Facility at Hanford (MWTF)	•		
92-5	Discipline of Operations during Changes	•		
92-6	Operational Readiness Reviews	•		
92-7	Training and Qualification			•
93-1	Standards Utilization in Defense Nuclear Facilities	•		
93-2	The Need for Critical Experiment Capability	•		
93-3	Improving Technical Capability in Defense Nuclear Programs	•		
93-4	Environmental Restoration Management Contracts	•		
93-5	Hanford Waste Tanks Characterization Studies	•		
93-6	Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Facilities Complex	•		

TABLE 2

STATUS OF ACTIVE IMPLEMENTATION PLANS
REQUIRING GREATER THAN ONE (1) YEAR TO COMPLETE

RECOMMENDATION	SUBJECT	ANTICIPATED COMPLETION SCHEDULE
90-2	Standards Compliance	Beyond September 1995
90-4	Rocky Flats Operational Readiness Reviews (ORRs)	December 1994
90-5	Systematic Evaluation Plans	September 1996
90-6	Rocky Flats, Plutonium in the Ventilation Ducts	No schedule commitment
90-7	Hanford Waste Tanks	September 1995
91-6	Radiation Protection	December 1994
92-2	Facility Representatives	December 1994
92-4	Multi-Function Waste Tank Facility at Hanford (MWTF)	No schedule commitment
92-5	Discipline of Operations during Changes	No schedule commitment
92-6	Operational Readiness Reviews	December 1994
93-3	Improving Technical Capability in Defense Nuclear Programs	December 1995

II. DEPARTMENTAL INITIATIVES

Since the Office of the Departmental Representative was assigned under the Assistant Secretary for Environment, Safety and Health, regular "DNFSB Issues Meetings" have been held with the Cognizant Secretarial Officers or their representatives. Key offices represented have included the Under Secretary; Associate Deputy Secretary for Field Management; Assistant Secretaries for Environment, Safety and Health, Environmental Restoration and Waste Management, Defense Programs, and Human Resources and Administration; and the Directors of Nuclear Energy and Energy Research. As a result of these DNFSB Issues Meetings, the Cognizant Secretarial Officers and their Offices have been more aware of and consequently more closely involved with Board interactions.

Departmental initiatives in 1993 to improve the interactions with the Board are discussed below.

A. Secretarial Policy

The Secretary of Energy issued a policy letter dated May 17, 1993, to Cognizant Secretarial Officers stipulating the Secretary's commitment to working with the Board. The Secretary directed Department personnel to cooperate fully with and be responsive to the Board to enhance and improve public health and safety. As a result of this specific policy, the DNFSB Issues Meetings were initiated.

B. Guidelines for Interacting with the Board

Revised Guidelines for the Department's interface with the Board have been developed within the Office of the Departmental Representative. These guidelines have been developed in coordination with the Cognizant Secretarial Office representatives in the DNFSB Issues Meetings. Both DOE Field and Headquarters personnel participated in the development and review of the Guidelines.

C. Information Management

A computer-based library has been developed and assembled. The library includes an electronic file of:

- 1990 Recommendations
- 1991 Recommendations
- 1992 Recommendations
- 1993 Recommendations
- All Implementation Plans and Significant Correspondence
- DNFSB Policy Statements
- DNFSB Annual Reports
- DOE Annual Reports on DNFSB Related Activities
- Talks by DNFSB and Staff
- Technical Issue Papers by Board Staff
- List of Safety Related Orders (dated June 17, 1992)
- Guidelines for DOE interaction with the Board

- o DOE Field Office Questions and Answers about the DNFSB
- o Resumes of Board and Staff
- o Trip Reports

The above information is available for Headquarters and Field use and reference on diskette and will be available on the Environment, Safety and Health Local Area Network (EH LAN) system in the near future.

The Milestone Tracking System has been developed. This system provides key milestone information associated with each Board Recommendation including:

- o Recommendation description
- o Pending action and schedule dates
- o Summary of transmitted correspondence
- o Points of contact

D. Commitment Management

A system to identify and manage commitments made by the Secretary of Energy to the Board has been implemented. All potential future commitments to the Board will be reviewed within the Office of the Departmental Representative for concurrence and entry into the system. Departmental procedures have been implemented for this process.

The Office of the Departmental Representative has reviewed the DNFSB Recommendation Implementation Plans and has identified approximately 1150 items which the Department believes to be commitments to the Board. These 1150 items have been grouped into a manageable set of "consolidated commitments." The Office of the Departmental Representative is negotiating with the responsible Departmental element and the Board to obtain their concurrence with these consolidated commitments and to clearly define and determine the status of a manageable set of commitments and schedules.

E. Process for Development of Implementation Plans

Development of the Implementation Plan in response to Recommendation 93-3, Improving Technical Capability in Defense Nuclear Programs, was conducted differently than for previous Recommendations. The Implementation Plan was developed by an Ad Hoc group reporting directly to the Acting Under Secretary. This Ad Hoc group was comprised of a varied membership of Field and Headquarters personnel under the guidance of a full-time dedicated chairman.

The development process included the early involvement of line managers and staff personnel. As the Implementation Plan matured, numerous stakeholders' comments were solicited and addressed. This process, with the frequent involvement of the Assistant Secretary for Human Resources and Administration, resulted in an Implementation Plan that had full Departmental "buy-in."

The Board established a similar staff committee with a lead negotiator to work with the Department's Ad Hoc group. Meetings with the Board and its staff were held to define their expectations and develop a workable and acceptable Implementation Plan. This interaction and the single point of contact with the Board's staff were key elements in producing an acceptable plan.

The Implementation Plan format was changed from that of previous submittals. The new format is clearer and more professional and readable. The format adds a title page, table of contents, executive summary, introduction, glossary, and acronym list to the previous format. In addition to format changes, the Implementation Plan also contains a section on change control and incorporates the concept of target dates. The section on change control discusses a negotiated process to address significant changes in commitment dates, target dates, or planned actions. Target dates were added to provide a timeframe for implementation of specific deliverables. While not considered a Department commitment, progress toward target dates is reported in periodic reports to the Board and is used as a Department goal.

Implementation Plans for Recommendations 92-4, Multi-Function Waste Tank Facility at Hanford, and 93-5, Hanford Waste Tanks Characterization Studies, were being developed at the end of Calendar Year 1993 in this format using a similar approach.

III. DEFENSE NUCLEAR FACILITIES SAFETY BOARD Calendar Year 1993 RECOMMENDATIONS

A. Recommendation 93-1, Standards Utilization in Defense Nuclear Facilities

Summary. Recommendation 93-1 was issued by the Board on January 21, 1993. This Recommendation was focused on ensuring that the level of safety assurance at those facilities that assemble, disassemble and test nuclear weapons is at least as rigorous as that required at other defense nuclear facilities and commercial nuclear material processing facilities.

Status. Recommendation 93-1 was accepted by the Secretary on April 27, 1993. The Department's Implementation Plan for Recommendation 93-1 was provided to the Board on July 19, 1993. The Board accepted the Implementation Plan on July 30, 1993, contingent on additions to the Plan which were incorporated by the Department on August 24, 1993. The Implementation Plan committed the Department to five actions:

- Review the Department's Nuclear Safety Orders and Directives to determine applicability to those facilities and sites that assemble, disassemble, and test nuclear weapons. (Complete - September 30, 1993).

  The Department has defined the operations and listed the operations and facilities that involve assembly, disassembly, and testing of nuclear weapons.

  The Nuclear Safety Orders (i.e., "Level 1 Orders of Interest to the DNFSB" and associated supplemental Directives) and Nuclear Explosive Safety Orders (i.e., "Weapon Sensitive DOE Orders of Interest to the DNFSB" and associated supplemental Directives) are referred to as "Combined Orders." The list of the Combined Orders that apply to the operations and facilities that involve assembly, disassembly, and testing of nuclear weapons has been developed. Each of these lists includes a description of how the list was derived.

