
ANNUAL REPORT
TO CONGRESS

DEFENSE NUCLEAR FACILITIES
SAFETY BOARD



FEBRUARY 1992

John T. Conway, Chairman
A.J. Eggenberger, Vice Chairman
Edson G. Case
John W. Crawford, Jr.
Herbert John Cecil Kouts

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400 • FTS 268-6400



February 11, 1992

To the Congress of the United States:

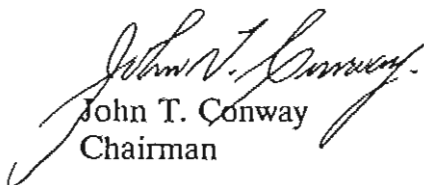
The Defense Nuclear Facilities Safety Board is pleased to submit to the Congress its second annual report, covering activities of the Board during calendar year 1991.

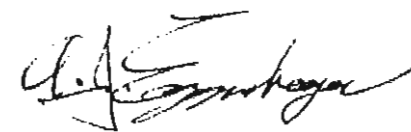
An independent executive branch establishment, the Board provides advice and recommendations to the President and the Secretary of Energy regarding public health and safety issues at Department of Energy (DOE) defense nuclear facilities. The Board also reviews and evaluates the content and implementation of health and safety standards, as well as other requirements, relating to the design, construction, operation, and decommissioning of DOE defense nuclear facilities.

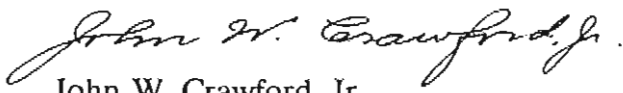
As required by statute, the Board's report to Congress summarizes activities during the past year, assesses improvements in the safety of DOE defense nuclear facilities, and identifies outstanding safety problems at DOE defense nuclear facilities.

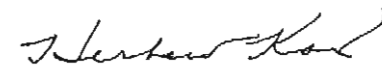
During this reporting period, the Board made progress in discharging its health and safety review responsibilities while addressing the many managerial issues associated with the operation of a relatively new agency.

Respectfully submitted,


John T. Conway
Chairman


A. J. Eggenberger
Vice-Chairman


John W. Crawford, Jr.
Member


Herbert John Cecil Kouts
Member

IN MEMORIAM

EDSON G. CASE

With great sadness and regret, the Board notes the death on September 14, 1991, of Edson G. Case, who was twice confirmed as a Member of the Defense Nuclear Facilities Safety Board. Mr. Case was a 43-year veteran of Federal service, and can rightly be called one of the pioneers of nuclear reactor safety. He graduated from the United States Naval Academy in 1946, earned an M.S. from MIT in 1952, and spent the next eleven years as a Naval Officer, including work in the Naval Nuclear Propulsion program under Admiral Hyman Rickover. Mr. Case began his civilian career as a senior staff member of the U.S. Atomic Energy Commission and served with distinction as the Deputy Director of the Office of Nuclear Reactor Regulation with the Nuclear Regulatory Commission. As Senator Strom Thurmond has noted, when the Senate voted in the 100th Congress to establish a safety board with broad powers over the safe operation of the Nation's critical nuclear weapon facilities, it was entirely fitting that the President should have nominated Ed Case as one of the initial Members of the Board. Ed continued to travel and work toward the advancement of nuclear safety following his typical grueling schedule until he was struck down by his final illness.

We all owe a great deal to Ed Case for this. He was an expert in his field, and our Nation will sorely miss his dedication and skill. The Nation has lost a dedicated public servant who will be missed by all who served with him during his long career.

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I. INTRODUCTION

A. Overview of Board Functions

Congress created the Defense Nuclear Facilities Safety Board (Board) to provide advice and recommendations to the Secretary of Energy regarding public health and safety at Department of Energy (DOE) defense nuclear facilities. The President nominated the initial five members of the Board in 1989 and the Senate confirmed those nominations in October of that same year. This is the second annual report provided to Congress by the Board and it covers activities during calendar year 1991.¹

Broadly, the Board reviews facilities, operations, practices, and occurrences at DOE defense nuclear facilities and makes appropriate recommendations to protect public health and safety. The Board also assesses safety management and personnel effectiveness both within DOE and the various management and operation contractors. If, as a result of the Board's reviews, it determines an imminent or severe threat to public health or safety exists, the Board transmits its recommendations directly to the President as well as to the Secretary of Energy.

The Board's enabling statute, 42 U.S.C. § 2286, explicitly requires the Board to review and evaluate the content and implementation of health and safety standards, including DOE orders, rules, and other safety requirements, relating to the design, construction, operation, and decommissioning of DOE defense nuclear facilities. The Board must then recommend to the Secretary of Energy any specific measures, such as changes in the content and implementation of those standards, that the Board believes should be adopted to ensure that the public health and safety are adequately protected. The Board is also required to review the design of defense nuclear facilities, as well as modifications to older ones, before construction begins, and to recommend modifications necessary to protect health and safety. Board review and advisory responsibilities continue throughout the construction, testing, and operation of new facilities.

The Board may conduct investigations, hold public hearings, gather information, conduct studies, establish reporting requirements for DOE, and take other actions in furtherance of its review of health and safety issues at defense nuclear facilities. These ancillary functions of the Board and its staff all relate to the accomplishment of the Board's primary function, which is to assist DOE in identifying and correcting

¹A summary of activities from the date of the Board establishment, October 18, 1989, through December 31, 1989, was also submitted to Congress early in 1990.

health and safety problems at defense nuclear facilities. The Secretary of Energy and contractors at the various facilities are required to cooperate fully with the Board.

B. Annual Reporting Requirements Under 42 U.S.C. Section 2286e

By statute, the Board must submit an annual report to the Committees on Armed Services and on Appropriations of the Senate and to the Speaker of the House of Representatives at the same time that the President submits the budget to Congress. The report must include a review of the activities of the Board during the preceding year, including all recommendations made by the Board. An assessment is required of the improvements in safety at DOE defense nuclear facilities during the previous year. The report must also assess outstanding safety problems remaining at DOE defense nuclear facilities. The Board is hereby submitting its second annual report to Congress in fulfillment of these requirements.

II. REPORT TO CONGRESS REGARDING SAFETY AND HEALTH AT DEFENSE NUCLEAR FACILITIES

A. BOARD ACTIVITIES DURING 1991

The Board's primary mission is to issue recommendations to the Secretary of Energy, and in some cases, the President, regarding public health and safety issues at defense nuclear facilities. Highlighting their importance, Congress specifically requires that a discussion of recommendations be included in the Board's annual report, 42 U.S.C. § 2286e. The following summaries of the Board's activities relative to recommendations include a verbatim recounting of those portions of the Board's transmittals that constituted the actual recommendations made in 1991 -- the numbered sections. To avoid confusion, the numbered paragraphs identified as Board recommendations herein correspond to those contained in the original recommendations.

1. Recommendations Issued in 1991

a. Recommendation 91-1, Strengthening the Nuclear Safety Standards Program for DOE's Defense Nuclear Facilities

During 1991, the Board continued to review and monitor closely DOE progress in identifying applicable health and safety standards (including DOE orders, rules, and other requirements), assessing the adequacy of those standards and their implementation. The Board considered it necessary to issue Recommendation 91-1, asking that certain strengthening actions be taken to meet the priorities that the

Secretary has articulated regarding the implementation of safety standards at DOE's defense nuclear facilities.

On March 7, 1991, the Board recommended:

1. that the Department expeditiously issue a formal statement of its overall Nuclear Safety Policy;
2. that increased attention be given to the qualifications and background of managers and technical staff assigned to the development and implementation of standards and that the numbers of personnel suited to this activity be increased commensurate with its importance;
3. that standards program officials be given direct access to the highest levels of DOE management;
4. that the Department critically reexamine its existing infrastructure for standards development and implementation at Headquarters to determine if organizational or managerial changes are needed to (1) emphasize the priority and importance of standards to assuring public health and safety; (2) expand the program to facilitate the rapid development and implementation of standards; and (3) streamline the DOE approval process for standards;
5. that the Department reexamine the corresponding organizational units at DOE's principal Operations and Field Offices and DOE contractor organizations to determine if those organizations' standards infrastructure, responsibilities and resources would also benefit from changes to reflect improvements at Headquarters which strengthen and expedite standards development and implementation;
6. that DOE review all the findings and conclusions of both the Executive Summary and of Volume 2 of the MITRE report, identify which findings and conclusions it considers valid and appropriate in DOE's Response to this set of recommendations, and subsequently address those findings and conclusions in the implementation plan; and
7. that DOE expedite the issuance of revised safety orders, directives or other requirements as a means of addressing the need for substantive guidance on the wide variety of safety requirements, while DOE is promulgating rules.

The Secretary responded affirmatively to this recommendation on May 13, 1991. The Board received DOE's implementation plan on August 15, 1991. DOE has

subsequently briefed the Board on several occasions regarding the schedule for completing elements of its implementation plan 91-1.

b. Recommendation 91-2, Closure of Safety Issues Prior to Restart of K-Reactor at the Savannah River Site

The principal safety issues requiring resolution in conjunction with the restart of the K-Reactor at the Savannah River Site were compiled in the Reactor Operations Management Plan (ROMP) issued by the Savannah River Site contractor, and updated on a number of occasions. These issues were identified in the course of reviews by a number of organizations, including in-house groups of the DOE, a committee of the National Academies of Science and Engineering, and the Savannah River contractor. The issues so identified were divided into those that required resolution prior to reactor restart, and those that can be addressed over a longer period. DOE found this process of definition and prioritizing of issues to be acceptable, and the Board has generally regarded it as orderly and competently done.

However, the Board considered the extension of the ROMP process to its culmination in closure of the issues as equally important. Therefore, the Board carefully followed progress under the ROMP, largely through review of the issue closure packages as they were submitted to the Board, and through further discussion of the packages with representatives of the DOE and its contractor.

The Board had two concerns regarding the closure process. First, there was no discussion of the relation of the reports to the safety issue itself, and no technical summary of the reason for concluding that the work had produced the desired objective. Second, the Board was concerned that changes made to the process of final review and approval of closure of issues indicated a weakening of DOE's determination to assure itself of resolution of these problems of the past.

Because of these concerns, the Board recommended on March 27, 1991:

1. that each closure package of an issue in the ROMP be provided with a brief narrative discussion that clarifies the meaning of the issue, describes the steps that were taken to resolve it, states the reason for concluding that closure has been achieved, and shows how the referenced documents support the claim of closure,
2. that the DOE revert to its earlier plan to fully review and concur with the determinations of each issue closure.

On May 28, 1991, the Secretary accepted this recommendation, and subsequently prepared an implementation plan, which was submitted to the Board on August 7, 1991. During a public hearing of the Board regarding the restart of the K-Reactor on December 9, 1991, in Aiken, South Carolina, DOE officials, contractors, and members of the Operational Readiness Review (ORR) team testified that all ROMP closure packages had been transmitted to the Board for review. DOE informed the Board that all the ROMP issues had been closed and that Board Recommendation 91-2 had been met.

On December 20, 1991, the Board conducted a public meeting in Washington, D.C. to discuss the health and safety issues that the Board and its staff had reviewed concerning startup and operation of the K-Reactor. ROMP issues were analyzed in detail at the meeting and the Board concluded that no further action by the Board was required at that time, other than to complete its ongoing review of the technical issue closure process in the future and carefully monitor DOE's and the contractor's activities as they proceeded with preparation and testing prior to restart.

c. Recommendation 91-3, DOE's Comprehensive Readiness Review Prior to Initiation of the Test Phase at the Waste Isolation Pilot Plant (WIPP)

DOE's initial review of the readiness at WIPP to conduct the test bin phase was spread over approximately a three-year period. Therefore, the Board was concerned that DOE did not intend to perform a final comprehensive readiness review, after completion of the contractor's readiness review, prior to the initiation of the test phase. After reviewing the existing DOE plans, the Board recommended on April 25, 1991:

1. that an independent and comprehensive DOE readiness review be carried out at WIPP prior to initiation of the test phase. As indicated in item 2, members of the review team may include some personnel from the line organization;
2. that the team constituted to carry out the readiness review consist of experienced individuals whose backgrounds collectively include all important facets of the unique operations involved and that the majority of the team members be independent of WIPP programmatic or line management responsibilities to ensure an independent and unbiased assessment;
3. that the DOE readiness review team confer with the DOE teams that are currently performing readiness reviews at other DOE facilities to determine what procedures for conducting readiness reviews have or have not been effective, recognizing that a tailored approach is required for WIPP; and

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4. that the review include, but not be limited to, the following items:
 - a. assessment of the adequacy and correctness of waste handling and utility systems normal and abnormal operating, and emergency procedures;
 - b. assessment of level of knowledge achieved during operator qualification as evidenced by review of examination questions and examination results, and by selective oral examinations of operators by members of the review team;
 - c. assessment of conduct of operations by observation of actual waste handling operations using simulated waste containers, and the response to simulated abnormal and emergency situations;
 - d. assessment of the interrelationships and the delineation of roles and responsibilities among the various DOE (Carlsbad and Albuquerque) and contractor (Westinghouse and Sandia National Laboratory) organizations involved in the test phase;
 - e. examination of records of tests and calibration of safety systems and other instruments monitoring Limiting Conditions of Operations or that satisfy Operating Safety Requirements; and
 - f. verification of safety system as-built drawings by walkdown of selective systems.

