93-0006976

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.

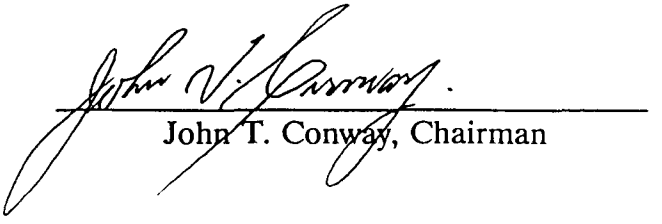
(4) That DOE and its defense nuclear contractors negotiate the continued availability (through retention, hiring, consulting, etc.) of those personnel scheduled to depart whose skills and knowledge have been determined to be important in accordance with the above.

(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