- Provide a clear explanation of the attributes of the Department's Nuclear Safety Orders and Nuclear Explosive Safety Orders and how they are applied by identifying those critical safety elements of operations and how those elements are addressed by each Order and directive. (In progress)

  The procedure for executing this action, the list of critical safety elements, and the list of DOE Order attributes have been completed. Completion of this action is expected by February 28, 1994.

- Identify the areas of inconsistency or discontinuity between the sets of Nuclear Safety Orders and Nuclear Explosive Safety Orders, if any.

  Completion of this action is expected by March 31, 1994.

- Where appropriate, identify areas where Orders and directives can and should be strengthened.

  Completion of this action is expected by June 1, 1994.

- Expedite Order compliance review at Pantex. (In progress)

  In response to Recommendation 90-2, Standards Compliance, the Order Compliance Self-Assessment Program was implemented for DOE facilities, including those that assemble, disassemble, and test nuclear weapons. The Board's Trip Reports of the review of the status of the Order Compliance Self-Assessment Program at Pantex had identified a number of concerns, including delays in performing the Order compliance activities and weaknesses in the review process and documentation.

  The Department reviewed the Board's Trip Reports and developed a corrective action plan for implementation of specific actions to address the Board's concerns. The corrective action plan includes actions to expedite and upgrade the Order Compliance Self-Assessment Program at Defense Programs facilities that assemble, disassemble, and test nuclear weapons, and the Y-12 Plant at Oak Ridge. These corrective actions include expediting the completion of the Order compliance review at Pantex. The corrective action plan was provided to the Board on September 30, 1993.

  Based on a subsequent assessment by Defense Programs, additional information will be provided on the Lawrence Livermore National Laboratory and the Lawrence Livermore Site Office.

B. Recommendation 93-2, The Need for Critical Experiment Capability

Summary. On March 23, 1993, the Board issued Recommendation 93-2 concerning the Department's need to retain a program of general purpose criticality experiments. The Board noted that the art and science of nuclear criticality control involve three principal ingredients. The first is familiarity with factors that contribute to achieving nuclear criticality. This familiarity is developed only through individuals' working with critical systems. The second is theoretical understanding which is benchmarked against good and well characterized critical experiments. The third is a complete, thorough familiarity by individual nuclear criticality engineers with the first two factors.

Status. The Secretary accepted Recommendation 93-2 on May 12, 1993, and submitted the Implementation Plan to the Board on August 10, 1993. The

Plan was accepted by the Board on September 30, 1993. The Implementation Plan commits the Department to:

- o Retain its program of general purpose criticality experiments. (Item 1, Complete)

- o Establish a Nuclear Criticality Experiments Steering Committee (the Committee) made up of appropriate Department stakeholders to provide program leadership. (Item 2)

  - Develop the charter for the Committee. (Complete - December 1993).

    The Committee was established with meetings beginning in September 1993. The Committee developed the charter for the Committee which was approved by the Assistant Secretary for Defense Programs on December 2, 1993.

  - Develop the charters for the Technical Subcommittees. (In progress).

    Formation of two Subcommittees, the Methodology and Experiments Subcommittee and the Training Subcommittee, was begun. Subcommittee Chairmen and members have been selected.

  - Meetings of the Committee. (In progress).

    Meetings of the Committee were initiated in September 1993.

  - Meetings of the subcommittees. (In progress)

    The Methodology and Experiments Subcommittee was inaugurated in a joint meeting with the Committee on December 15, 1993. The initial meeting of the Training Subcommittee was scheduled for January 1994.

- o Complete Experiments Needs Assessment Review. (Item 3, Complete - Fourth Quarter 1993).

  An Experiments Needs Assessment had been initiated early in 1993 by the Department. This assessment was used as a source document by the Committee. The Draft Nuclear Criticality Experiments Needs Assessment (the assessment) was completed and presented to the Committee for its review in the Fourth Quarter of 1993. The assessment will be used by the Methodology and Experiments Subcommittee in determining the future direction of the criticality experiments program.

- o The Committee shall incorporate the improvements to the criticality experiments program, as appropriate, resulting from the preliminary performance of the annual needs assessment and

concurred on by the cognizant CSOs. (Item 4. Refer also to Item 5.)

- o The Committee shall identify the criticality capability needed to support current and expected future DOE operations as detailed under Annual Committee Activities. (Item 5)

- o The Committee shall incorporate the improvements to the criticality experiments program resulting from the final performance of the first annual needs assessment and concurred on by the cognizant CSOs. (Item 6. Refer also to Item 5.)

- o Implementation Plan status reports to the Assistant Secretary for Defense Programs and the DNFSB. (Item 7, Complete - Fourth Quarter 1993)

  Quarterly reports were initiated and issued for Third and Fourth Quarters 1993.

C. Recommendation 93-3, Improving Technical Capability in Defense Nuclear Programs

Summary. The Board issued Recommendation 93-3 on June 1, 1993, concerning the technical capability of personnel associated with defense nuclear facilities. The Board in its last three Annual Reports has observed that:

> "... the most important and far reaching problem affecting the safety of Department of Energy defense nuclear facilities is the difficulty in attracting and retaining personnel who are adequately qualified by technical education and experience to provide the kind of management, direction and guidance essential to safe operation of the Department of Energy's defense nuclear facilities."

Status. The Secretary accepted Recommendation 93-3 on July 23, 1993, with the understanding that Recommendation 92-7 would be included under Recommendation 93-3. After extensive coordination with the Board and its staff, the 93-3 Implementation Plan was developed and forwarded to the Board on November 4, 1993. The Board accepted the Implementation Plan on November 5, 1993, stating that the Implementation Plan was "exemplary," and that it also serves as a revised 92-7 Implementation Plan for Department of Energy and contractor training and qualification for technical personnel.

The Implementation Plan organizes initiatives into eight task areas. These are:

- o Organization and Policy, Task 1, which will establish clear-cut internal leadership to ensure continual improvement in the technical capability of Department personnel and its contractors who are performing safety-related tasks at defense nuclear

facilities. This task includes development of a policy of technical excellence, the establishment of a Technical Excellence Executive Committee, clarification of oversight roles and responsibilities, and the responsibilities of the Technical Personnel Program Coordinator.

Appointment of the Technical Personnel Program Coordinator (Commitment 1.3, Complete - September 1993) and the issuance of the Technical Excellence Policy (Commitment 1.1, Complete - October 31, 1993) were accomplished before the Implementation Plan was forwarded to the Board.

- Recruitment and Retention, Task 2, which will improve and expand technical personnel recruitment and retention programs. A key initiative involves the innovative use of an Excepted Service System to fill appropriate positions.

- Education and Career Planning, Task 3, which will develop and expand existing formal technical education opportunities for technical and technical management positions while establishing an integrated career and succession planning program. This task highlights the initiatives related to the pursuit of graduate technical educational programs and personnel development initiatives (educational incentives, succession planning, and career path guidance).

- Department of Energy Technical Employee Training and Qualification, Task 4, which will establish a formal and structured training and qualification program for Department technical employees associated with the defense nuclear facilities. This task involves significant initiatives in training and qualification standards, interim guidance, development of new training courses, institutionalizing the training and qualification process, issuing guidance for Department evaluation of contractor training and qualification, and guidance for performance appraisal standards. Comprehensive information management systems will allow senior managers to integrate their goals and objectives to assure cost effective implementation, track progress, and take appropriate corrective actions.

- Contractor Training, Task 5, which will increase Department senior management involvement and improve the quality and pace of implementing Department Orders governing the training and qualification of Management and Operating contractor personnel who operate the defense nuclear facilities in the complex. This task addresses the Management and Operating contractor issues contained in Recommendation 92-7, Training and Qualification. These initiatives include accelerating the approval of Training and Implementation Matrices (TIMs) and validating the status of Training Program Accreditation Plans (TPAPs). Additional actions include revising Orders 5480.18A and 5480.20, sharing lessons

learned among Management and Operating contractors and Operations Offices, and providing expanded and enhanced guidance to Management and Operating contractors.