The Secretary accepted the Board's recommendations and rapidly moved to begin to meet the concerns raised, even in advance of completing the implementation plan which was submitted to the Board on August 7, 1991. The Board and its staff carefully followed DOE's implementation of Recommendation 91-3, and on November 24, 1991, informed the Secretary of Energy by letter that the Board determined that there was no need for further Board action at the time. However, the Board advised DOE that it would continue to closely follow the activities of DOE and its contractor as they proceeded with the test bin phase.

d. Recommendation 91-4, DOE's Operational Readiness Review Prior to Resumption of Plutonium Operations at the Rocky Flats Plant

By letter dated May 4, 1990, the Board recommended that a comprehensive Operational Readiness Review (ORR) be carried out by a group of experienced individuals prior to the resumption of operations at Rocky Flats. Recommendation 91-4 specified a number of items to be included in the review.

The Secretary of Energy accepted the Board's Recommendation and prepared an implementation plan that was later revised and submitted to the Board on February 15, 1991. DOE elected to conduct a separate ORR for each building that the Department proposed to bring back into operation in processing plutonium. The analytical chemistry laboratory, Building 559, was chosen to be the first for resumption.

DOE's implementation plan stipulated specific objectives that must be achieved for readiness of plant and equipment (hardware), management, and personnel, and management programs (procedures, plans, etc.) prior to resumption of plutonium operations in a building. The implementation plan also required a number of specific actions to be undertaken. Those actions included an EG&G program to upgrade the safety of operations, followed by a non-plutonium start-up test program and an EG&G Operational Readiness Review to confirm the adequacy of the upgrades to insure safety of operations at that building.

DOE's implementation plan recognized that the sequence for practical reasons might not be fully serial. However, DOE intended that the plutonium start-up tests (functional and preoperational) would be completed for vital safety systems equipment before the EG&G Readiness to Proceed Memorandum would be sent to DOE requesting DOE approval to commence operations, and that subsequently DOE would conduct its own ORR.

In his August 19, 1991 letter to the President of the Senate, the Secretary reaffirmed that DOE's ORR would be carried out in accordance with the implementation plan approved by the DNFSB. The contractor, DOE, and the Board each recognized that the first ORR conducted at Rocky Flats would establish an important precedent for future ORR's, both at Rocky Flats and other defense nuclear facilities.

The Board carefully followed EG&G's and DOE's implementation of the ORR process. The Board's staff and expert consultants observed portions of the ORR while they were being conducted. The Board was satisfied that the DOE established an ORR team with competent independent experts capable of providing confidence that the findings would be technically sound and unbiased.

While the plan recognized that some steps in the DOE ORR might begin before the EG&G Readiness to Proceed Memorandum was issued, an ORR cannot properly be undertaken without progress toward resumption of operations sufficient to establish that the safety objectives have been met, or an acceptable plan with reasonable schedules exists for meeting them. The purpose of an ORR for Rocky Flats as stated in the letter from the Secretary accepting Recommendation 90-4, was "to verify the readiness of the Rocky Flats plant to safely resume plutonium operations". If

conducted prematurely, an ORR is weakened in accomplishing its purpose. It tends to lose its ability to provide independent confirmation of a state of readiness, subject to planned actions, and becomes instead an adjunct to management in identifying important areas of concern requiring further attention.

The Board found that the DOE ORR conducted during the period June 28 to July 24, 1991, was premature and incomplete, and thus it failed to adhere adequately to the prerequisites established by the Secretary in the implementation plan for Recommendation 90-4. DOE conducted the ORR before sufficient progress was made by EG&G toward resumption of plutonium operations to enable performance of an adequate DOE ORR. For example, EG&G's self-assessment of compliance with safety-related DOE orders was in such a preliminary stage that when DOE's team began its ORR it was unable to conduct an evaluation of compliance.

During the Board's public hearing in Boulder, Colorado on August 24, 1991, DOE endorsed the finding of its ORR report that Building 559 is not yet ready for resumption of plutonium operations. The Board had already come to that conclusion, and had so expressed its views as stated above. Work previously planned by EG&G had not been completed at the time of DOE's ORR and the completion process was not fully developed. Therefore, the DOE ORR team was unable to complete its review in some areas and was unable to begin such a review in others.

The Board affirmed that safety in a complex operation such as that at the Rocky Flats Plant rests on layered safety features that comprise a defense in depth. This permits safety to be achieved even when some safety provisions are imperfectly accomplished. Therefore, the Board did not object to the ORR on the grounds that inadequacies were found; some could always be present. The Board found that an adequate Operational Readiness Review, to confirm existence of an adequate level of safety at the planned time of operations, could not have been performed at the time of DOE's review. DOE was unable to adequately address specific Board requirements set forth in Recommendation 90-4, and the review itemized safety deficiencies still existing in seven major categories. DOE recognized that it had not completed an adequate ORR for Building 559, and scheduled further action toward this end prior to resumption of plutonium operations in the building.

The Board agreed with EG&G and DOE and their experts that the plutonium operations in Building 559 could be resumed without risk to persons off site, based on its independent observations and the information it had obtained in the course of numerous briefings (two of them public). However, while a number of corrective actions were recognized to have been accomplished, it still remained to be confirmed that workers on site will be adequately protected.

Since DOE had stated that the ORR of Building 559 will set the standard for the following buildings, the Board deemed it to be essential that DOE's first ORR be performed in a manner that properly adhered to the implementation plan submitted to the Board. Accordingly, before operations with plutonium are to be resumed in Building 559, the Board recommended that:

1. A DOE ORR team, including a Senior Advisory Group, using as many as may still be available of the original members, complete the ORR for Building 559, but only when (a) DOE has adequate reason to believe that the deficiencies it has identified during its original ORR have been corrected or are appropriately near closure with credible timetables toward closure, and (b) EG&G has issued a Readiness to Proceed Memorandum requesting DOE approval for resumption of plutonium operations in the building, subject to scheduled elimination of the deficiencies.
2. The DOE ORR team continue its review consistent with the requirements of the Recommendation 90-4, and its implementation plan. Namely that the review be structured to include, but not be limited to, the following items:
 - Independent assessment of the adequacy and correctness of process and utility systems operating procedures. Consistent with the contractor's operating philosophy, these procedures should be in sufficient detail to permit the use of the "procedural compliance" concept.
 - Assessment of the level of knowledge achieved during operator requalification as evidenced by review of examination questions and examination results, and by selective oral examinations of operators by members of the review group.
 - Examination of records of tests and calibration of safety systems and other instruments monitoring Limiting Conditions of Operation or that satisfy Operating Safety Requirements.
 - Verification that all plant changes including modifications of vital safety systems plutonium processing workstations have been reviewed for potential impact on procedures, training and requalification, and that training and requalification have been done using the revised procedures.
 - Examination of each building's Final Safety Analysis Report to ensure that the description of the plant and procedures and the accident

analysis are consistent with the plant as affected by safety related modifications made during the outages period.

3. The DOE ORR team include in its final report a description of remaining issues which require closure, if any, and an overall conclusion of readiness for Building 559 to resume operations.
4. EG&G and DOE complete their assessment of compliance with DOE safety orders at Building 559, and their implementation of any compensatory measures that may be needed to achieve the objectives of compliance, as necessary and appropriate for resumption of plutonium operations in Building 559.

Throughout the remainder of 1991, DOE and its contractors worked to eliminate deficiencies identified in the ORR process by the Board, ONS, and others. The Board and its staff carefully followed the progress of the ORR teams during that period. At the close of 1991, DOE notified the Board that it was close to concluding the ORR process for Building 559 and would conduct a public hearing on January 6, 1992. The Board promptly scheduled a public meeting and hearing in Boulder, Colorado, for January 16, 1992, to review DOE's revised final ORR for Building 559, and a public meeting on February 4, 1992, in Washington, D.C.

e. Recommendation 91-5, Power Limits for K-Reactor Operation at the Savannah River Site

The Defense Nuclear Facilities Safety Board (the Board) has conducted an ongoing review of the bases and criteria for the operational plans for the K-Reactor at the Savannah River Site. These plans currently include limitation of the power of the reactor to 30 percent of the historical full power, or to approximately 720 megawatts. The information reviewed was provided to the Board in numerous briefings and documents, including the Savannah River K Production Reactor Safety Analysis Report (WSRC-SA-10003).

On December 19, 1991, the Board addressed to the Secretary of Energy its Recommendation 91-5, which commented on the proposed plan for restart of the K-Reactor, and included its present views on the maximum power at which the reactor could safely be operated.

The Board concluded on the basis of this information that operation of the K-Reactor at a power level not exceeding 30 percent of the nominal historical maximum power would impose no undue risk to public health and safety assuming that all other improvement measures established as necessary for startup have been

completed and effectively implemented. In this connection, the Board has been stationing members of its staff and some of its outside experts at the Savannah River Site during the period of restart to monitor the activities during restart and initial power ascension of the K-Reactor.

Information in the K-14-1 Core Operations Report (September, 1991), and some of the Reactor Operations Management Plan (ROMP) closure packages implies that at a later time the Department of Energy may wish to increase the operating power level of the K-Reactor above the 30 percent value. However, the Board is of the opinion that the existing information on the effectiveness of the engineered safety features, especially those that would be relied on in the event of a large loss-of-coolant accident, does not at present support operation at a power level much above the 30 percent value. The Board considers that justification of any increase in power would require further refinement of the thermal-hydraulic evidence on the cooling capability of the emergency cooling systems under accident conditions. Therefore, pursuant to 42 U.S.C. § 2286b(d), DOE should inform the Board well before any decision to increase the reactor's power level above 30 percent of the historical value of its maximum full power.

Furthermore, if such an increase in operating power is to be contemplated by the DOE, the Board recommended that:

1. The DOE should conduct more definitive studies on the thermal-hydraulic methodology, criteria, and experimental test program used in analyzing performance of core cooling of the K-Reactor during unusual conditions that could prevail during accidents. These studies should more fully reflect prototypical geometry and accident conditions (temperature, flow, pressure, and configuration).
2. Any proposal to operate the K-Reactor at a level above the 30 percent value should be supported by accident analysis based on the thermal-hydraulic methodology revised in accordance with the above.
3. The evaluation model for analysis of postulated loss of coolant accidents should be documented and controlled in accordance with the procedures described in 10 C.F.R. § 50.46 (1991). Similar controls should be implemented for models used in analyzing non-LOCA accidents.

DOE's response to 91-5 is due on February 10, 1992.

f. Recommendation 91-6, Radiation Protection for Workers and the General Public at DOE Defense Nuclear Facilities

The Board and its staff have conducted extensive reviews of radiation protection programs at Department of Energy (DOE) Headquarters and several DOE sites in the defense nuclear facilities complex. In particular, the Savannah River Site (SRS) health and radiological protection programs have been reviewed on several occasions.

After an inquiry into worker exposures to tritiated water from a moderator water spill at the site, the Board transmitted a report to the Secretary of Energy on May 31, 1991, which reviewed the management and radiation protection issues, as well as other factors that DOE and its contractor identified as root causes of the spill. Before completion of that report, the Board had directed its staff to continue review of technical radiation protection issues that had been surfaced during the inquiry. In October, 1990, the Board's staff reviewed the SRS radiation protection program, which is included by SRS within what are commonly referred to as Health Protection (HP) program and Health Physics program. Board staff conducted follow-up reviews in February and April, 1991. Staff reports based on the October, 1990, and February, 1991, trips were provided to DOE's Defense Programs personnel in letters from the Board dated November 1, 1990, and June 10, 1991, respectively. In its transmittal letter of June 10, 1991, the Board indicated it was giving consideration to the possibility of developing recommendations to the Secretary of Energy in the radiation protection area after further Board review.

On June 20, 1991, representatives from DOE's Defense Programs, the DOE Savannah River Site Special Projects Office, and the operating contractor at SRS briefed the Board and its staff on radiation protection program issues. As a follow-up to that briefing, the Board conducted a site visit at SRS in July, 1991. During that visit, Board Members interviewed SRS HP personnel and supervisors.

The most recent Board staff assessment of DOE's radiation protection program and the operating contractor's HP program at SRS occurred during the period September 27 through October 10, 1991. The Board's staff reviewed relevant documents, attended briefings and discussions with DOE and operating contractor personnel at DOE Headquarters and at SRS, and observed selected evolutions at reactor and non-reactor facilities.

Other independent organizations and committees have documented required improvements in DOE's radiation protection program, including the Institute for Nuclear Power Operations (INPO) in December 1990, the Advisory Committee on Nuclear Facility Safety in section 5 of its final report dated November 13, 1991, and

the final DOE Operational Readiness Review (ORR) team in its report for Savannah River's K-Reactor dated November, 1991.

Primarily as a result of these assessments at Savannah River, but also because of other reviews at Rocky Flats Plant and elsewhere in the defense nuclear facilities complex, the Board has found a need for increased DOE attention in five major areas: (1) DOE management and leadership in radiation protection programs; (2) radiation protection standards and practices at defense nuclear facilities; (3) training and competence of Health Physics technicians and supervisors; (4) analysis of Reported Occurrences and correction of radiation protection program deficiencies; and (5) understanding and attention to radiation protection issues by individuals in DOE and its contractor organizations.

Therefore, the Board recommended that:

1. The Secretary of the Department of Energy expeditiously issue a formal statement of the Department's radiological health and safety policy. Among the subjects that should be considered for inclusion are:
 - a. The goals of the Department's radiation protection program.
 - b. Potential sources of guidance and bases for the radiological protection standards adopted by, or to be adopted by, DOE.
 - c. A reaffirmation, by the Secretary of Energy, of DOE's full commitment to the "As Low As Reasonably Achievable" (ALARA) principle for both occupationally exposed personnel and the general public, which emphasizes the various commitments to radiological protection contained elsewhere in DOE rules, orders, and other requirements.
2. DOE review existing radiation protection training programs, and develop and implement a plan for an expanded training program that includes consideration of the following elements:
 - a. Comparison with guidance on training contained in "Guide to Good Practice in Radiation Protection Training," Training Resources and Data Exchange (TRADE) Oak Ridge Associated Universities (ORAU) 88/4-99 and "Guidelines for Training and Qualification of Radiological Protection Technicians," Institute of Nuclear Power Operations (INPO), INPO 87-088. While the Board does not necessarily endorse all of the guidance contained in these documents, it believes they are important sources of professional and commercial information on training which

can be productively used by DOE in identifying improvements for DOE's programs.

- b. Delineation of the level of knowledge, skills, abilities, and other qualifications necessary for each generic radiation protection personnel position within the DOE complex, based on professional and industry standards and guidance. This should include association and/or interaction with professional health physics organizations such as the Health Physics Society and American Board of Health Physics certification for appropriate professionals.
 - c. Determination of the current level of knowledge of radiation protection managers, professionals, supervisors, and technicians, by means of written, oral, and practical examinations.
 - d. Delineation of the existing and supplemental training necessary to ensure that radiation protection personnel meet the qualifications of their respective positions.
 - e. Evaluation of individuals after supplemental training to ensure that they meet the qualifications for their positions.
 - f. Continuing radiation protection training requirements and retention testing.
 - g. Delineation of existing and supplemental training for workers, contractors, and subcontractors, other than radiation protection personnel, necessary to ensure adequate radiation protection for those workers.
3. The Department critically examine its existing infrastructure for radiation protection program development and implementation at DOE Headquarters to determine if resource, organizational, or managerial changes are needed to (a) emphasize the priority and importance of the radiation protection program to assuring public health and safety; (b) communicate the importance of the radiation protection program from the highest level of management to all appropriate Department personnel; (c) expand the radiation protection program and increase program resources to facilitate the rapid development and implementation of radiological protection standards throughout the defense nuclear facility complex; and (d) make other changes as are warranted.

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4. The Department examine the corresponding radiation protection organizational units at DOE's principal Operations and Field Offices and DOE contractor organizations to determine if those organizations' radiation protection programs' infrastructure, responsibilities, and resources can be strengthened to expedite implementation of radiological protection standards. A critical aspect of DOE's review should be an assessment of management's involvement and effectiveness in implementing radiation protection programs and management's ability to communicate the steps to be taken to implement an effective radiation protection program to all levels within relevant DOE and contractor units, particularly within line organizations.
 5. DOE focus its efforts relating to reporting of occurrences to enhance the usefulness of the Occurrence Reporting (OR) system as a tool for enhancing radiological health and safety at DOE facilities, by emphasizing determination of root causes and management follow-up of lessons learned.
 6. DOE compare (a) its operating contractor practices and procedures, and (b) DOE radiological protection standards with the guidance used by other government, commercial, and professional organizations. The documents which DOE should use for this study and comparison include, at a minimum, those listed in the attachment to this recommendation. While the Board does not necessarily endorse any of the listed documents in their entirety, it believes they are important sources of government, commercial, and professional opinion on radiological protection standards, procedures, and practices. As such, they serve as valuable tools for identifying improvements needed in DOE's programs.
 7. After completion of the study recommended in item 6, DOE identify any supplemental measures that are necessary or appropriate to compensate for the differences identified between practices which conform to the guidance enumerated above and actual operating contractor practices; and between standards and procedures listed and DOE standards and procedures for radiation protection at defense nuclear facilities.

DOE's response to 91-6 is due on February 10, 1992. If accepted, the Board believes that fundamental changes in DOE and contractor radiation protection programs will result. Ultimately, this should mean greater safety and health protection for defense nuclear facilities workers and the public.

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2. **DOE Efforts to Implement Board Recommendations Issued in 1990 and Followup Board Action**
 - a. **Recommendation 90-1, Operator Training at Savannah River Site Prior to Restart of K, L, and P Reactors**

Recommendation 90-1, issued on February 22, 1990, addressed the Board's concerns on the training of reactor plant operators for the K, L, and P reactors at the Savannah River Site (SRS). The recommendation, among other things, called for identification of reactor operator and supervisor qualifications; specification of differences between qualification of operators and supervisors at civilian nuclear power plants and at DOE facilities; assessment, by written and oral examination, of current levels of qualifications of reactor operators and supervisors, and establishment of modified training programs to enhance operator and supervisor qualifications prior to restart. The recommendation is presented in its entirety in the Board's first annual report to Congress, at pages 3-4.

On April 10, 1990, the Secretary of Energy accepted the Board's recommendation. The Secretary's plan to implement this recommendation was received by the Board on July 13, 1990. The Secretary issued a supplement to the implementation plan on February 7, 1991, to rectify deficiencies which the Board had identified in the initial response and implementation plan for Recommendation 90-1. In accordance with DOE's implementation plan, the Secretary provided additional updates on progress made in implementing this recommendation during 1991. Extensive retraining has occurred, focusing upon the K-Reactor operators and supervisors, since K-Reactor was scheduled to restart first. Subsequently, DOE determined to schedule only K-Reactor for restart. Training was included as a critical element in DOE's operational readiness reviews. The Board reviewed progress made in the SRS training programs at a public hearing held in Aiken, SC, on December 9, 1991. The Board noted that substantial improvement had been made prior to the Secretary's announcement of the restart of the K-Reactor. During the public meeting conducted by the Board in Washington, D.C. on December 20, 1991, the Board concluded that sufficient progress had been made regarding qualifications of K-Reactor personnel, that further Board action was not necessary at that time.

- b. **Recommendation 90-2, Design, Construction, Operation and Decommissioning Standards at Certain Priority DOE Facilities**

On March 8, 1990, the Board issued Recommendation 90-2 on the subject of safety standards for the K, L, and P reactors at SRS, and for other selected DOE facilities at Rocky Flats, Hanford, and the Waste Isolation Pilot Plant. In addition to recommending that DOE identify the applicable standards, DOE orders, and other

requirements for these facilities, the Board recommended that DOE provide its view on the adequacy of the standards and requirements and determine the extent to which the standards and requirements have been implemented there. Recommendation 90-2 is presented in its entirety in the Board's first annual report to Congress at pages 4-5. The Board received the Secretary of Energy's response on June 11, 1990, accepting the recommendation and expressing a commitment that the Department would establish a DOE-wide program for development and promulgation of nuclear safety requirements at all DOE defense nuclear facilities. Based on Board comments on DOE's response, the Secretary issued a supplemental response and implementation plan on September 14, 1990, which included additional information and a detailed plan for meeting the Board's recommendation. The Secretary has changed and strengthened the arrangements for managing DOE's nuclear standards program and provided a series of briefings to the Board pertaining to those modifications. Under this plan, the DOE submits bi-monthly reports on progress.

In early 1991, during its ongoing review of DOE's responses to Recommendation 90-2, the Board became dissatisfied with the content and pace of the Department's efforts on standards identification, adequacy, and implementation. Partly as a result, the Board issued its Recommendation 91-1 on March 7, 1991. As reported previously, the recommendation addressed the general subject of the Department's program for the development and implementation of safety standards and included several suggestions for enhancing that program.

In addition to issuing Recommendation 91-1, the Board, its staff, and expert consultants held a series of discussions with DOE representatives during the spring of 1991 seeking to improve the content of DOE's responses to Recommendation 90-2. While the Secretary has taken actions to strengthen the nuclear safety standards program, review of DOE reports has disclosed shortcomings which have been called to his attention in a letter dated May 20, 1991, which conveyed the Board's views regarding material previously provided by the Department in response to Recommendation 90-2.

In addition, senior members of the DNFSB staff met personally with the Assistant Secretary for Defense Programs on June 4, 1991, to emphasize directly to him the Board's continuing frustration regarding the Department's responses to Recommendation 90-2. Members of the DNFSB staff also met frequently with their counterparts in DOE during this period, most notably on June 27 and August 1, to further amplify Board concerns and to gain better understanding of what DOE proposed to do in response to Recommendations 90-2 and 91-1. On October 3, 1991, the Board held a public meeting to receive a status report from DOE covering progress to date on both Recommendation 90-2 and Recommendation 91-1. Based on the presentations made by DOE representatives at that meeting, the Board asked

the Department a series of written questions aimed at expanding and clarifying matters addressed during the October 3 public meeting. DOE prepared and presented responses to these questions in a briefing to the Board on January 10, 1992. The Department elected to completely revise its implementation plan for Recommendation 90-2, and submitted its revised plan on November 14, 1991.

Having reviewed the plan, the Board has informed DOE that the plan and its implementation were unacceptable for major reasons to be identified in a January letter.

c. Recommendation 90-3 and Recommendation 90-7, Safety at Single-Shell Hanford Waste Tanks

During the confirmation hearings for the Board Members in October, 1989, before the Senate Armed Services Committee, Senator Glenn expressed his concern that the contents of certain single-shell nuclear waste tanks at the Hanford site might be susceptible to spontaneous or ignited chemical explosions, which could disperse the radioactive contents of the tanks. In December, 1989, members of the Board visited Hanford and were informed of an analysis by the Hanford contractor supporting an opinion that the possibility of an explosion in these tanks is low.

In March, 1990, technical experts retained by the Board visited the Hanford site in continuation of the Board's review. They subsequently informed the Board that they saw no imminent safety concerns related to the single-shell tanks, but added that, in their view, the monitoring of the conditions in the tanks needed upgrading. They also reported on the problem of slurry growth and potential associated hydrogen generation in some double-walled tanks, an issue that had surfaced as a result of questions they had asked.

On March 27, 1990, the Board forwarded Recommendation 90-3 to the Secretary of Energy for his consideration. Recommendation 90-3 is presented in its entirety in the Board's first annual report to Congress at pages 5-6. The Board stated its opinion that the probability of an explosion in the single-shell tanks is low. However, the Board had residual concerns regarding the lack of information on the chemical composition and physical conditions of the contents of the tanks. Recommendations were made concerning monitoring of the tanks and research to insure understanding of their safety.

In a letter to the Board dated May 16, 1990, the Secretary of Energy accepted the Board's recommendations. On August 10, 1990, he forwarded a plan for implementation. This led to further discussions between the Board and DOE staff, and eventually to Recommendation 90-7.

Following receipt of the implementation plan for Recommendation 90-3, on August 10, 1990, members of the Board, its staff, and its technical experts again visited the Hanford site on several occasions, and held additional discussions in Washington, D.C. After careful consideration, the Board decided that the implementation plan was not adequately responsive to the Recommendation 90-3. It did not reflect the urgency that was merited by the circumstances, and that was implicit in the Board's recommendations. It also did not appear that the contractor involved had been required to marshal the managerial and technical resources required, nor to focus those resources on the problem in a measure commensurate with its gravity.

The Board, therefore, issued Recommendation 90-7 on October 11, 1990, containing a number of additional recommendations that were more specific than those provided in Recommendation 90-3. Recommendation 90-7 is presented in its entirety in the Board's first annual report to Congress at pages 9-11.

On December 3, 1990, the Secretary accepted the recommendations in 90-7. The Board received the Secretary's implementation plan for this recommendation on March 7, 1991; it replaced the Secretary's implementation plan for 90-3. In his transmittal letter, the Secretary stated that key actions described in the implementation plan were already ongoing and generally on schedule. Quarterly reports on the status of the actions listed would also be provided to the Board. The Secretary assured the Board that resolution of the Hanford high level waste tank (HLW) safety issues had top priority. He also advised the Board that DOE would notify Congress that completion of the actions given in this implementation plan would take more than one year.

DOE's second quarterly report, provided to the Board on October 25, 1991, indicated that all activities under the implementation plan had been initiated, with a large number of milestones being met. However, DOE projected significant slippage of several important milestones. For example, installation of the first multifunctional instrument tree is projected to slip to late FY 1992 with additional trees installed in FY 1993.

The Board continues to closely monitor and review with the DOE and contractor staff all actions DOE has committed to under the implementation plan. Particular attention is being given to schedule slippage and its causes; involvement of top Department of Energy and contractor management; and improvement in management controls.

d. Recommendation 90-4, Operational Readiness Review at the Rocky Flats Plant

In May 1990, the Board issued Recommendation 90-4, which urged that DOE conduct an operational readiness review (ORR) at Rocky Flats prior to resumption of plutonium processing operations. Recommendation 90-4 is presented in its entirety in the Board's first annual report to Congress at pages 6-7.