A status report was issued on December 28, 1993, concerning the submittal and implementation of TIMs (Commitment 5.1.1, In progress.)

- o External Assessment, Task 6, which establishes independent external assessment capability. This includes an independent assessment followed by an Implementation Plan detailing the Department's response and planned corrective actions.

- o Reporting Requirements, Task 7, which establishes and describes the requirement for quarterly reports updating the progress and significant accomplishments made in the 93-3 Implementation Plan initiatives. The quarterly reports will contain updated performance indicators, as available, and discussions on the progress of various initiatives. The reports will review completion dates and upcoming milestones, as well as the upcoming quarter's activities and any concerns.

- o Change Control, Task 8, which concerns the process to address changes in commitments, actions, completion dates or target dates when modifications are necessary due to additional information, project refinements, or changes in the Department's baseline assumptions.

The Department recognizes the importance and magnitude of the changes discussed in the Implementation Plan. Aggressive efforts have been started to complete near-term initiatives that can quickly achieve momentum and demonstrate success in implementing the plan. Successful and timely completion of the near-term initiatives is paramount to commencing a significant long-term effort.

An experienced Senior Executive Service manager was designated in September 1993 to serve as the Technical Personnel Program Coordinator (TPPC). The TPPC provides continuity by having served as a key development team member in developing the Implementation Plan and being the Departmental agent responsible for coordinating its implementation. (It should be noted that the primary responsibility for completing these initiatives lies with line management.) The Technical Excellence Policy has been approved and negotiations have been initiated on Excepted Service authority.

The TPPC Commitment Schedule, Revision 0, was issued in December 1993. This schedule provides the framework for tracking actions necessary to ensure that appropriate progress is achieved in meeting commitment dates.

The first of a series of Technical Training Excellence Workshops was held in September 1993. The last of the five site Training Surveys was completed in December 1993. The site Training Surveys included Pantex, Savannah River, Rocky Flats, Idaho National Engineering Laboratory, and Lawrence Livermore National Laboratory. A Training Implementation Matrix workshop was held in October 1993. The Oak Ridge Operations Office has established and staffed a training office, and the Albuquerque Operations Office has committed to accelerating training initiatives at Pantex to facilitate compliance with DOE Order 5480.20 and to address Federal employee training and qualification.

To continue aggressive efforts in implementing the plan, a number of initiatives will be completed by March 1994. A select number of these initiatives are listed below:

- Technical Excellence Policy - Issue the DOE Technical Excellence Policy statement committing the Department to upgrading the technical expertise of employees and contractors. (Commitment 1.1, Complete - October 31, 1993)

- Training Implementation Matrices - Determine the status of development, submittal, approval and implementation for Training Implementation Matrices (TIMs) required by DOE Order 5480.20. (Commitment 5.1.1, Complete - December 28, 1993)

- External Assessment - Complete an external assessment plan for providing the Department with independent, candid and timely feedback on its efforts to increase the technical capability of its employees. (Commitment 6.1)

- Interim Report to the DNFSB - Issue an interim report to the Board containing an update of all activities occurring between the issuance of the Implementation Plan and the end of the Calendar Year. (Commitment 7.1)

- Interim Guidance - Establish interim guidance to verify the adequacy of, or to establish as necessary, Individual Development Plans (IDPs) or their equivalent for technical employees and managers. (Commitment 4.2.1)

- Oversight Roles and Responsibilities - Issue Department policy and guidance to define training and qualification program oversight roles and responsibilities for line management and the Office of Environment, Safety and Health. (Commitment 1.4)

- Technical Personnel Coordinating Committee - Establish a Technical Personnel Coordinating Committee to facilitate intrasite and intersite communications, coordinate initiatives, share resources and lessons learned, and facilitate progress. (Commitment 5.5)

- Near-Term Recruitment Strategy - Establish policy and guidance for developing a near-term strategy to attract competent, well-

qualified technical candidates to fill critical technical personnel shortages. (Commitment 2.4)

- Training Program Accreditation Plans - Determine the status of contractor implementation for the Training Program Accreditation Plans (TPAPs) required by DOE Order 5480.18A. (Commitment 5.2)

- Administrative Processes - Issue guidance for identifying and communicating to line managers selected administrative processes to enhance recruitment, retention, and performance management of Federal technical staff. (Commitment 2.2)

As described in the Implementation Plan, the original due dates for the following commitments are greater than one (1) year from the date of submittal of the Implementation Plan:

- Commitment 4.1.4, to bring operations and program offices into compliance with the new requirements for selection, training, and qualification for DOE technical staff responsible for evaluating contractor training and qualification programs (Commitment 4.1.2) and for personnel responsible for implementing Federal employee technical training programs (Commitment 4.1.3), has a due date of June 1995 for the deliverable of "compliance verified by selected self-assessments and oversight reviews."

- Commitments 4.4.4, to develop and issue a Technical Specialist Qualification Standard that contains Department-wide and facility/site/program-specific requirements for the Technical Specialist position, has a due date of December 1994.

- Commitment 4.4.5 to complete and implement the technical qualification standards process for new employees and job incumbents has a due date of December 1995 for the deliverable of "implementation verified by selected self-assessments and oversight reviews.

- Commitment 4.5, to coordinate the development and implementation of formal technical training courses to cover the knowledge, skills, and abilities identified in the technical qualification standard developed in Commitment 4.4 including:

  - Evaluation of existing training courses to determine if they sufficiently cover the identified learning objectives in the qualification standards and

  - Modification and development of courses as necessary to support the technical qualification standards,

  has a due date of December 1994.

- Commitment 4.6, to institutionalize the Technical Training and Qualification Program for Federal technical employees by

developing and issuing a Department Order and related guidelines covering the process and requirements, has a due date of December 1994.

- Commitment 4.7, to develop and issue policy and guidance for upgrading the language in performance appraisals for technical personnel required to complete training and qualification requirements, for supervisors of technical personnel that must complete qualification requirements, and for personnel that oversee or evaluate Federal and contractor technical training and qualification activities, has a due date of December 1994.

- Commitment 4.8, to coordinate the development and implementation of management information systems to monitor and assess the effectiveness of both Federal and contractor training and qualification initiatives and to establish standard reporting requirements, including specific performance indicators, to ensure that DOE senior management is cognizant of activities and progress and is able to make changes when necessary to ensure that initiatives stay on schedule and are being implemented as intended, has a due date of December 1994.

D. Recommendation 93-4, Environmental Restoration Management Contracts

Summary. On June 16, 1993, the Board issued Recommendation 93-4 concerning health and safety factors associated with the Department's management and direction of Environmental Restoration Management Contracts (ERMCs). The Board has an interest in the Department's use of its new Environmental Restoration Management Contractor approach to defense nuclear waste storage, treatment, disposal, and site decommissioning and restoration at the Fernald Environmental Management Project. The Board recommended that the Department formalize and strengthen its technical management of Environmental Restoration Management Contracts through developing detailed project and technical management plans, allocating qualified technical personnel to manage the contracts at both the Headquarters and Field level, and applying the lessons learned at Fernald to future Environmental Restoration Management Contracts and to other Departmental contracting.

Recommendations also were included to review recent Uranyl Nitrate Hexahydrate (UNH) accidents at Fernald, develop an operational readiness plan to resume UNH activities, and improve the Facility Representative program at Fernald.