In June 1990, DOE accepted this recommendation. The Board reviewed a draft implementation plan, and provided comments for the plan's improvement prior to DOE's issuance of the final plan on November 30, 1990. The Board reviewed the criteria and review approach for conducting the Building 559 ORR.

Because the Board determined that DOE's ORR for Building 559 conducted in the spring and summer of 1991 was premature and inadequate, the Board issued Recommendation 91-4.

Recognizing the value of conducting Operational Readiness Reviews after extended outages of facilities, DOE is developing a standard instruction which specifies when and how they are to be conducted.

e. Recommendation 90-5, Systematic Evaluation Program at the Rocky Flats Plant

Also in May 1990, the Board issued Recommendation 90-5 which requested that DOE develop and establish a Systematic Evaluation Program (SEP) at Rocky Flats to assure proper evaluation and coordination of proposed long-term safety improvements. Recommendation 90-5 is presented in its entirety in the Board's first annual report to Congress at pages 7-8.

In June 1990, DOE accepted this recommendation and provided the Board with an implementation plan which the Board accepted on October 24, 1990. DOE is currently implementing Phase I of the SEP.

During 1991, the Systematic Evaluation Program (SEP) for the Rocky Flats Plant focused on establishing the technical base from which an integrated safety assessment can proceed. The following milestones were reached:

- The operating contractor dedicated a full time technical staff to the project and wrote program plans.
- Progress was made on defining technical topics for assessment and on development of acceptance criteria.

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- In-depth reviews were conducted of contractor and DOE documentation and compared with relevant commercial nuclear information to ensure that assessment topics cover appropriate safety issues.
 - Independent reviews were conducted by outside experts on the definition and scope of SEP topics.
 - Individual topic evaluation plans were begun and should be completed in early 1992.

The Board and its staff have met on a number of occasions with DOE and its contractor in 1991 to review progress on the Rocky Flats SEP. The Board will continue to monitor this program closely in 1992.

Although not required by the Board's recommendations, DOE committed and has initiated an SEP for the reactors at the Savannah River Site. This effort, now in the early stages of development, will be monitored by the Board and its staff along with that for the Rocky Flats program.

f. Recommendation 90-6, Criticality Safety at the Rocky Flats Plant

In June 1990, the Board issued Recommendation 90-6, which recommended that DOE establish a program to address the accumulation of fissile and other materials in ventilation ducts and related systems prior to the resumption of plutonium operations at Rocky Flats. Recommendation 90-6 is presented in its entirety in the Board's first annual report to Congress at pages 8-9. The short-term objectives of the recommendation were to ensure the prevention of criticality accidents and to make an initial reduction in the amount of fissile material in the ducts as required to protect public health and safety. The long-term objectives of the recommendation were to reduce substantially the remaining fissile material in the ducts and prevent significant additional accumulation of fissile materials upon resumption of plutonium operations. DOE accepted Recommendation 90-6 on July 26, 1990, and submitted an implementation plan on November 30, 1990.

In 1991 progress was made on the major tasks in the DOE program established to address accumulation of fissile and other materials in the ducts at Rocky Flats. These major tasks include determination of the extent of fissile material accumulation, evaluation of criticality safety and potential worker radiation exposure, and removal of fissile and other materials from the ducts.

The DOE contractor has assessed the potential for a criticality accident due to fissile material accumulation measured in the ducts and related systems. The DOE

contractor concludes that all fissile material accumulations measured in the ducts will be reduced, to remain safe with no potential for criticality even in event of catastrophic flooding along with a series of highly unlikely events to compact the accumulation. Remediation of the ducts with significant fissile material accumulation is in progress to eliminate any potential for criticality and reduce radiation exposure of workers; remediation includes removal of the material or replacement of the ducts. These actions are being taken prior to resumption of plutonium operations utilizing those ducts. In the long term, all accumulations of fissile material in ducts are to be removed to the maximum extent practicable. To prevent significant additional fissile material accumulation, all glovebox filters and alarm systems are being inspected and repaired or refurbished, as necessary, and procedures for operation are being reviewed and upgraded. After resumption of plutonium operations, the ducts are to be closely monitored for any accumulation of additional fissile material.

Members of the Board and its staff have reviewed monthly status reports from DOE and have met several times in 1991 with DOE and its contractors to discuss the progress in meeting the objectives of this recommendation.

3. DOE Communications with Congress Identifying Implementation Plans Requiring More Than a Year to Implement

Pursuant to Section 315(f) of the Atomic Energy Act of 1954, as amended, if implementation of a plan takes more than one year, the Secretary of Energy is required to submit a report to the Committees on Armed Services and to the Speaker of the House of Representatives setting forth the reasons for the delay and an estimate of when implementation will be completed.

On August 19, 1991, the Secretary of Energy reported on the reasons why it will require more than one year to implement plans that are responsive to the following DNFSB recommendations:

Recommendation 90-1: This recommendation identified five elements associated with requirements for qualification of reactor plant operators and supervisors at the Savannah River Site (SRS), and one element associated with configuration management at that Site. The Secretary's original implementation plan and subsequent revision of February 7, 1991, defined improvements and interim compensatory measures as well as a comprehensive examination process that were required to significantly upgrade the restart qualification requirements and configuration management programs.

The Secretary stated that successful completion of the extensive and comprehensive actions inherently required longer than one year (July 12, 1991) for completion and he expected them to be successfully completed by the end of September 1991. The decision to operate only one reactor in the near term afforded the opportunity to develop composite crews for the restart of K-Reactor comprised of the best qualified candidates from all three reactors. Final implementation plan activities culminated with completion of the Operational Readiness Review for K-Reactor in November 1991.

Recommendation 90-2: This recommendation encompassed the review for adequacy of the standards, including applicable safety orders, rules, and other requirements, applied to certain defense nuclear facilities, and determination of the extent to which these standards have been implemented at the facilities specified by the Board.

The Secretary stated that the implementation of current commercial nuclear standards for activities such as conduct of operations and operator training is well underway at a number of defense nuclear facilities, and training to continue this evolution across the defense nuclear complex is ongoing. The Department has also initiated an extensive self-assessment program to assure that appropriate and sufficient standards are identified and implemented for the many facilities in the defense nuclear complex. This effort will be closely coordinated with activities carried out under Recommendation 91-1 regarding the Department's overall nuclear safety standards program.

In the Secretary's view, the scope and complexity of the efforts required to fully respond to Recommendation 90-2 precluded completion in one year. DOE expects to complete the documentation of applicable standards and initial assessment of adequacy during calendar year 1992. The determination of long-term adequacy for the design and construction standards for many of the older facilities requires systematic comparison to more current criteria through detailed and often complex analyses. DOE concluded that experience in the commercial nuclear sector has shown that several years are required to complete such efforts. The Secretary decided that it is necessary, therefore, that completion of this effort be part of other longer term programs,

primarily the Systematic Evaluation Program (SEP), instituted under Recommendation 90-5.

Recommendation 90-4: The Secretary stated that the DOE Operational Readiness Review (ORR) for Rocky Flats resumption will be carried out in accordance with an implementation plan approved by the Board. DOE plans to accomplish operational readiness for plutonium operations at Rocky Flats in sequence for each of the several buildings involved. He stated that detailed planning and training of the technical and nuclear safety experts who will conduct the ORR was completed and the review of Building 559 started on June 24, 1991. The ORR for the remaining five buildings will be completed in sequence, with the last currently scheduled to be completed in early 1993. Since the buildings will be resuming operations over a period of about three years from the time of the Board recommendation, the Secretary indicated it is not possible to complete implementation of the recommendation within one year.

Recommendation 90-5: DOE extended this recommendation to include the reactors at the Savannah River Site. The SEP as recommended by the Board will be modeled after a program developed by the Nuclear Regulatory Commission (NRC), during the late 1970s and early 1980s, to assess the adequacy of safety of a number of older commercial reactors. This type of program consists of a complex, inherently sequential series of systems analyses, each of which must be carefully documented. The implementation plan that was approved by the Board calls for the SEP to be conducted in three phases. The first phase requires the contractor to identify safety topics based on a review of current safety requirements and generic safety issues relevant to the facility being evaluated and the development of detailed evaluation methods and acceptance criteria for each topic. In the second phase, the evaluations are to be performed. In the third phase, the results are to be analyzed to determine the most cost-effective combination of plant improvements for long-term, safe operation of the facility.

DOE expects the SEP to take about four years at each facility where it is to be implemented. This duration is consistent with that anticipated by the Board in its recommendation. The process should also represent a significant improvement over the experience

of the commercial nuclear industry in implementing the NRC SEP during the late 1970s and early 1980s.

Recommendation 90-6: The Secretary points out that at the center of this recommendation is the removal of accumulated plutonium from the ventilation system ducts in various buildings at the Rocky Flats Plant. This work is to be done in accordance with the DOE implementation plan and is to meet the criteria set by the DNFSB. The Secretary stated that every step of the process is to be carefully planned and executed. The actual removal of material from ventilation ducts and associated systems is to be accomplished by a program that includes systematic inspections, sample analyses, and use of a mock-up facility for verification and rehearsal. Unique procedures are to be developed for removal of material from each duct. Specific duct configurations are to be modeled in the mock-up facility to permit training of personnel and verification of equipment and procedures. The removal typically involves loosening the material by abrasive, vibratory, or mechanical techniques and collecting the debris in a vacuum collection device. New technologies, including robotic devices, are being developed to enhance removal effectiveness and safety.

DOE's evaluations to date indicate that three buildings require removal of plutonium from ventilation ducts prior to the resumption of operations in those buildings. The completion of removal operations in each building is coordinated with the planned sequence of operational readiness for the buildings at the Rocky Flats Plant.

Despite the high priority DOE has assigned this effort, the work cannot be completed within one year with the quality and rigor of planning and execution and the high personnel safety standards that are expected of DOE's current and future operations. This program is one of the pacing items for resumption of operations.

4. Public Hearings, Public Comment, and Interaction with Board

During 1991, Board members have traveled to defense nuclear facilities sites where they have met with contractors and DOE representatives on 28 occasions and with members of the public, labor unions, and public interest groups. The Board conducted 12 public meetings, hearings, and briefings at various sites throughout the country. It established a public reading room and document center which has come

to be used routinely by members of the public, and which has electronic search capability. With respect to deliberations on recommendations, the Board has maintained a balance between the need for confidentiality and robust debate on sensitive nuclear safety recommendations related to defense facilities. This includes addressing the rights of public access as required by the Board's enabling statute. The 1991 highlights from the Board's efforts to include and inform the public of Board activities include the following:

1. On March 7, 1991, after public notice in the Federal Register and consultation with the Administrative Conference of the United States, the Board issued its rules Implementing the Government in the Sunshine Act. 56 Fed. Reg. 9605.

2. On May 8, 1991, after public notice in the Federal Register, the Board issued its final Rules Implementing the Freedom of Information Act. 56 Fed. Reg. 21259.

3. The Board acquired and installed appropriate equipment to record meetings.

4. Pursuant to the Atomic Energy Act of 1954, as amended, the Board has issued recommendations to the Secretary of Energy and published them in both the Federal Register and the Department of Energy's public reading rooms. The Board specifically solicited public comments on each of the recommendations.

5. The Board has, in its discretion, conducted a number of staff and Department of Energy briefings in public meetings which were not legally required to be held in the public. These public briefings were noticed in the Federal Register, newspapers, and radio stations. Notices were sent in advance to interested groups and individuals.

6. The Board has allocated staff and other resources to facilitate public access to Board records and to maintain a fully functional public reading room in its Washington office.

7. Since March of 1990, the Board has responded to and fully satisfied numerous FOIA requests and requests for public documents. No Board response to a FOIA request or request for public documents has been administratively challenged or judicially appealed.

8. Since 1990, the Board has also consistently used participatory public hearings, pursuant to specific provision of its enabling statute, 42 U.S.C.A. § 2286b(a)

(West Supp. 1991) as well as less formal exchanges with the public, to keep the public informed of matters before the Board.

5. Official Site Visits by Board Members and by Staff

From the establishment of the Board in October, 1989, through December 31, 1991, Board Members, its staff, or its contractor experts made 214 site visits to DOE defense nuclear facilities. In 1991 alone, 151 site visits have been made to DOE defense nuclear facilities by Board Members, its staff, or its contractor experts. These visits focused on selected facilities that both the Board and DOE consider to be urgent in light of DOE's mission, primarily the Savannah River Site, the Hanford Site, the Rocky Flats Plant, and the Waste Isolation Pilot Plant. Preliminary visits have also been made to Pantex near Amarillo, Texas, the Y-12 Plant at Oak Ridge, Tennessee, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the Idaho National Engineering Laboratory, Mound Laboratory, and the Fernald Feed Material Processing Center.

The Board has reviewed firsthand the health and safety issues at each of these sites. In 1991, the Board Members spent a combined total of 200 work days in official travel status associated with these reviews. During these visits, the Board sought to avoid unduly interfering with DOE's program to manage the site or facility, while gathering the bases for its recommendations to the Secretary of Energy and monitoring the implementation of recommendations that have already been made.

The Board has been reviewing classified aspects of the DOE's defense programs, including plans for stockpile maintenance, reconfiguring of the production complex, and research and development projects.

B. SAFETY AND HEALTH STATUS OF DEFENSE NUCLEAR FACILITIES

1. Board Perspective on Outstanding Issues of Health and Safety

a. Overview

The Defense Nuclear Facilities Safety Board has been in operation for slightly more than two years. To fulfill its safety mission, the Board and its staff regularly conduct site visits, attend briefings, collect relevant documents, and generally review operations and practices which have safety implications at defense nuclear facilities. A significant amount of travel is required. Obtaining the necessary data is time-consuming and requires persistence and diligence on the part of the Board and staff. Detailed reviews and assessments of data are necessary to identify trends. Many

issues which the Board and its staff eventually address cannot be predicted in advance. By the close coordination of Board and staff activities, the Board is able to cover significant safety issues which arise in the course of a year. Board oversight cannot, and should not, substitute for indepth safety activities and reviews by DOE and its contractors.

The daily operations of the Board staff directly support the activities of the Board and are concentrated in three general operational areas. The first area supports recommendations made by the Board where the Board staff assists in the development of supporting information for proposed Board recommendations and then follows, examines, and assesses the DOE's response and implementation of Board recommendations. The second area is examining any concentrated DOE activity (e.g., Operational Readiness Reviews) by indepth analyses, inspections, and review. This usually involves Board staff being present at a facility while the activity is conducted. The third area is technical inquiries and review as well as continued monitoring of DOE activities to detect and assess practices to determine if public health and safety are being compromised.

As was noted in last year's report, some progress has been made in a number of DOE's problem areas identified by the Board, or addressed by DOE on its own initiative. Major safety and health issues remain. In his letter to the President, dated December 21, 1990, the Secretary of Energy acknowledged the serious nature of these problems. He recently reaffirmed his position in a December 20, 1991, letter to the President which stated the following regarding nuclear safety:

Some of the Department's nuclear facilities have safety deficiencies. These deficiencies include outdated nuclear safety standards, inadequate nuclear facility safety analyses, and less than optimum operational practices and technical oversight. A number of facilities have been shut down until safety upgrades can be implemented. In some cases, facilities that are no longer operating continue to pose safety risks.

Regarding nuclear waste storage and disposal, the Secretary noted:

The Department's nuclear waste storage and disposal projects have experienced a number of delays. Having overcome an almost 2-year schedule delay to resolve a number of technical and regulatory compliance problems, initiation of the experimental program at the Waste Isolation Pilot Plant (WIPP) in New Mexico is

now being delayed further by litigation and political opposition.

Congress also, through reports of the General Accounting Office and legislative history of the Board's enabling statute, has identified many of the major safety and health problems at defense nuclear facilities. Rather than recount these outstanding health and safety problems, the following presents the Board's views on two critical issues that underlie many of the specific health and safety problems at defense nuclear facilities.

b. Importance of Qualified DOE Technical Staff

In his recent December 20, 1991, letter to the President, the Secretary noted that, "Many of the Department's programs are being severely impacted by staffing inadequacies. This is particularly true in critical areas such as environment, safety, project management" The Board believes 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. There is a need for additional technical expertise in both Headquarters and field organizations. Until this problem is solved, DOE will continue to have difficulty in developing and applying nuclear standards, in providing direction and guidance to contractors, in assessing the performance of contractors, in promptly carrying out Board recommendations, and otherwise carrying out its responsibilities for assuring safe operation of facilities.

The Board is aware of the efforts of the Secretary to correct the situation regarding insufficiently qualified technical staff. As stated in Secretary of Energy Notice SEN-11-89, The Secretary intends "to establish permanent positions and put into place DOE people with the capabilities necessary to support line managers in the execution of their oversight responsibilities in both headquarters and field positions." It is appropriate to note that in building up its own technical staff, the Board at an early stage faced problems similar to those encountered by DOE. The similarities were heightened by the fact that both agencies are attempting to recruit from the same sectors of the nuclear community. The Board found at an early date that it needed to acquire authority to except the hiring of scientific and technical personnel from the rules and procedures that apply ordinarily. It requested such authority and, in late 1990, Congress passed the needed legislation.

The Board recognizes that the shortage of qualified technical personnel at DOE has been long-standing, going back to the time of the Energy Research and Development

Administration and the Atomic Energy Commission. Alleviating these shortages will be a difficult job. While the Secretary has already filled some key positions, much remains to be done, and the effort must be carried forward as rapidly as possible.

The Board believes that the Secretary of Energy should take all possible means to attract personnel with outstanding capabilities to help solve DOE's technical and managerial problems. The Board is convinced that this can be done with an extraordinary effort and commitment.

c. Development and Implementation of Safety Standards

The development and implementation of sound safety standards, orders, and directives are the foundation of any nuclear safety program. Congress considered DOE's safety standards program to be critical to ensuring the public health and safety at defense nuclear facilities. Therefore, it directed the Board to review and evaluate the content and implementation of the standards relating to the design, construction, operation, and decommissioning of defense nuclear facilities of the Department of Energy at each of its defense nuclear facilities, and to make appropriate recommendations to DOE in light of its review.

The DOE and its predecessor organizations have long had difficulty in developing and implementing nuclear safety standards. This difficulty has been well documented in independent studies of nuclear safety at DOE facilities, including two reports by the National Academy of Sciences. The reasons given are complex and include: lack of understanding among DOE managers of the importance of standards to safety; resistance by national laboratories and contractors to the use of standards; and lack of authority in the past over DOE field offices by appropriate DOE officers in Headquarters. For reasons such as these, a set of coherent nuclear safety standards is neither well-developed nor in use at DOE defense nuclear facilities, in contrast to commercial nuclear power plants being licensed and regulated by the U.S. Nuclear Regulatory Commission (USNRC). The Board's assessments of DOE nuclear standards include appropriate comparative evaluations of DOE standards and requirements with those of the USNRC. The Board does not imply that nuclear standards in commercial practice meet all DOE needs.

DOE today faces several kinds of difficulties regarding safety standards and requirements. First, there has been a decision to develop and issue a set of nuclear safety rules following formal rulemaking procedures, a process that will be time-consuming. Second, there is the need to issue safety orders and directives that are substantially more numerous than the rules planned for issuance. DOE recognizes both the need for rules and for orders as directives and is making efforts to meet those needs. The Board believes that the issuance of these more numerous and

urgently needed safety directives should not be unnecessarily delayed by formal processes. Because of Board concern for the pace of this effort, it issued Recommendation 91-1 analyzed previously.

Beyond the problem of developing adequate rules, orders, and directives themselves lies the formidable one of assuring that they are put into effective use. The Secretary has stated his intention to establish a new safety culture for nuclear activities within DOE. Improved nuclear standards are indispensable to the establishment of this culture.

It is also difficult in many cases to identify the standards used in designing and constructing existing defense nuclear facilities. Many of these facilities were built in years past and in certain respects cannot and, in some cases, need not be expected to meet current nuclear standards. DOE will need a policy for modifying such facilities or otherwise compensating for inability of those facilities to meet appropriate current standards. This policy would be similar in purpose to the backfitting policy used by USNRC for commercial nuclear power plants. DOE has proposed a backfit policy for defense nuclear facilities.

d. Issues of Concern Which the Board and the Ahearne Committee Both Reviewed

The Advisory Committee on Nuclear Facility Safety (the "ACNFS") issued its final report on November 12, 1991. As an advisory committee to the Secretary of Energy, the ACNFS reviewed safety issues at the request of the Secretary. The ACNFS reviewed numerous subjects relating to the defense nuclear complex that overlap with areas within the jurisdiction of the Board, including risk analysis, process facilities, radiation protection, the Rocky Flats Plant, the Waste Isolation Pilot Project, and DOE's nuclear safety policy. The Board has commenced work in all of those areas, and has issued recommendations pertaining to many.

In the case of the Savannah River Site (SRS), the Board concentrated most of its attention through 1991 on the proposed restart of the K-Reactor, whereas the ACNFS ceased its oversight of the SRS reactors at the direction of DOE when the Board assumed external independent oversight of the SRS production reactors. The ACNFS did conduct a review of high-level waste storage and processing facilities at SRS, as well as the Idaho Chemical Processing Plant (ICPP) at INEL, the tank farms at Hanford, and the PUREX and Plutonium Finishing Plants at Hanford. The Board is now examining the waste processing facilities at the SRS and has also commenced a review of the ICPP waste processing facilities. With respect to the tank farms at Hanford, the Board issued two recommendations in 1990 relating to the possibility of explosion or fire in the single-shell tanks, an issue which the ACNFS also reviewed.

The Board and the ACNFS also both examined the possibility of explosion or fire in the double-walled tanks.

Both the ACNFS and the Board have emphasized the necessity of radiation protection programs at DOE defense nuclear facilities, and to that end the Board recently issued Recommendation 91-6. The situation at the Rocky Flats Plant has occupied substantial attention from both the ACNFS and the Board, with common emphasis on issues, including the establishment of a safety culture, order compliance and CSAs, training of personnel, conduct of the Operational Readiness Reviews at Building 559, the constraints on waste accumulation, safety analyses, accumulation of plutonium in the ducts, fire safety, emergency preparedness, gloveboxes and HVAC and radiation protection.

2. Overview of Improvements in Safety at DOE Defense Nuclear Facilities

The Board directly endeavors to ensure the health and safety of the public by issuing formal recommendations to the Secretary of Energy, and then tracking DOE's implementation of those recommendations to determine if the anticipated improvements in the health and safety are achieved. Nevertheless, the recommendation process is not the only way in which the Board's actions and activities have had a positive impact on the status of nuclear safety in the Department of Energy. For example, technical reviews, investigations, questions, and comments by individual members of the Board and its staff and technical experts during briefings and site inspections also have their effects. These frequently highlight issues and lead to self-initiated changes and improvements in DOE's practices and technical directions. Board activities across their full spectrum have operated to raise the level of DOE and contractor performance at defense nuclear facilities. Board reviews, assessments, requests for information, recommendations, evaluations of DOE implementation plans, hearings and similar activities by Board staff all embody and reflect the needed level of technical excellence. To protect public health and safety, the Board makes recommendations as circumstances dictate. Complementing these formal measures are the ever-present benefits from DOE's awareness of what is regarded by the Board as acceptable, and what is not.

In the following sections, improvements are listed in which Board recommendations, actions, and activities played substantial parts. As stated in last year's annual report to Congress, it is seldom possible to define which organization has primary and which has subsidiary responsibility for initiating improvements that take place. The process that was defined in the enabling legislation empowers the Board to recommend, while the decisions and the actions to implement belong to DOE. Some improvements are the results of parallel initiatives in the DOE and the Board. The Department of Energy must file its own separate report to Congress which details the Department's views regarding safety improvements within the complex.

3. Board Activities Leading to Improvements at More Than One Facility

a. Operator Training

Significant improvements were made by DOE's contractor in training and qualifications of reactor operators and supervisors at Savannah River Site's K-Reactor as a result of the Board's Recommendation 90-1 and followup activities. *See* Section II.A.2.a., above. The same can be said of operator training and qualifications at Rocky Flats Building 559 and WIPP as a result of the Board's overview of ORR and training activities at those two sites.

b. Operational Readiness Reviews

In response to Board recommendations and related activities, DOE and its contractors made numerous improvements during 1991 in the selection of qualified ORR teams, the scope and adequate completion of ORRs, and documentation of ORR results. Significant safety improvements were made at Savannah River Site's K-Reactor, WIPP, and Rocky Flats Building 559 as a result of the Board's oversight of ORR activities. *See* Sections II.A.1.c.; II.A.2.d.; and II.A.1.b. Consistent with the Board's enabling Act, DOE agreed to inform the Board whenever an ORR is anticipated for a defense nuclear facility in the future.

c. Standards, Including DOE Order Compliance

Some progress has been made by DOE and its contractors at selected facilities in identifying safety standards, assessing their adequacy, and verifying implementation of the standards. *See* Sections II.A.2.b.; II.A.1.a.; II.A.1.c.; and II.A.1.d. Some improvements have been made in response to Board Recommendations 90-2, 91-1, and associated Board activities related to operational readiness reviews. Unfortunately, however, the lessons-learned at selected facilities has not been translated into adequate progress at other facilities complex-wide. *See* discussions on Recommendations 90-2 and 91-1.

d. Seismic and Systems Engineering for Nuclear Waste Tanks

The Board continues to examine the adequacy of the design of nuclear waste tanks to resist seismic and other external events. This is being done in conjunction with the Board's activities at SRS, the Hanford Site, the INEL, and the remainder of the DOE complex. As part of this effort the Board has encouraged the various DOE waste tanks groups to hold workshops with selected Board members and staff to discuss issues of mutual interest and concern.