Status. The Secretary notified the Board on August 6, 1993, of acceptance of Recommendation 93-4 and submitted the Implementation Plan to the Board on November 8, 1993. The Plan was accepted by the Board on November 18, 1993. The Implementation Plan commits the Department to:

- Develop and implement a technical management plan for Fernald and future Environmental Restoration Management Contracts. (Item 1)

- o Consider insights gained from Item 1 above in pursuing the broader initiatives for reforming contract management announced by the Secretary. (Item 2)

- o Conduct an independent review of the corrective actions taken subsequent to a recent Uranyl Nitrate Hexahydrate spill at Fernald. (Item 3)

- o Formalize a clear process and line of authority for restart of the Uranyl Nitrate Hexahydrate Stabilization Project at Fernald. (Item 4)

- o Fully implement the Facility Representative Program at Fernald in accordance with Recommendation 92-2, Facility Representatives. (Item 5)

The principles contained in applicable DOE Orders and in the Implementation Plans in response to previous Board Recommendations on topics such as Facility Representatives (92-2), operational readiness reviews (92-6), and training (93-3) were incorporated, where appropriate, into the Implementation Plan for Recommendation 93-4.

E. Recommendation 93-5, Hanford Waste Tanks Characterization Studies

Summary. The Board's dissatisfaction at the rate of waste tank sampling and characterization for the Hanford Waste Tanks resulted in the Board's issuance of Recommendation 93-5 which urges more rapid progress. At the end of Calendar Year 1993, 22 of the 177 tanks on the Hanford Site had been sampled. Only four of those sampled were among the 54 tanks on the Watch List of tanks that generate the greatest safety concerns.

In Recommendation 93-5, the Board recommended that the Department:

- o Undertake a comprehensive reexamination and restructuring of the characterization effort with the objectives of:

  - Accelerating sampling schedules and strengthening technical management of the effort; and

  - Completing safety-related sampling and analysis of Watch List tanks within a target period of two years, and the remainder a year later.

- o Integrate the characterization effort into the systems engineering effort for the Tank Waste Remediation System (TWRS).

Status. The Department accepted Recommendation 93-5 on August 18, 1993. The Implementation Plan was submitted to the Board in January 1994.

F. Recommendation 93-6, Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Facilities Complex

Summary. The Board issued Recommendation 93-6 on December 10, 1993, identifying its concerns in relation to a number of safety-related consequences associated with the ongoing reduction in size of the stockpile of nuclear weapons and the related changes in the defense nuclear complex. The Board had addressed several Recommendations to such problem areas, including 92-5 which concerned discipline of operations in a changing defense nuclear facilities complex, and 93-2, which concerned the continued need for the capability to conduct critical experiments. The Board's concerns included the need to retain access to the capability and to capture the unique knowledge of individuals who have been engaged for many years in certain critical defense nuclear activities, in order to avoid future safety problems in these and related areas.

The Board's concerns included:

- Ensuring the capability is maintained to safely conduct nuclear testing operations at the Nevada Test Site.
- Ensuring all future dismantlement activities at Pantex are safely completed.
- Potential safety-related consequences of the ongoing downsizing, layoffs, and retirement of knowledgeable personnel within the nuclear weapons complex.
- Effectiveness of administrative controls to ensure nuclear explosive safety at the Nevada Test Site in light of the loss of experienced personnel.
- The need to obtain as yet undocumented anecdotal technical information from departing personnel including design, test, engineering, and manufacturing data for weapons and weapon experiments.

Status. The Office of Defense Programs has been assigned as the lead Office to manage this Recommendation. The Department's response to Recommendation 93-6 is due to the Board in February 1994.

APPENDIX A

Recommendation 93-1

Standards Utilization in Defense Nuclear Facilities

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400

January 21, 1993

Ms. Linda G. Stuntz
Acting Secretary of Energy
Washington, DC 20585

Dear Ms. Stuntz:

On January 21, 1993, the Defense Nuclear Facilities Safety Board, in accordance with 42 U.S.C. § 2286a(5), unanimously approved Recommendation 93-1 which is enclosed for your consideration. Recommendation 93-1 deals with Standards Utilization in Defense Nuclear Facilities.

42 U.S.C. § 2286d(a) requires the Board, after receipt by you, to promptly make this recommendation available to the public in the Department of Energy's regional public reading rooms. The Board believes the recommendation contains no information which is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please arrange to have this recommendation promptly placed on file in your regional public reading rooms.

The Board will publish this recommendation in the Federal Register.

Sincerely,

John T. Conway
Chairman

Enclosure

RECOMMENDATION 93-1 TO THE SECRETARY OF ENERGY
pursuant to 42 U.S.C. § 2286a(5)
Atomic Energy Act of 1954, as amended.

Dated: January 21, 1993

Several of the Board's recommendations have emphasized the importance of an effective program of standards utilization in defense nuclear facilities. By so doing, the Board has shown that it considers the detailed review of ongoing operations for compliance with DOE Orders (and applicable consensus standards) as an essential measure in assuring that defense nuclear facilities are being operated in a safe manner.

The Board has noted significant progress by DOE in the issuance of new and revised nuclear safety orders that more explicitly delineate requirements in such areas as: unreviewed safety question determinations, technical safety requirements, nuclear safety analysis reports, design requirements and nuclear criticality safety. However, the Board's ongoing review of the use of standards in defense nuclear facilities has disclosed a number of potential inconsistencies in the manner in which DOE Orders related to nuclear safety are applied at facilities that produce and process fissile materials, relative to those facilities that assemble, disassemble, and test nuclear weapons. The Board notes that DOE orders differentiate between nuclear safety and "nuclear explosive safety," (the latter is defined by DOE Order 5610.11, Nuclear Explosive Safety); however, the Board considers that certain basic safety principles apply to the handling of fissile materials, regardless of the form that the material is in.

For example, a number of orders related to nuclear safety are explicitly excluded from applicability to facilities that assemble, disassemble and test nuclear weapons, while others are applicable only to "nuclear facilities," (as defined by DOE Order 5480.5, Safety of Nuclear Facilities). Those that apply to "nuclear facilities do not necessarily apply to facilities that assemble, disassemble and test nuclear weapons. In other technical areas, such as quality assurance, essentially different programs have been put in place (i.e., DOE-AL directives QC-1 and QC-2, as opposed to DOE Order 5700.6C).

The Board is committed to ensuring the level of safety assurance at those facilities that assemble, disassemble and test nuclear weapons is at least as rigorous as that required at other defense nuclear facilities and that it can be measured to compare with the level of safety assurance provided to the public and site workers by commercial nuclear material processing facilities. The above being recognized, the Board recommends that:

1. DOE review its list of orders and directives related to nuclear safety and determine those that apply to facilities and operations that assemble, disassemble and test nuclear weapons.

2. DOE evaluate the level of nuclear safety assurance provided by the orders and directives applicable to facilities that assemble, disassemble and test nuclear weapons and compare it to the level of safety assurance provided by DOE Orders and directives applicable to other DOE defense nuclear facilities.

3. DOE develop a plan for addressing any deficiencies found by the above two reviews.

4. Priority be given by DOE to completing site-wide order compliance reviews at facilities that assemble, disassemble and test nuclear weapons; with special emphasis placed on the Pantex Plant.

John T. Conway, Chairman

APPENDIX A

Recommendation 93-2

The Need for Critical Experiment Capability

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400

March 23, 1993

The Honorable Hazel R. O'Leary
Secretary of Energy
Washington, DC 20585

Dear Madame Secretary:

On March 23, 1993, the Defense Nuclear Facilities Safety Board, in accordance with 42 U.S.C. § 2286a(5), unanimously approved Recommendation 93-2 which is enclosed for your consideration. Recommendation 93-2 deals with The Need for Critical Experiment Capability.

42 U.S.C. § 2286d(a) requires the Board, after receipt by you, to promptly make this recommendation available to the public in the Department of Energy's regional public reading rooms. The Board believes the recommendation contains no information which is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please arrange to have this recommendation promptly placed on file in your regional public reading rooms.

The Board will publish this recommendation in the Federal Register.

Sincerely,

John T. Conway
Chairman

Enclosure

RECOMMENDATION 93-2 TO THE SECRETARY OF ENERGY
pursuant to 42 U.S.C. § 2286a(5)
Atomic Energy Act of 1954, as amended.

Dated: March 23, 1993

The end of the international competition in manufacture of nuclear weapons, and the transition to large scale dismantling of nuclear weapons, have generated strong pressures to reduce the defense nuclear budget and to close down many defense nuclear facilities and operations. At the same time, the development of firm plans for a Complex 21 to serve future nuclear defense needs has slowed. These trends lead to a possibility that capabilities and functions necessary for current and future needs could be terminated along with those no longer required. One of these, important for the avoidance of certain types of accidents, is support of nuclear criticality control.

Because of the importance of avoiding criticality accidents, the Board carefully follows the state of criticality control at DOE's defense nuclear facilities. This interest has been evident as Board members and staff have reviewed practices at the Pantex Plant. The Board believes it is important to maintain a good base of information for criticality control, covering the physical situations that will be encountered in handling and storing fissionable material in the future, and to ensure retaining a community of individuals competent in practicing the control.

In the course of retrenchment of its activities in recent years, the Department of Energy and its predecessor agencies have terminated use of all but one of its general purpose facilities for conducting neutron chain-reacting critical experiments with fissionable material. The research at these facilities had served programmatic purposes of diverse DOE programs, as well as laying a general experimental basis for practices that ensure averting criticality accidents. The Board is informed that there is now a strong possibility that the last DOE facility capable of general purpose critical experiments will be shut down in the near future, due to lack of funding. This possibility arises because no single program of the Department has an overriding need for this remaining facility at the Los Alamos National Laboratory, and therefore no single program office is motivated to provide its financial support in this period of budget stringency. A certain complacency fed by some years of freedom from criticality accidents seems also to underlie this possibility.

The Board observes that the art and science of nuclear criticality control have three principal ingredients. The first is familiarity with factors that contribute to achieving nuclear criticality, and the physical behavior of systems at and near criticality. This familiarity is developed in individuals only through working with critical systems. It cannot be imparted solely through learning theory and using computer codes. The second is theoretical understanding of neutron multiplication processes in critical and subcritical systems, leading to predictability of the critical state of a system by methods that use theory benchmarked against good and well characterized critical experiments.

The third is thorough familiarity of nuclear criticality engineers with the first two factors, obtained through a sound program of training that indoctrinates them in the experimental and theoretical aspects.

The Board has reviewed the status of benchmarking the theoretical methods of criticality control against existing critical experiments and has found that there are notable failures of theoretical analysis to account for the results of a number of experiments. It is not known whether this discrepancy results from inadequate nuclear data used in the analysis or from inadequate care in conducting the experiments and recording their physical features. Both factors could contribute. In addition, it seems that on the average there may be a small non-conservative bias in overall predictions of the theory. In spite of these shortcomings, conservatism in methods used to develop the limits to be applied during handling and storage of fissionable material seems to have led to adequate safety in recent years. The Board believes that in the interest of continued safety it is important to clear up the existing discrepancies, which are obstacles to confident understanding of criticality control. To do so will require conduct of further neutron chain-reacting critical experiments targeted at the major sources of discrepancy between the theory and the experiments, as well as careful analysis of the experiments.

Finally, the Board believes that there is no guarantee that the physical circumstances of handling and storage of fissionable material in the future will always be found in the realm of benchmarked theory. This point is especially important under circumstances that will exist for a number of years to come, with increasing amounts of fissionable material to be stored in a variety of chemical and physical forms. This does not appear to be an appropriate time to eliminate an ability to ensure that such activities will be free of criticality hazard. For safety purposes it will be necessary to retain the capability to perform experiments under conditions not foreseen at this time. This capability once lost would be most difficult to reproduce, and it could be approximated only at great cost and after substantial time, deterring such development even if it were needed badly.

For all the above reasons, the Board believes that continuation of an experimental program of general purpose critical experiments is necessary for continued safety in handling and storing fissionable material. It is needed to improve the basis for the methodology. It is needed as part of the process of properly educating criticality control engineers. It is needed to ensure the capability of answering criticality questions with new and previously unresearched features.

Therefore the Board recommends that:

1. The Department of Energy should retain its program of general purpose critical experiments.

2. This program should normally be directed along lines satisfying the objectives of improving the information base underlying prediction of criticality, and serving in education of the community of criticality engineers.

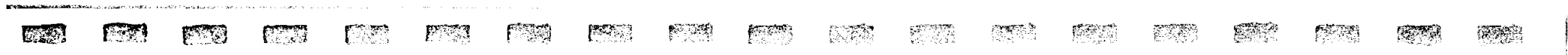
3. The results and resources of the criticality program should be used in ongoing departmental programs where nuclear criticality would be an important concern.

John T. Conway, Chairman

APPENDIX A

Recommendation 93-3

Improving Technical Capability in Defense Nuclear Programs



DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400

June 1, 1993

The Honorable Hazel R. O'Leary
Secretary of Energy
Washington, DC 20585

Dear Secretary O'Leary:

On June 1, 1993, the Defense Nuclear Facilities Safety Board, in accordance with 42 U.S.C. § 2286a(5), unanimously approved Recommendation 93-3 which is enclosed for your consideration. Recommendation 93-3 deals with Improving DOE Technical Capability in Defense Nuclear Facilities Programs.

42 U.S.C. § 2286d(a) requires the Board, after receipt by you, to promptly make this recommendation available to the public in the Department of Energy's regional public reading rooms. The Board believes the recommendation contains no information which is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please arrange to have this recommendation promptly placed on file in your regional public reading rooms.

The Board will publish this recommendation in the Federal Register.

Sincerely,

John T. Conway
Chairman

Enclosure

RECOMMENDATION 93-3 TO THE SECRETARY OF ENERGY
pursuant to 42 U.S.C. § 2286a(5)
Atomic Energy Act of 1954, as amended.

Dated: June 1, 1993

Effective functioning of any organization, whether in the private sector or government, is highly dependent upon the capabilities of people and the way they are guided and deployed. Nowhere is this dependency more crucial than in the Department of Energy's defense nuclear complex, where the potential hazards inherent in nuclear materials production, processing, and manufacturing, require high quality technical expertise to assure public and worker safety.

Nuclear weapons development and production have progressed over the years from early efforts of a small group of highly talented, ingenious individuals in scientific laboratories to employment of thousands of workers in industrial-type production environments. While the national response to today's changing international scene is resulting in down-sizing of the nuclear stockpile and a change in mission of many of the defense nuclear facilities, the need remains for continuing vigilance to protect public and worker health and safety. In fact, a case can be made for the need for greater vigilance now throughout the weapons complex because of: increased risk of equipment mishaps in aged facilities, loss of existing technical expertise through attrition and down-sizing, and a reduced inclination for young engineers and scientists to get involved in the nuclear weapons field.

Nevertheless, the level of scientific and technical expertise in the DOE of defense nuclear facilities and operations has been declining. The Defense Nuclear Facilities Safety Board in its last three annual reports has observed that:

> "... the most important and far reaching problem affecting the safety of DOE defense nuclear facilities is the difficulty in attracting and retaining personnel who are adequately qualified by technical education and experience to provide the kind of management, direction and guidance essential to safe operation of DOE's defense nuclear facilities."

The Board has not been alone in calling attention to the problem. Congressional perception of the need to upgrade DOE technical expertise is evident in the Board's enabling legislation. The need for such up-grading is further underscored by assessments made by a number of other groups over the past decade, as the attached excerpts from their reports indicate.

A reputation for technical excellence is a strong attraction for talented individuals. Organizations with strong technical missions commonly cite technical excellence as a goal towards which management should strive. However, sustained leadership emphasis and deliberate actions are required if the reality of technical excellence is to be achieved.