The Board continues to examine the design, construction, and contractor evaluations of the nuclear waste tanks at the Savannah River Site, the Hanford Site, and the INEL to assess the adequacy of these tanks to resist seismic and other external events. This requires establishing the standards which were used for the original design and construction and those used for upgrades and modifications. The activity has helped to impress upon DOE the importance of adequate designs and was a contributing factor in DOE's establishment of its High-Level Waste Tanks Advisory Panel and its High-Level Waste Tanks Seismic Experts Panel.

At the Board's suggestion, DOE has initiated an effort by these panels to develop a common rationale for the design, construction, operation, maintenance, and decommissioning of nuclear waste tanks across the complex. Seismic engineering being the first focus, the seismic panel has been meeting regularly to evaluate the seismic safety of the existing tanks and to develop generic seismic design criteria for waste tanks. This activity was initiated in 1990 with a workshop involving selected members of the Board, and its staff, the Savannah River Site, the Hanford Site, the Oak Ridge Site, the Idaho Site, the West Valley Site, and DOE Headquarters. The Board believes that continuation of this activity will contribute to enhanced seismic nuclear safety across the complex. In early November 1991, Board technical staff and outside experts visited the Idaho Chemical Processing Plant at the INEL to examine the status of existing high level waste tanks and bin sets. The Board is now reviewing the design and construction of the new waste tanks being constructed at the Idaho Site.

e. Unusual Occurrence Reporting (UOR)

DOE has been implementing a major change in its occurrence reporting system through Secretary of Energy Notices and DOE Order revisions. This is an important system for determining the cause of events and ensuring that effective corrective actions are taken. In late 1990, the Board by letter identified its concerns on the implementation of the revised occurrence reporting system throughout DOE, and requested follow-up briefings and additional information on specific procedures being developed for the various defense nuclear facilities. Included in its December 19, 1991, Recommendation 91-6 the Board recommended that changes be made in UOR system to ensure that the root causes of unusual occurrences related to radiation protection are determined. The Board will continue to review the implementation and effectiveness of the DOE occurrence reporting system during FY 1992 and into FY 1993 since this DOE effort will take some time to become fully effective.

4. Board Activities Leading to Improvements at the Rocky Flats Plant

The Board has reviewed several aspects of plant operations and related activities at Rocky Flats. These reviews have been directed toward ensuring adequate protection

of public health and safety, especially those matters bearing on DOE's planned resumption of plutonium processing operations on a building by building basis. The subject of standards was previously addressed in the discussions on Recommendations 90-2 and 91-1. Some of the other important safety issues reviewed by the Board, its staff, and our outside technical experts during 1991, included:

- Operational Readiness Reviews for Building 559, discussed in detail elsewhere in this Report;
- Standards for the design, construction, and operation of all plutonium process buildings;
- Reconstruction of system-level drawings;
- Development and validation of plant operating procedures;
- Training and qualification of plant operators;
- Fire protection program;
- System startup test program;
- System maintenance and surveillance programs;
- Conduct of operational readiness reviews;
- Removal of fissile material from process ventilation ductwork;
- Adequacy of safety analysis reports (SAR);
- Systematic evaluation and consideration of facility upgrades;
- Criticality safety; and
- Pondcrete preparation and storage.

The Board is carefully monitoring DOE progress in implementing each of its recommendations pertaining to Rocky Flats through regular site visits and the review of reports related to these issues. In the future, the Board will expand its review to other areas of Rocky Flats while continuing to monitor the long-term improvement in the areas previously identified. Areas that will receive increased emphasis in the future are:

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- Implementation of Board Recommendations regarding nuclear safety standards;
 - Safety analysis for buildings targeted for resumption of plutonium operations;
 - ORR for buildings targeted for resumption of plutonium production;
 - Radioactive and hazardous waste management and site remediation;
 - Safety upgrades to existing plutonium processing facilities and new facility construction; and
 - Facility decommissioning and decontamination.

The Board, its staff, and outside experts have continued their ongoing review of training of operator and support personnel at Rocky Flats. This has included: review of training plans and materials; interviews with trained and qualified personnel; oversight of the testing and qualification process; in-plant reviews of on-the-job training; and oversight of two DOE-ORR's.

In addition, the Board, its staff, and outside experts have performed review of a number of other technical topics pertaining to public and worker health safety. A detailed review has been performed of the site fire protection system, with particular emphasis on Building 559 systems and actions. Preliminary reviews have been performed in the areas of overall site emergency planning and waste management.

5. Board Activities Leading to Improvements at the Savannah River Site

The Board has given high-priority attention to the contemplated restart by DOE of the Savannah River production reactors. The Board's review of these reactors and the Savannah River Site (SRS) conforms with the intention of the Board to perform its duties on a schedule compatible with the Department's defense missions, to the extent such a course is consistent with the Board's statutory responsibilities. The Board has issued several recommendations that directly or indirectly affect the SRS restart efforts. Those recommendations, and the progress which DOE has made in implementing them, are reviewed in detail earlier in this report.

In addition to the actions and follow-up activities associated with Recommendations 90-1, 90-2, 90-4, 90-5, 91-1, 91-2, 91-5, and 91-6, as they affect Savannah River in whole or in part, the Board and its staff have initiated reviews of numerous major technical issues that can have a direct impact on public health and safety, and may

affect restart and continued operation of the Savannah River reactors. These issues include:

- Implementation of Board Recommendations Regarding Nuclear Safety Standards
- Seismic Design Basis and Adequacy
- Reactor Tank and Primary Piping System Integrity
- Power Limits and Thermal Hydraulic Design Adequacy
- Station Blackout and Fire Protection Basis and Adequacy
- Configuration Management and Quality Assurance Program Effectiveness
- Electrical Distribution System Design
- Core Design, Manufacturing & Operations
- Equipment Qualification
- Waste Management Practices

The reviews in these areas have resulted in further identification of areas requiring improvements by DOE and its contractor. For example, lack of a coordinated, overall core technical design review, has led DOE and its contractor to evaluate improvements to this process at SRS.

The Board has spent considerable effort in examining the ability of the K-Reactor facility to withstand seismic forces. This examination has utilized both the short and long-term DOE programs as a baseline. As a result of these reviews, both the DOE and the contractor have adjusted and modified their program to include several safety enhancing activities. These include:

- Seismic qualification of the cooling water reservoir basin and buried cooling water piping;
- Development of seismic engineering procedures to include code consistent language;

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- Seismic qualification of the process water system;
 - Integrated reanalysis of stack and reactor building analysis to include augmented loadings;
 - Substantiation of seismic design basis for restart activities;
 - Seismic qualification of the supplementary safety system;
 - Integrated systems assessments;
 - Seismic assessment of piping supports and support systems;
 - Probabilistic risk analysis;
 - Systematic evaluation program;
 - Site foundation condition assessment; and
 - Improvement of subsurface conditions by subsurface grouting.

While the Board has focused its attention at SRS on the K-Reactor, the Board also initiated reviews of the other numerous defense nuclear facilities at SRS during 1991. These include:

- Separations Facilities, including the F-Canyon, FB-line, H-Canyon and HB-line;
- Tritium Facilities, including the Replacement Tritium Facility; and
- Waste Management Facilities, including the Tank Farms, Defense Waste Processing Facility, and Saltstone Facilities.

The Board, its technical staff, and outside technical experts made site visits to these non-reactor facilities and conducted initial reviews in June, July, and December of 1991. The July and December reviews indicate that DOE and contractor personnel responsible for non-reactor facilities are aware of the Board's previous recommendations and reports concerning other SRS facilities and are therefore taking actions to implement programs undertaken within the Savannah River reactor areas.

6. Board Activities Leading to Improvements at the Hanford Site

Board review of safety problems at the Hanford Site have focused on the storage of high level waste from reprocessing activities in the past. These concerns led the Board to issue Recommendations 90-3 and 90-7 in 1990. These two recommendations addressed issues related to the contents of single-shell and double-walled nuclear waste tanks, and are described in detail previously in this report. The Board is unsatisfied with the rapidity with which DOE's implementation plans are being executed.

The Board is closely following DOE's investigation of this issue, and has encouraged DOE to proceed more expeditiously in obtaining the information necessary to achieve stable operations, assurance of safety, and ultimate remediation. The Board will continue to evaluate the safety of these tanks as more information becomes available. In addition, the standards applied at the facilities listed in Recommendation 90-2 need to be identified and compiled by DOE in accordance with the revised implementation plan.

Partly in response to reviews by the Board, its staff, and outside technical experts over the past year, DOE has assembled a technical advisory group to monitor issues concerning high level waste tanks at DOE establishments, and has formed a project staff to oversee the programs for resolution of problems. The Board is currently examining possible ways of accelerating the testing and analysis recommended by the Board.

Board and staff reviews have been instrumental in generating improvements by DOE and its contractors outside the recommendation process, for example:

- Plutonium Finishing Plant (PFP) readiness to operate was recognized as deficient by both DOE-Richland (RL) and Westinghouse Hanford Company (WHC). As a result, the invitation for a DOE-HQ operational readiness review (ORR) was rescinded. Both RL and WHC are assessing lessons-learned from WIPP, SRS, and RF ORR's, in preparation for conducting their own ORR's.
- As a result of staff questions about the condition of and discipline of operations at the Uranium Oxide (UO₃) Plant, WHC management increased attention to the conduct of operations at both the UO₃ and the PUREX plants. Lockout/Tagout (LO/TO) problems at both plants were identified. WHC's heightened attention to LO/TO resulted in corrective measures site-wide. DOE-EM recognized the generic issue and made LO/TO improvements at all EM facilities a major goal for

1992. RL committed to perform a Conduct of Operations assessment of the UO₃ Plant after performing one on PFP. WHC management requested RL to defer its review until the UO₃ Plant is considered ready. DOE-EM has now established an office within HQ to assess Conduct of Operations at all EM facilities.

- Based on observations and questions by Board staff and outside experts, radiological control improvements for the T-Plant were accelerated.

7. Board Activities Leading to Improvements at WIPP

The Board, its staff, and outside technical experts have reviewed key WIPP documents including the Final Supplement to the Environmental Impact Statement, the Draft Final Safety Analysis Report, and various DOE and Sandia Laboratory reports. During 1991, the Board's staff and outside experts made five site visits to WIPP to observe the ORR and related safety activities. Also, the staff has been tracking overall WIPP developments and research so as to keep the Board fully informed about WIPP-related public health and safety issues. At a public meeting in January, 1991, DOE and its contractors briefed the Board on the status of the WIPP test phase plan. The presentation and subsequent discussion focused on issues open or unresolved at the time.

Subsequently, the Board requested a briefing by DOE on the readiness reviews it had conducted for WIPP. Since DOE's review of the readiness at WIPP was spread over approximately a three-year period, the Board was concerned that DOE did not intend to perform a final comprehensive readiness review, after completion of the contractor's readiness review, and prior to the initiation of the test phase. After reviewing the existing DOE plans, the Board issued Recommendation 91-3 which recommended that an independent and comprehensive DOE readiness review be carried out at WIPP prior to initiation of the test phase.

The Secretary of Energy accepted the Board's recommendation on June 5, 1991. The Board has received additional briefings on this issue since making Recommendation 91-3, and is pleased to note that a WIPP operational readiness review has been completed. As a result of the ORR process, safety was enhanced at WIPP. The integrated systems approach mandated by the ORR allowed DOE to make significant improvements.

DOE has also prepared a database describing the standards applied during design and construction of WIPP in partial response to Recommendation 90-2. A report to the Board is expected shortly.

Currently, the Board and staff are continuing to track the overall progress of WIPP development, and will monitor the technical and scientific aspects of WIPP through and beyond completion of the planned test phase.

As appropriate, the Board is prepared to issue additional recommendations related to the design, construction, operation and decommissioning of WIPP that are determined necessary by the Board to ensure adequate protection of public health and safety.

C. ADMINISTRATIVE AND MANAGEMENT ISSUES

1. Personnel and Recruitment

As of December 31, 1991, the Board had hired 58 full-time employees and another five prospective employees were in the process of being hired. Another five offers were still pending. During 1991, the Board reviewed 1,263 applications and conducted 77 sets of interviews in our effort to recruit employees with requisite scientific, engineering, or legal backgrounds to effectively carry out the highly specialized work required.

As detailed previously, the Board has been able to make good progress in hiring since submittal of its first annual report to Congress, due in large part to the fact that Congress has now authorized the Board to use excepted appointment authority for both new hires and incumbents on the scientific and technical staff. Recognizing the unique requirements for scientific and engineering personnel of the highest calibre to address the health and safety questions associated with the design, construction, operation, and decommissioning of DOE's defense nuclear facilities, Congress amended the appointment and compensation authorities of the Board for scientific and engineering personnel in the National Defense Authorization Act for Fiscal Year 1991. With this excepted appointment authority to hire scientific and engineering staff, the Board has been able to significantly strengthen its ability to compete with other Federal agencies and the private sector for the talent to properly perform its mission.

The Board has been able to hire outstanding technical talent with extensive backgrounds in nuclear, mechanical, electrical, chemical, and metallurgical engineering using a nationwide recruiting campaign. The technical staff selected by the Board included individuals with advanced degrees at the PhD or Masters level and practical nuclear experience gained from duty in the U.S. Navy's nuclear reactor program or the civilian reactor industry. Among them are several scientists and engineers with PhD degrees in the areas of metallurgical, mechanical, and nuclear, civil, and chemical engineering, and physics. Two other senior members of our staff

with varied technical backgrounds also have law degrees (JD) as well as Masters degrees in their technical specialty. The Board plans to continue its aggressive program to attract and hire additional technical staff with the backgrounds commensurate with the Board's public health and safety responsibilities.

The Board requested the Office of Personnel Management for critical position pay authority for four key scientific/technical positions on April 30, 1991, pursuant to 5 U.S.C. § 3593(a). The four requested positions include a Senior Principal Engineer (Uranium and Plutonium Transuranic Chemical Engineering) and Senior Principal Scientists in three fields: Seismology/Earthquake Engineering, Metallurgy/Metallurgical Engineering, and Nuclear Physics. OPM approved the request, August 5, 1991, and the Board is seeking qualified applicants. Filling these critical positions will further enhance the Board's ability to execute its health and safety mission.

2. Establishment of Technical Intern Program

The Defense Nuclear Facilities Safety Board's new Technical Intern Program is designed to aid in the development of a number of the nation's top engineering graduates, with the intent that they subsequently join the technical staff of the Board. As Board interns, they will be salaried employees of the United States Government.

Board interns will have opportunities to add to their knowledge and expertise while contributing to the work of the Board.

The program encompasses 3-4 years, and involves:

- One or more years of orientation carrying out Board assignments under the direction of a technically qualified personal mentor at our headquarters.
- Nine months of graduate education in nuclear and nuclear-related engineering at an institution mutually agreed upon by the intern and agency. During this time the mentor would continue to advise and guide the intern. The intern will receive a salary, and tuition will be fully paid by the Board.
- A meaningful term assignment in a cooperating utility, contractor, or national laboratory organization.
- A final year as an intern at Board Headquarters in Washington, D.C.

Intern activities will involve areas such as nuclear engineering, radiological engineering, nuclear waste management, reactor operations, nuclear quality assurance, accident analysis, civil/structural/seismic engineering, nuclear materials, and thermal hydraulics.

An intern will be selected on the basis of outstanding academic performance and other attributes that indicate the likelihood of effective performance as a DNFSB staff member. An intern candidate must be a U.S. citizen eligible for "Q" level security clearance. Prior to selection he will also be required to undergo screening for illegal drug use and are now subject to random testing as with any other employees.

The most promising candidates will be brought to the Board's Washington offices for personal interviews with Board Members.

3. General Accounting Office Report

On April 24, 1991, the General Accounting Office (GAO) transmitted to the Board the report entitled Nuclear Safety: The Defense Nuclear Facilities Safety Board's First Year of Operation (GAO/RCED-91-54, dated February 5, 1991). The Board was gratified that GAO emphasized in the report's initial principal finding that the "Board has accomplished much during its first year". The Board is also grateful that, thanks to many Members of Congress and support from the GAO and others, legislation was passed in November of 1990 which provides the Board with more flexibility in hiring and establishing competitive salary levels for its scientific and technical employees.

The GAO report contained a number of recommendations for improving Board operations, which will be addressed below. Each recommendation by GAO is presented with the Board's response and proposed action following.

- GAO recommends that the Board establish procedures for reviewing all hiring and contractual arrangements to determine the potential for conflicts of interest and, where potential conflicts are possible, disqualify the contractor/consultant or make a determination that the award of the contract is in the best interests of the United States and include mitigating provisions in the contract.

The Board agreed with this recommendation and directed its General Counsel and Designated Agency Ethics Official (DAEO) to draft procedures which govern all aspects of potential conflicts of interest by contractors and consultants. In drafting the procedures, the DAEO, working with the Board's General Manager and

discussions and establish requirements for public and non-public documentation of those activities. Documentation of "open and closed" Board meetings are prepared in accordance with the requirements of the Government in the Sunshine Act.

In addition, the Board maintains final briefing documents prepared by the Board staff, DOE, its contractors, and experts to document the results of briefings which are conducted. Availability of these documents to the public is determined under FOIA, with many such documents available for inspection in the Board's Public Reading Room.

- GAO recommends that the Chairman direct the preparation of a strategic plan for identifying future work areas. The plan should also delineate organizational structure and work force staffing strategies that identify the kind, number, and pay levels for all scientific and technical positions required for future work.

The Board agrees with the portion of GAO's recommendation that calls for development of a strategic plan, which the Board believes must remain flexible. Last year's annual report submitted to Congress presented the Board's strategic plan for work in 1991, as well as plans for the future. A similar plan for 1992 and beyond is contained in this year's report.

- GAO recommends that the Chairman of the Defense Nuclear Facilities Safety Board direct that operating procedures be expeditiously established to ensure that all Safety Board activities are conducted in a manner that is clearly independent from DOE. These procedures should include criteria for determining when safety and health concerns related to DOE's defense nuclear facilities will result in the Safety Board's issuing formal recommendations to the Secretary of Energy. In developing such criteria, the Safety Board should recognize the importance of allowing the public to be aware of the Board's activities and of significant safety and health issues at DOE's defense nuclear facilities.

Before addressing the recommendation itself, the Board would like to clarify several matters raised in the body of the GAO Report regarding Board independence, especially in issuing its recommendations. The Board, in fact, conducted its activities during the its first two years of operation in an independent manner consistent with the totality of its statutory obligations. Board members, acting individually and collectively, must be able to conduct site visits, technical reviews, and investigations, and engage in formal and informal communications in order to perform their statutory duties.

Formal recommendations are a very important part of the Board's oversight activities, but they are not the sole method used by the Board to assist the Secretary of Energy and the President in improving health and safety conditions at defense nuclear facilities. Formal recommendations are to be issued if the Board determines they are "necessary to ensure adequate protection of public health and safety." 42 U.S.C. § 2286(a)(5) (emphasis added). Board technical analysis and review of safety problems, site visits, observations, and discussions with DOE and its contractors may trigger their initiating further review or corrective action without a formal recommendation even having been contemplated. This very productive and efficient means of effectuating change at defense nuclear facilities was not adequately addressed in GAO's Report. In fact, self-initiated corrective action is often a natural consequence of any oversight activity. It is so much so in our case that communication with DOE, technical reviews, and site visits would have to be discontinued if DOE or its contractor were prohibited from improving safety conditions as a result of Board activities outside the formal recommendation process.

Congress recognized that all Board activities can, and indeed should, result in safety and health improvements at defense nuclear facilities. In reporting to Congress on an annual basis, the Board must document all recommendations made in the preceding year, as well as the improvements in safety at Department defense nuclear facilities resulting from "actions taken by the Board or taken on the basis of the activities of the Board..." 42 U.S.C. § 2286e(a) (emphasis added). As stated previously, those activities include analyses, site visits, discussions, and investigations by the Board itself, and also its staff and expert consultants.

While Congress authorized the Board to use formal recommendations, subpoenas, and other coercive investigative tools, if they are necessary, it also emphasized that DOE is to "fully cooperate with the Board." 42 U.S.C. § 2286c(a). The GAO Report's admonishment to stay "at arms length" with DOE is, of course, a statement of one of the principles of oversight. The admonishment obscures the fact that oversight organizations, including the GAO, IG Offices, and Committees of the Congress, are able to accomplish much of their mission when they work in cooperation with the officials of the agency being scrutinized. The fact that DOE has given the Board open access to its defense nuclear facilities, has frequently briefed the Board extensively on safety problems at sites, and has not resorted to an adversarial relationship with the Board does not mean the Board has failed to maintain its independence or desire to exercise judgment at "arms length." The Board's activities in closely reviewing the programs and practices of DOE and its contractor do not violate the principles of independence of judgment-- in fact, our enabling statute demands a level of attention that could not be achieved if Board activities were limited to those that result only in formal recommendations. Moreover, the Board's thirteen individual sets of recommendations issued to date

demonstrate that the Board is independently exercising its expertise and collective judgment on health and safety matters.

The Board has serious reservations about the usefulness of written procedures for determining when formal recommendations are "necessary to ensure adequate protection of public health and safety." A wide variety of circumstances could result in the Board's issuing recommendations. Any attempt to anticipate those circumstances by issuing written guidance might in fact prove a hindrance in the future, especially during an emergency. Ultimately, it is the majority of the voting members of the Board who must exercise their expertise and judgment to determine, on a case-by-case basis, whether the facts support a finding that a recommendation is "necessary" to protect health and safety.

The Board does, however, agree with GAO's recommendation that the public should be kept informed regarding Board activities, not just those pertaining to recommendations, subject, of course, to legal restrictions regarding classified and other restricted information. On May 8, 1991, the Board promulgated its final regulations governing the Board's Public Reading Room and availability of information on Board activities through the Reading Room or pursuant to a Freedom of Information Act request.

These procedures augment other Board efforts to keep the public informed, such as public hearings and other meetings conducted at or near defense nuclear facilities; open public meetings conducted pursuant to the Government in the Sunshine Act; the public comments procedures regarding Board recommendations established by the Board's enabling statute; and similar actions by the Board to confer with representatives of workers at DNFs and the general public.

4. Litigation

In early 1990, Energy Research Foundation and the Natural Resources Defense Council (Petitioners) challenged the Board's position that it was not an "agency" for purposes of the Sunshine Act and the Freedom of Information Act (FOIA). Petitioners initially sought an injunction against Board activities until Board regulations implementing the Sunshine Act and FOIA were promulgated. Faced with Board opposition, the Petitioners dropped this aspect of their request for relief. The District Court ruled in favor of the Board on all issues, finding that the Board was not an agency. *Energy Research Foundation v. Defense Nuclear Facilities Safety Board*, 734 F. Supp. 27 (D.D.C. 1990). On appeal, the Circuit Court of Appeals reversed, ruling that "the Board ... must be considered an 'agency' within the meaning of both statutes." *Energy Research Foundation v. Defense Nuclear Facilities Safety Board*, 917 F.2d 581, 585 (D.C. Cir. 1990).

The Board did not await an order from the district court on remand, but immediately began developing Sunshine Act rules. In accordance with the Circuit Court of Appeals' ruling and mandate of December 14, 1990, the Board promptly published proposed rules implementing the Sunshine Act. After receipt of a single set of public comments from the same Petitioners, the Board amended certain aspects of its rules, published its response to the comments, and promulgated its final Sunshine Act rules. Petitioners then filed a Petition for Review with the D.C. Circuit Court of Appeals challenging a single provision of the Board's rule which allows closure of Board meetings involving formal recommendations to the Secretary of Energy or the President. Both sides briefed the issues and oral argument was conducted by the Court on November 14, 1991. The Board awaits the Court's decision. The Board's enabling Act provides that recommendations shall be made available to the public "after receipt by the Secretary" or the President in appropriate cases. 42 U.S.C. § 2286d(a). Thus, the Board asserts that deliberations regarding recommendations are properly closed to the public.

5. Regulatory Agenda

The Board has aggressively pursued its agenda for promulgating administrative regulations required by law for operation of an agency. Although time-consuming and resource intensive, substantial progress was made in the Board's rulemaking during 1991.

a. Government in Sunshine Act

On December 31, 1990 (55 FR 53526), the Board published for comment its first set of proposed regulations, those implementing the Sunshine Act. The issuance of the proposed regulations was undertaken in response to the decision of the United States Court of Appeals for the District of Columbia Circuit, overriding the D.C. District Court, that the Board is an "agency" generally covered by the Sunshine Act. *Energy Research Foundation v. Defense Nuclear Facilities Safety Board ("ERF v. DNFSB")*, 917 F.2d 561 (1990). The Board received a single set of comments which were filed jointly by the Energy Research Foundation and the Natural Resources Defense Council (ERF/NRDC). The Board also consulted with the Office of the Chairman, Administrative Conference of the United States (ACUS), pursuant to the requirements of the Act, 5 U.S.C. 552b(g), and received ACUS's suggestions and observations on the proposed regulations. The Board carefully considered the ERF/NRDC comments and the ACUS suggestions and made some modifications to the proposed rule in response.

In early 1991, the Defense Nuclear Facilities Safety Board (Board) promulgated the final regulations to implement the Government in the Sunshine Act, 5 U.S.C. 552b.

These regulations provide for public notice of Board meetings and for public access to Board meetings, except when the subject matter and nature of a meeting indicates that it should be closed to the public.

b. FOIA

On March 8, 1991 (56 FR 9902), the Board published a proposed notice of rulemaking for regulations implementing the Freedom of Information Act (FOIA), 5 U.S.C. 552. The Board undertook this rulemaking in response to the decision of the United States Court of Appeals for the District of Columbia Circuit that the Board is an "agency" covered by FOIA. The Board stated from the outset that it intended to comply with FOIA, whether legally obligated to or not. *Energy Research Foundation v. Defense Nuclear Facilities Safety Board (ERF v. DNFSB)*, 917.F.2d 581 (1990). However, during 1991 the Board voluntarily complied with the requirements of FOIA in the absence of formal rules.

The Board received a single set of comments on the proposed rules, which were filed jointly by the Energy Research Foundation and the Natural Resources Defense Council (ERF/NRDC). In addition, one of ERF/NRDC's comments filed with respect to the Board's proposed Sunshine Act regulations related to FOIA. The Board carefully considered the ERF/NRDC comments and made some modifications to the proposed rule in response.