Actions by the Board, such as recommendations and public hearings, have resulted in some efforts on the part of certain DOE organizations and M & O contractors to upgrade existing staff and recruit better qualified personnel. However, such efforts have not been coordinated DOE-wide and have been well short of the need. The Board believes that a more aggressive, broad-based and well-coordinated program directed at the enhancement of the technical capabilities of the DOE staff should be defined and implemented.

The Board recognizes the difficulty any on-going organization faces in developing programs targeted at upgrading competence of staff. Such efforts rarely succeed without strong endorsement, involvement, and guidance by the organization's top management and without the impetus provided by objective appraisals made by outside, independent experts. Further, the sheer size, differing requirements, and dispersion of DOE staff complicates both the problem and the solution. Nonetheless, the strong correlation between technical excellence and assurance of public health and safety compels this Board to urge that DOE give high priority to the problem of attracting and retaining technical personnel with exceptional qualifications. More specifically the Board recommends that DOE:

1. Establish the attraction and retention of scientific and technical personnel of exceptional qualities as a primary agency-wide goal.

2. Take the following specific actions promptly in the interest of achieving this goal.
   a. Seek excepted appointment authority for a selected number of key positions for engineering and scientific personnel in DOE programmatic offices, in other line units and in the oversight units responsible for the defense nuclear complex.

   b. Establish a technical personnel manager within the Office of the Secretary to coordinate recruitment, classification, training, and qualification programs for technical personnel in defense nuclear facilities programs.

3. Develop a broadly-based program, giving consideration to the following:

   a. DOE Internal Initiatives.

      (1) Develop a set of mutually supportive actions which DOE could take, within existing personnel structures, to enhance capabilities. Measures warranting consideration:

         (a) Plan and execute a system for using attrition to build technical capability.

(b) Review the performance appraisal system for technical employees for its effectiveness in determining basic pay, training needs, promotions, reductions in grade, and reassignment/removal.

(c) Review and improve programs for training and assigning technical personnel. (This activity would be coordinated with actions taken, planned to be taken, in response to Board Recommendations 90-1, 91-6, 92-2, and 92-7.)

(d) Explore with the Secretary of Defense the possibility of assigning to DOE defense nuclear facilities activities a number of outstanding officers with nuclear qualifications who may now be surplus to DOD needs.

(e) Establish initiatives designed to take advantage of skills of marginal technical performers and re-train them.

(f) Expand Headquarters/Field personnel exchange programs for highly qualified junior technical staff to promote understanding of all aspects of technical issues including their resolution.

b. Independent External Assessments.

(1) Use respected, independent, external organizations such as the National Research Council of the National Academy of Sciences, and the National Academy of Public Administration to assess DOE's ongoing and planned actions directed at attracting and retaining personnel with strong technical capabilities and to make recommendations for enhancements. Such assessment could include:

(a) Government-wide and/or DOE personnel recruitment and development policies and practices that may be effective inducements to government service.

(b) Comparison of DOE methods of building a qualified technical staff with qualifications comparable to those of other government agencies with predominant technical missions.

c. DOE Internal Assessments.

(1) Perform an in-depth assessment of educational and experience requirements of key positions and develop both a short-term and long-term plan for key personnel development. Such assessment could include:

(a) Identification of qualifications (education and experience) required in key positions (above GS-14) in DOE Headquarters and field organizations with responsibilities for safely carrying out the defense nuclear program.

(b) Evaluation of incumbents for their ability to meet such qualification requirements.

(c) Evaluation of current availability within DOE of fully qualified personnel to fill these positions.

(2) Develop an action plan to meet needs thus identified.

John T. Conway, Chairman

REFERENCE DOCUMENTS IDENTIFYING DOE TECHNICAL PERSONNEL PROBLEMS

1. "A Safety Assessment of Department of Energy Nuclear Reactors," DOE/US-0005, March 1981.

> An important contributing factor [to the lack of adequate attention by DOE Headquarters' organizations to the nuclear safety aspects of its reactors] is the lack of sufficient numbers of highly competent technical people in Headquarters' organizations with nuclear safety responsibilities. Field Office organizations also suffer from this lack.

2. National Research Council Reports:

   a. "Safety Issues at the Defense Production Reactors," National Academy Press, 1987.

> The committee concludes that the Department, both at headquarters and in its field organizations, has relied almost entirely on its contractors to identify safety concerns and to recommend appropriate actions, in part because the imbalance in technical capabilities and experience between the contractors and DOE staff is of sufficient magnitude to preclude DOE from comprehensive DOE involvement in the operation of the production reactors. The committee recommends that the Department acquire and properly assign the resources and talent necessary to ensure that safe operation is being attained.

b. "Safety Issues at the DOE Test and Research Reactors," National Academy Press, 1988.

> The suitability of the existing [DOE organizational] arrangement is undermined by the absence of adequate staff in the DOE line management who are sophisticated on safety and operational matters .... In effect, the system relies almost exclusively on the skills and competence of the contractors.

c. "The Nuclear Weapons Complex: Management for Health, Safety, and the Environment," National Academy Press, 1989.

> Constant attention must be paid to the maintenance and improvement of technical capabilities. Concerted efforts are needed to recruit competent technical personnel at all levels; and DOE must maintain an environment for the retention of employees by providing challenging assignments, meaningful participation in decision making, and professional advancement. Strong training programs are necessary to build a culture in which health, safety, and environmental considerations are seen as an integral component of operations.

3. Secretary of Energy letter to the President, December 20, 1991.

> ... the technical knowledge and skills of many DOE managers and employees are not sufficient to do their jobs.

4. S. Conf. Rep. No. 232, (to accompany S. 1085), 100th Cong., 1st Sess. (1987).

> The Board is expected to raise the technical expertise of the Department substantially, to assist and monitor the continued development of DOE's internal ES&H organization, and to provide independent advice to the Secretary.

5. Advisory Committee on Nuclear Facility Safety ("Ahearne Committee") letter to the Secretary of Energy, March 24, 1989

> We recommend that you streamline management to make responsibilities clear, that you put knowledgeable people in line positions of responsibility, and that you give them authority. This is important for assurance of nuclear safety. Solving the DOE's problems will require upper management and operating personnel to work together closely and effectively. This will not be possible if the staff must work through buffers of people who are not technically competent.

6. "Hazards Ahead: Managing Cleanup Worker Health and Safety at the Nuclear Weapons Complex," Office of Technology Assessment, 1993.

> EM ... lacks adequate numbers of qualified staff to develop occupational health and safety programs suited to EM line operations and has little capacity to assess contractors' performance in health and safety matters.

> The DOE Office of Environment, Safety and Health (EH) does not have enough qualified field staff to monitor contractor operations.

APPENDIX A

Recommendation 93-4

Environmental Restoration Management Contracts

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400

June 16, 1993

The Honorable Hazel R. O'Leary
Secretary of Energy
Washington, DC 20585

Dear Secretary O'Leary:

On June 16, 1993, the Defense Nuclear Facilities Safety Board, in accordance with 42 U.S.C. § 2286a(5), unanimously approved Recommendation 93-4 which is enclosed for your consideration. Recommendation 93-4 deals with health and safety factors associated with DOE's management and direction of Environmental Restoration Management Contracts.

42 U.S.C. § 2286d(a) requires the Board, after receipt by you, to promptly make this recommendation available to the public in the Department of Energy's regional public reading rooms. The Board believes the recommendation contains no information which is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please arrange to have this recommendation promptly placed on file in your regional public reading rooms.

The Board will publish this recommendation in the Federal Register.

Sincerely,

John T. Conway
Chairman

Enclosure

Copy to: Mark B. Whitaker, DR-1

RECOMMENDATION 93-4 TO THE SECRETARY OF ENERGY
pursuant to 42 U.S.C. § 2286a(5)
Atomic Energy Act of 1954, as amended.

Dated: June 16, 1993

The Board and its staff have been monitoring the efforts of the Department of Energy (DOE) in technically managing the Uranyl Nitrate Hexahydrate (UNH) stabilization project at the Fernald Environmental Management Project since DOE began preparations for operational testing in early 1992. The stabilization project was initiated after the UNH solution was declared waste in 1991. The purpose of the project is to process the UNH into a filter cake for interim nuclear waste storage onsite pending final disposition.

In addition to maintaining a focus on the technical aspects affecting safety at Fernald, the Board has a high interest in DOE's use of its new Environmental Restoration Management Contractor (ERMC) approach to defense nuclear waste storage, treatment, disposal, and site decommissioning/restoration at this site. Experience acquired at Fernald can prove valuable to the Department and its future ERMCs for defense nuclear sites. Of particular interest to the Board is how, under this approach, DOE and the ERMC will ensure adequate protection of the health and safety of the public and the onsite workers involved in storage and processing of nuclear waste at Fernald.

The Board's staff has visited Fernald to review the UNH stabilization project on five separate occasions since March 1992. Topics for review have included technical management arrangements, operator training, start-up test plans, radiation protection, nitrogen dioxide releases, and the testing of system operability. The Board forwarded observations from the March 1992 Fernald visit to the Assistant Secretary for Environmental Restoration and Waste Management (EM-1) in a letter dated July 8, 1992. Observations from a staff trip in April of this year were forwarded to EM-1 in a letter dated May 11, 1993. These reviews at Fernald have shown weaknesses in DOE's technical direction of contractor performance, the contractor's conduct of operations, and the level of knowledge of personnel. With respect to the first weakness, a lack of technical vigilance on the part of DOE-Fernald (DOE-FN) allowed the ERMC contractor to start operations at the UNH project in April 1993 without (1) conducting a DOE-FN-required readiness review and without (2) informing and obtaining the approval of either the DOE-FN manager or the DOE headquarters project office to start the operation.

Most recently, incidents involving the improper transfer of UNH solution into a treatment system sump, and the resultant release of approximately 30 gallons of UNH solution to the environment, have again shown how inadequate procedures, inadequate knowledge of systems and procedures on the part of operators, and absence of an appropriate level of discipline in the conduct of operations can contribute to unsafe operations. These incidents were logged in DOE's occurrence reporting system in reports ORO--WMCO-FMPC-1993-0027 and ORO--WMCO-FMPC-1993-0028, respectively. Furthermore, the Board has noted recent events at other facilities under the cognizance of EM, including the Defense Waste

Processing Facility at SRS and the Uranium Oxide Plant at Hanford, that appear to indicate fundamental safety problems resulting from defective discipline of operations.

The incidents at Fernald and at other sites, taken together, also suggest that DOE's technical management and oversight structure for ERMC contracts are in need of upgrading. As the defense nuclear complex moves more rapidly toward long-term storage, environmental restoration, and cleanup, new contractors at other sites will be engaged using the ERMC approach, as is being used at Fernald. Based upon observations of the Fernald project, the Board has concern stemming from health and safety considerations that: (1) DOE may not have sufficient numbers of competent, trained headquarters and field personnel to technically manage such contracts, and (2) contracts may be negotiated and signed before DOE has developed internal plans on how to carry out its technical management and oversight responsibilities.

The Board is aware that you have recently announced initiatives to reform DOE contract management. These initiatives are directed largely at more effective financial management and program implementation. The Board would encourage, in the interests of public and worker health and safety, that the planned review of contracting mechanisms and practices also encompass the DOE technical direction and oversight structure. The Board believes that competence and effectiveness in technical aspects of management are essential to assure that contract services are provided in a manner which meets health and safety objectives.

The Board believes that DOE should formalize and strengthen its technical management of ERMC contracts. A straightforward step toward achieving this objective is for DOE to develop, in parallel with the drafting and negotiation of a new contract, a separate document which will provide detailed project and technical management plans and allocate qualified technical personnel to manage that contract at both HQ and the field location. Such a plan would in effect be a functions and responsibilities document. It would lay out management expectations for those assigned the technical monitoring, direction, and oversight of the contracted services, and identify the interfaces with other DOE resources managing the non-technical aspects of the contract. The contractor would normally not be allowed to commence operations involving radioactive materials until DOE's plan for technical management of site activities has been put into effect. This means, among other things, that the relevant DOE site and headquarters offices have been adequately staffed with qualified persons to provide competent technical direction, guidance, and oversight of the contractor's operations. In addition, the principles contained in applicable DOE Orders and in previous Board recommendations on such topics as DOE facility representatives (92-2), operational readiness reviews (92-6), and training (92-7) should be incorporated, where appropriate, into DOE's plan.

Such advance planning for technical management of ERMC contracts would have the following beneficial impacts: (1) timely identification and commitment of adequate technical resources to manage new contracts and projects; (2) up front identification for

DOE technical managers of expectations deriving from DOE responsibilities for protection of health and safety of workers and the public; and (3) assurance that DOE's technical line management and safety oversight organizations are involved early in the contracting process.

In summary, the Board believes that improvement of DOE's capability to provide technical management and oversight of ERMCs across a broad front is necessary to ensure adequate protection of the public health and safety. Therefore, the Board recommends that:

1. DOE develop and implement a technical management plan for Fernald and all future ERMC contracts. For Fernald, the technical management plan should be developed and implemented expeditiously. For future ERMC contracts, such a plan should be readied prior to contractor selection, and should be implemented at the initiation of contracted services.

2. Each plan for technical management of contracted services include as a minimum:

   a) a clear statement of functions and responsibilities of those in DOE assigned the task of technical direction, monitoring, or oversight of the contracted efforts, both at headquarters and the relevant operations offices;

   b) definition of the technical and managerial qualifications required of DOE's technical management staff at each level of responsible DOE line and oversight units;

   c) identification of the principal interfaces with the non-technical DOE personnel involved in the contract management;

   d) identification, by name, of the key technical personnel selected to perform the requisite technical direction, monitoring, and oversight functions;

   e) identification of policies, practices, orders, and other key instructions that represent a basic framework to be used in DOE technical management of the contractor in ensuring public and worker safety and adequate environmental protection; and

   f) a detailed program to ensure compliance with applicable statutes and DOE Orders, standards, rules, directives, and other requirements related to public and worker safety and environmental protection.

3. DOE consider the insights gained from addressing recommendations 1 and 2 above for ERMC contracts in pursuing the broader initiatives for reforming contract management you recently announced.

To assist DOE in resolving the broader-based safety issues addressed in the previous recommendations, the Board recommends that the following additional actions be taken at Fernald:

4. DOE headquarters complete an independent review of the recent incidents at Fernald, identifying the root causes for those incidents and the corrective actions required to remedy the underlying problems, and translate the Fernald findings into lessons learned applicable to other facilities.

5. DOE establish a clear process with an appropriate set of requirements and clear definitions of the line of authority for approval to start the UNH stabilization project. The set of requirements should identify the type and scope of readiness reviews DOE will require for the start of the UNH stabilization runs. For the type and scope of the reviews, consideration should be given to the standards set forth in previous Board recommendations on this subject (i.e. 90-4, 91-3, 91-4, 92-1, 92-3, and 92-6) and account for the known safety considerations for this operation. This process should also include identification of the appropriate DOE official(s) responsible for ensuring that public and worker health and safety are adequately protected and for giving final start-up approval.

6. DOE immediately establish a group of technically qualified Facility Representatives at Fernald to monitor the ongoing activities of daily operations at the site. DOE's "Guidelines for Establishing and Maintaining a Facility Representative Program at DOE Nuclear Facilities," issued in March, 1993, may be a useful basis for quickly establishing such a program at Fernald.

John T. Conway, Chairman

APPENDIX A

Recommendation 93-5

Hanford Waste Tanks Characterization Studies

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400

July 19, 1993

The Honorable Hazel R. O'Leary
Secretary of Energy
Washington, DC 20585

Dear Secretary O'Leary:

On July 19, 1993, the Defense Nuclear Facilities Safety Board, in accordance with 42 U.S.C. § 2286a(5), unanimously approved Recommendation 93-5 which is enclosed for your consideration. Recommendation 93-5 deals with Hanford Waste Tanks Characterization Studies.