On May 8, 1991 (56 FR 21259), the Board promulgated a set of regulations to implement the Freedom of Information Act, as amended. These regulations provide procedures for public access to Board records. In the Federal Register issue of Friday, May 10, 1991, a Fee Schedule was issued in conjunction with the rule to implement the fee provisions of the FOIA.

c. Privacy Act

The Board published a proposed rule implementing the Privacy Act of 1974, 5 U.S.C. 552a, on August 12, 1991 (56 FR 38089). Having received no public comments on the proposed rule, the Board published a final rule on September 18, 1991 (56 FR 47144). This rule will be codified at 10 CFR Part 1705.

d. Employee Standards of Conduct and Conflicts-of-Interests

On March 5, 1991, after obtaining the Office of Government Ethics' (OGE) approval, the Board adopted government-wide requirements for employee conduct and potential conflicts of interest. OGE, working with all Executive Branch Departments and agencies, is in the process of revising these regulations designed to provide the baseline standards for all federal employees.

e. Equal Employment Opportunities

As required by law, the Board is currently developing comprehensive equal employment opportunity regulations to govern the handling of all EEO cases and other equal opportunity issues. The Board anticipates that the rules will be proposed in the Federal Register early in 1992.

III. BOARD STRATEGIC PLANNING

A. Criteria for Establishing Priority Activities of the Board

In response to the recent GAO Report analyzed previously, the Board committed to present elements of its strategic planning in this report.

The Board intends to continue to expand its activities during 1992 within the scope of its jurisdiction. The Board reviews the activities at DOE's defense nuclear facilities to ensure that they are consistent with protection of the public health and safety. The aspects covered by this review fall broadly in two categories: technical matters involving safety, and the process by which safety is ensured.

The technical matters include a range of issues, such as those involving system integrity of production reactors at the Savannah River Site, factors affecting safety during operation of these reactors, protection of the public with respect to other activities ancillary to production of nuclear weapons related materials at Savannah River, safety of plutonium operations at the Rocky Flats Plant, cleanup of facilities at Rocky Flats, safety of storage of fission products at the Hanford site, cleanup activities at Hanford, and safety of impending operations at the WIPP facility.

The oversight of safety in processes at defense nuclear facilities include ensuring the existence of suitable standards covering activities undertaken by the contractors, including DOE orders, rules, and applicable requirements; proficiency of workers in technical areas as ensured by training and formal qualification; and development and implementation of an appropriate safety culture. In establishing its oversight program, the Board gives particular attention to those important functions which are mandated in the legislation, such as review of the adequacy and implementation of safety standards. Also, the Board makes a special effort to evaluate safety issues which appear to be generic in nature and require improvement across the DOE complex. Examples are lack of sufficient numbers of appropriately qualified personnel, lack of adequate training, lack of adequate written procedures, or a lack of formalized disciplined approach to the operation of facilities and safety of workers.

The Board assigns priorities for oversight activities at specific sites on the basis of (1) urgency in terms of any imminent threat to public health and safety; (2) potential risk to public health and safety; (3) effectiveness of DOE management in managing those risks; and (4) timeliness in relation to DOE programmatic or operational goals and objectives. In assigning priorities, the Board also will continue to consider problems brought to its attention by members and staff of Congress, GAO, and the public. Should an imminent or severe threat to public health and safety be identified at a DOE facility, the Board must respond and change the priorities of other work as necessary.

The Board's ability to expand its coverage is directly related to DOE's performance in taking prompt and effective remedial action on safety problems which are called to its attention by the Board. If Board personnel must make repeated assessments of one facility or activity in order to assure that needed improvements are made, the Board's ability to expand its activities may be curtailed. Further, the Board is sensitive to the need to ensure that its resources are not used as a substitute for DOE activities to detect safety problems, both in line and internal oversight organizations.

While developing plans for the future, the Board must retain flexibility. As a relatively new oversight organization, the Board is faced with expanding its activities to meet all of the responsibilities imposed by the Board's initial enabling Act, while at the same time beginning to cover new areas of responsibility enacted into law recently. The modifications taking place in DOE's defense missions will be carefully followed, and priorities will be changed if necessary to be consistent with those adopted.

B. Legislative Changes Affecting Board Planning for 1992 and Beyond

1. Inclusion of Pantex and Nevada Test Site Within Board's Jurisdiction

Two new responsibilities were assigned to the Board in 1991 which will have a significant impact on the Board's mission, both short-term and long-term. First, Congress amended the Board's enabling Act, broadening the Board's jurisdiction over defense nuclear facilities to include the assembly and disassembly of weapons and the testing of weapons. The significant reduction in nuclear arms by the Soviet Union and the United States projected for the next several years is expected to cause an increase in weapons disassembly activity at certain defense nuclear facilities, particularly the Pantex facility. The Board recognizes the need and is undertaking action to meet this new oversight responsibility. In 1991, the Board and two senior staff members visited Pantex after reviewing available Tiger Team reports on health and safety issues generated by activities at the site. The Board has hired, and intends to hire, additional personnel and expert consultants with nuclear weapons expertise to assist it in the execution of its duties relative to Pantex and the Nevada Test Site.

The committee also requests the Safety Board to expand its activities, pursuant to existing statutory authority, over environmental restoration and waste management operations. The Safety Board has been very involved with the Hanford waste tanks and other limited issues arising out of Department of Energy environmental restoration and waste management, but the committee would like the Safety Board to take a more involved role in this area. S. Rep. 102-113, 102d Cong., 1st Sess. (July 1991).

The Board's statutory employee ceiling was raised from 100 to 150 full-time equivalents. Congress deemed this change necessary to accommodate the Board's increased responsibilities in 1992 and beyond.

C. Continuation of 1990/91 Activities During 1992

During its first two years of operation the Board coordinated its activities with obligations established in its enabling Act by Congress and synchronized them, to the extent allowed by law, with the priorities of the Secretary of Energy. This resulted in the Board focusing upon health and safety issues at the Savannah River Site (SRS) near Aiken, South Carolina; the Rocky Flats Plant near Denver, Colorado; Waste Storage Tanks at the Hanford, Washington site; and the Waste Isolation Pilot Plant (WIPP) in New Mexico. In 1992, the Board will continue to review safety and health issues at those sites and will monitor DOE's accomplishments relative to implementation plans for the first thirteen sets of recommendations issued by the Board. These followup activities alone will be substantial.

Continuation of Board review of operations at the four sites listed above is expected to result in further recommendations.

1. Savannah River Site (SRS)

The Board will continue to review DOE and contractor activities as they proceed with the proposed restart of the K-Reactor. The Board is currently conducting technical reviews of issues related to the reactor safety rods and of the recent tritiated water release from the heat exchangers. During initial startup activities, the Board had technical staff continuously monitoring the K-Reactor. The Board will station personnel at SRS, as needed, to closely follow restart activities. Board activities related to restart will continue to require a substantial commitment of Board resources in 1992. Another area requiring substantial attention is DOE response and implementation of Recommendation 91-6 regarding improvements in radiation health protection programs at SRS and elsewhere.

While the Board has focused its review of DOE and contractor efforts at SRS on the K-Reactor restart, reviews have been initiated of other defense nuclear facilities there. Those efforts will be continued and expanded in 1992. These include assessment of the following:

- Separations Facilities, including the F-Canyon, FB-line, H-Canyon and HB-line;
- Tritium Facilities, including the Replacement Tritium Facility;
- Defense Waste Processing Facility; and
- Other Waste Management Facilities, including the Tank Farms and Saltstone Facilities.

The Board, its technical staff, and outside technical experts made site visits to these non-reactor facilities and conducted initial reviews in June, July, and December of 1991. The July and December reviews indicate that DOE and contractor personnel responsible for non-reactor facilities are aware of the Board's previous recommendations and reports concerning other SRS facilities and are therefore taking actions to implement programs undertaken within the Savannah River reactor areas.

Other issues requiring Board attention at the SRS in 1992 include, but are not limited to, seismic design, waste operations and storage, discipline of operations, vessel and piping integrity, thermal hydraulics, closure items, and reactor power level.

2. Rocky Flats Plant

The Board will continue to follow the DOE efforts to resume plutonium operation in buildings at the Rocky Flats Plant, subject to changes required by DOE's reconfiguration and modernization plans. Board review of projected ORR activities at Rocky Flats Plant will require substantial resources, based on Board experience with Building 559, as will tracking of DOE's implementation of Board recommendations regarding removal of plutonium in the ducts and the Safety Evaluation Program.

The Board also intends to expand its review to other aspects of programs at Rocky Flats while continuing to monitor long-term improvements in the problem areas described earlier. Topics at Rocky Flats that will receive increased emphasis in the future include, but are not limited to: nuclear and hazardous waste management and site remediation; safety analyses; safety upgrades to existing plutonium processing facilities; and facility decontamination.

3. New Production Reactors

As required by law, the Board intends to review "the design of new Department of Energy defense nuclear facilities before construction." The Board has been following evolution of the DOE's plans for a New Production Reactor (NPR). The Board will make the appropriate reviews after the changes in the NPR program announced by the Secretary of Energy in December 1991 are finalized.

4. Hanford Reservation

The Board will expand its review of safety questions related to the waste tanks at Hanford in 1992. It will continue to assess potential health and safety issues at the PUREX Plant and Plutonium Finishing Plant at Hanford in 1992, and would continue to review decommissioning efforts at several Hanford defense nuclear facilities, including the N-Reactor to ensure that no undue risk to public health and safety will exist during this phase.

5. Activities at Other Facilities

In addition to continued and expanded activities at the sites focused on during 1990 and 1991, the Board currently plans to continue its assessment of health and safety issues at other DOE facilities including:

- Pantex
- Nevada Test Site
- Mound Plant
- Y-12 Plant at Oak Ridge
- Fernald Plant
- PUREX Plant at Hanford
- Plutonium Finishing Plant at Hanford.
- Isotope Separation Facilities
- Weapons Laboratories

D. Flexible Strategic Plan Through First Five Years of Existence

Further changes in the scope of the Board's oversight could, of course, impact short and long-term planning. Therefore, Board planning must provide for flexibility to respond to changing priorities even in a five-year time horizon. There are, however, a number of important safety and health issues at the DOE defense nuclear facility complex which will require long-term attention, certainly through the first five years of the Board's existence. Many of these issues have been addressed previously in this report. Without exception, they present complex policy and technical issues which

the Secretary of Energy has indicated cannot be resolved within the usual time frame provided for completion of implementation plans by the Board's enabling statute.

1. Standards

Although the Board immediately began its statutory duty of review and evaluating health and safety standards in early 1990, DOE has just begun its task of identifying and assessing the adequacy of and measuring compliance with safety standards at DOE's defense nuclear facilities. While the Board initially focused its review of and evaluating standards at four sites -- the Rocky Flats Plant, the Savannah River Site, WIPP, and Hanford -- DOE's review and evaluation will ultimately have to be completed throughout the complex. This evaluation will be complex and time-consuming.

The Board has not been completely satisfied with the progress to date by DOE in identifying safety standards, assessing their adequacy, and determining the status of compliance with adequate standards throughout the complex. At DOE's present pace, the Board's review and evaluation will extend well beyond the first five years of Board operation. Board Recommendation 91-1, addressed in detail previously, is designed to accelerate the pace by having DOE examine some of the administrative and managerial issues which may be the root causes of some of DOE's standards problems.

Even if the studies being conducted pursuant to Recommendation 91-1 are promptly completed and improvements implemented, the Board's standards work will require substantial expansion during the next three years. Identification of applicable standards at sites other than the four focused on to date will continue.

2. Qualification and Training at DOE Sites

Ensuring that both DOE and its contractors have sufficient numbers of qualified and adequately trained technical and managerial personnel to conduct DOE's defense mission in a safe manner is perhaps one of the most important, yet difficult to achieve, goals. The Board in 1990 issued Recommendation 90-1 on the qualification and training of reactor operators and supervisors at Savannah River Site. Elements of Recommendations 90-2 and 91-1 call for studies regarding the human resources needed by DOE and its contractors to identify, evaluate, and implement safety standards. The Board anticipates that personnel issues will require Board attention throughout the first five years of operation. It is essential that the training and qualifications of DOE and its contractor personnel be reflected in a disciplined engineering approach and in an effective and safe conduct of operation at the site.

3. Radiological Protection Throughout the Complex

The Board on December 19, 1991, issued Recommendation 91-6 regarding DOE and contractor radiological health protection programs throughout the DOE defense nuclear facilities. Assuming that the Secretary of Energy accepts the recommendation and develops an adequate implementation plan, it will take a substantial amount of time for DOE to conduct the studies and complete activities called for in the recommendation.

Upon completion of the studies and other preliminary action, DOE must then implement the improvements identified as necessary and appropriate.

4. Nuclear Waste Processing and Storage

An early draft Mitre report prepared for the Board identified literally hundreds of nuclear waste storage facilities within the DOE defense nuclear facilities complex.

Permanent repositories for low-level, high-level, and mixed radioactive waste are sorely needed.