42 U.S.C. § 2286d(a) requires the Board, after receipt by you, to promptly make this recommendation available to the public in the Department of Energy's regional public reading rooms. The Board believes the recommendation contains no information which is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please arrange to have this recommendation promptly placed on file in your regional public reading rooms.

The Board will publish this recommendation in the Federal Register.

Sincerely,

John T. Conway
Chairman

Enclosure

Copy to: Mark B. Whitaker, DR-1

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

Dated: July 19, 1993

Since its beginning almost four years ago, the Board has assigned one of its highest priorities to assurance of safety at the high level nuclear waste storage tanks at the Hanford Site. The Board addressed two of its sets of recommendations (90-3 and 90-7) to potential hazards associated with tanks containing ferrocyanide compounds and pointed to the need for action in connection with tank 101-SY, which periodically vents flammable mixtures of nitrous oxide and hydrogen gas. In Recommendation 90-7, the Board emphasized the urgent need for more rapid and complete sampling and analysis of tank wastes. The wastes in the Hanford tanks differ markedly from tank to tank. Identification of what specifically is in each tank is essential and urgent. Without timely characterization of the wastes, the nature of the risks associated with the tanks cannot be fully assessed and, where necessary, mitigated. Further, until the characteristics of the wastes are known, final methods for tank waste monitoring, retrieval, transport, and treatment cannot be realistically established.

The Board has repeatedly expressed its dismay at the continued slow rate of conduct of this characterization program and has urged a greater rate of progress. At last count only 22 of the 177 tanks on the site have been sampled. Only four of those sampled were among the 54 tanks on the watch list of tanks that generate the greatest safety concerns. The number of samples per tank continues to be insufficient to provide adequate characterization of the full tank. While the published schedules for sampling and analysis promise improvement, they seem optimistic when viewed against the record to date. They appear to present wishes rather than anticipated activities.

Two sets of problems appear to be principal contributors to the slow pace of characterization of the contents of the tanks. The first is a complex of factors acting to impede access to the interiors of the tanks and extraction of samples of their contents. The second is the exhaustive set of measurements made on each sample, along with limitations on laboratory capability for completing these measurements. The Board notes that measurements made for safety purposes do not necessarily receive priority over those done for other reasons, such as satisfaction of formal EPA-related requirements for final waste disposition.

The Board believes that accelerating the pace of the program of characterizing the contents of Hanford's high level nuclear waste tanks is important to nuclear safety at this important defense site. This view is shared by other experts, including DOE's own "Red Team", which reviewed the waste characterization program for the Hanford Tank Farm (DOE-EM, July 1992, Independent Technical Review of Hanford Tank Farm Operations). Characterization is essential for ensuring safety in the near term during custodial management and remedial activities, and also in the long term for advancing the development of permanent solutions to the high level waste problems at Hanford.

In addition to the matter of acceleration and reprioritization of the sampling schedules, the Board is also concerned about the sampling effort itself. The Board notes that a recently released DOE/RL audit (DOE-RL/OPA Audit 93-02, April 1993) of the sampling programs revealed significant weaknesses in the control, management, and technical implementation of core sampling, laboratory, and supporting activities.

Because the failure to vigorously pursue tank waste characterization raises important health and safety issues, DOE needs to take action to accelerate and strengthen the management of the characterization effort to ensure adequate protection of public health and safety.

Therefore, the Board recommends that DOE:

1. Undertake a comprehensive reexamination and restructuring of the characterization effort with the objectives of accelerating sampling schedules, strengthening technical management of the effort, and completing safety-related sampling and analysis of watch list tanks within a target period of two years, and the remainder of the tanks by a year later;

    a. In accordance with the above, give priority in the schedule of tanks to be sampled to the watch list tanks and others with identified safety problems, and priority to the chemical analyses providing information important to ensuring safety in the near term during the period of custodial management. Other analyses, required by statutes such as the Resource Conservation and Recovery Act prior to final disposition of the waste, should not be cause for delay of safety-related analyses. In most cases, analyses needed for long-term disposition may be postponed until more pressing safety-related analyses are completed.

    b. Reexamine protocols for gaining access to the tanks for sampling with the objective of simplifying documentation and approval requirements.

    c. Increase the laboratory capacity and activities dedicated to tank sample analysis:

        (i) Expedite efforts to obtain and begin utilizing additional sampling and analytical equipment now being procured, and the training of personnel needed for an enlarged through-put capacity.

        (ii) Explore availability and utility of laboratory services on- and off-site, such as Hanford's Fuel Materials and Examination Facility and the INEL and LANL laboratories, for accelerating the waste characterization effort.

2. Integrate the characterization effort into the systems engineering effort for the Tank Waste Remediation System:

   a. Schedule tank sampling consistent with engineering and planning for removal, pre-treatment, and vitrification of the tank wastes.

   b. Critically examine the list of chemical analyses done on samples to establish the smallest set needed to satisfy safety requirements.

   c. Strengthen the management and conduct of the sampling operations.

John T. Conway, Chairman

APPENDIX A

Recommendation 93-6

Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Facilities Complex

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400

December 10, 1993

The Honorable Hazel R. O'Leary
Secretary of Energy
Washington, DC 20585

Dear Secretary O'Leary:

On December 10, 1993, the Defense Nuclear Facilities Safety Board, in accordance with 42 U.S.C. § 2286a(5), unanimously approved Recommendation 93-6 which is enclosed for your consideration. Recommendation 93-6 deals with Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Facilities Complex.

42 U.S.C. § 2286d(a) requires the Board, after receipt by you, to promptly make this recommendation available to the public in the Department of Energy's regional public reading rooms. The Board believes the recommendation contains no information which is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please arrange to have this recommendation promptly placed on file in your regional public reading rooms.

The Board will publish this recommendation in the Federal Register.

Sincerely,

John T. Conway
Chairman

Enclosure

Copy to: Mark B. Whitaker, DR-1

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

Dated: December 10, 1993

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

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

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

The design individuals from the laboratories most needed in connection with dismantlement of a specific weapon are those who had been active in the original design of that weapon. They are believed to possess information not recorded in documentation, such as reasons for specific design features, and personal knowledge of any problems that have arisen during design, fabrication, and stockpile life. Many of the remaining individuals with this background are being lost from the system, because of the University of California's recent retirement incentive, planned layoffs by contractors, and DOE downsizing and retirements. Some recent moves to prevent or discourage use of retired individuals as consultants compound the problem; they erect barriers that could prevent access to the needed expertise.

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

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

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

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

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

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

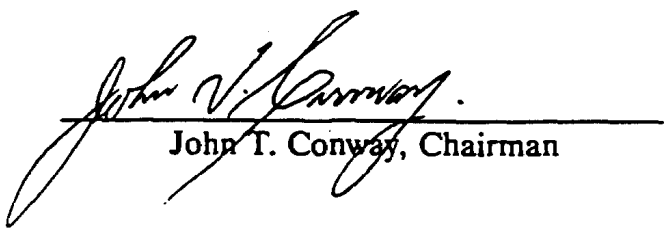
(4) That DOE and its defense nuclear contractors negotiate the continued availability (through retention, hiring, consulting, etc.) of those personnel scheduled to depart whose skills and knowledge have been determined to be important in accordance with the above.

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

(6) That procedures for safe disassembly of weapons systems be developed while the personnel with system-specific expertise on the original development of the weapons are still available. Likewise, analyses of the possibility of hazard from degradation of remaining nuclear weapons with time should be expedited, while these individuals are available. In addition, the current participation of design laboratory experts in the safety aspects of disassembly of weapons at the Pantex Site should be strengthened.

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

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



John T. Conway, Chairman