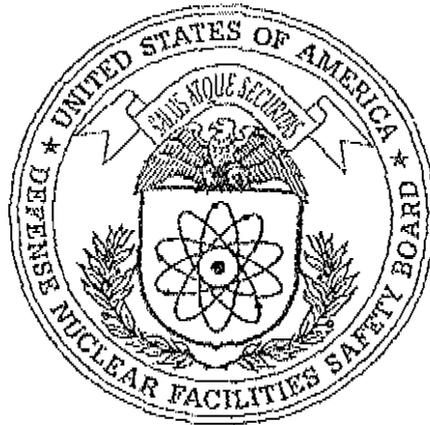


---

# ANNUAL REPORT TO CONGRESS

---

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD



---

FEBRUARY 1991

John T. Conway, Chairman  
A.L. 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 8, 1991

To the Congress of the United States:

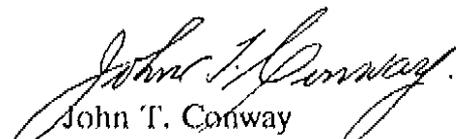
The Defense Nuclear Facilities Safety Board is pleased to submit to the Congress its first full annual report, covering the activities of the Board from the start of operations on October 18, 1989, through December 31, 1990. Last year, the Board submitted to Congress a report on its initial activities during the first three months of operation.

An independent executive branch establishment, the Board provides advice and formal 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.

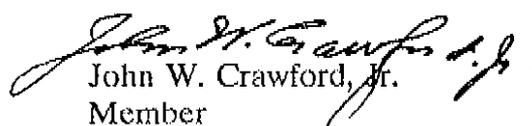
Our annual report also contains the results of the Board's preliminary study required by statute on whether or not DOE facilities outside the statutory definition of defense nuclear facilities should be subject to independent external oversight.

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 start-up of a new agency.

  
John T. Conway  
Chairman

  
A.L. Eggenberger  
Vice-Chairman

  
Edson G. Case  
Member

  
John W. Crawford, Jr.  
Member

  
Herbert John Cecil Kouts  
Member

# CONTENTS

---

	Page
<b>PART 1 REPORT OF BOARD ACTIVITIES DURING FIRST FULL YEAR OF OPERATION</b>	
<b>INTRODUCTION.....</b>	<b>1</b>
A. Overview of Board Functions.....	1
B. Reporting Requirements Under 42 U.S.C. §2286c and §2286e Note.....	2
<b>REPORT TO CONGRESS REGARDING SAFETY AND HEALTH.....</b>	<b>2</b>
A. Board Activities During 1990.....	2
1. Recommendations.....	3
a. Recommendation 90-1, Operator Training at Savannah River Facilities Prior to Restart of K, L, and P Reactors.....	3
b. Recommendation 90-2, Design, Construction, Operation and Decommissioning Standards at Certain Priority DOE Facilities.....	4
c. Recommendation 90-3, Safety at Single-Shell Hanford Waste Tanks.....	5
d. Recommendation 90-4, Operational Readiness Review at Rocky Flats Plant.....	6
e. Recommendation 90-5, Systematic Evaluation Program at the Rocky Flats Plant.....	7
f. Recommendation 90-6, Criticality Safety at Rocky Flats Plant.....	8
g. Recommendation 90-7, Safety at the Single-Shell Hanford Waste Tanks.....	9
2. Board Criteria for Judging the Adequacy of DOE Responses and Implementation Plans.....	11
3. Public Hearings, Public Comment, and Interaction with Board.....	11
4. Official Site Visits.....	13
B. 1991 PLANS FOR EXPANSION OF ACTIVITIES.....	14
<b>C. SAFETY AND HEALTH STATUS OF DEFENSE NUCLEAR FACILITIES.....</b>	<b>15</b>
1. Board Perspective on Outstanding Issues of Health and Safety.....	15
a. Overview.....	15
b. Importance of Qualified DOE Technical Staff.....	16
c. Development and Implementation of Safety Standards.....	17
2. Overview of Improvements in Safety at DOE Defense Nuclear Facilities.....	18
3. Board Activities Leading to Improvements at More Than One Facility.....	19
a. Operator Training.....	19
b. Operational Readiness Review.....	19
c. Standards.....	20
d. Discipline of Operations.....	22
e. Seismic Engineering for Nuclear Waste Tanks.....	23

4. Board Activities Leading to Improvements at the Rocky Flats Plant.....	24
a. Systematic Evaluation Program.....	24
b. Safety Analyses.....	24
c. Plutonium Removal Program.....	25
d. Seismic Engineering Programs.....	25
5. Board Activities Leading to Improvements at the Savannah River Site.....	25
a. Emergency Cooling System.....	26
b. Vessel and Piping Integrity of the K, L, and P Reactors.....	26
c. Seismic Engineering.....	26
6. Board Activities Leading to Improvements at the Hanford Waste Tanks.....	28
a. Single Shell Tanks.....	28
b. Double-walled Tanks.....	29
7. Secretary of Energy's Initiative to Improve Safety and Health Programs at DOE.....	29
C. Administrative and Management Issues.....	31
1. Budget.....	31
2. Recruitment of Technical Personnel.....	32
3. Contracting for Technical Expertise.....	33
4. Management Reviews and Audits.....	34
5. Litigation.....	34
6. Regulatory Agenda.....	36
7. Office Space in Washington, D.C.....	36

## PART 2 REPORT OF THE BOARD ON DEFENSE NUCLEAR FACILITIES SAFETY BOARD JURISDICTIONAL ISSUES

INTRODUCTION.....	37
SCOPE OF THE BOARD'S JURISDICTION.....	37
A. Public Health and Safety Matters.....	37
B. The Limits of Defense Nuclear Facilities.....	39
C. The Three Basic Categories of DOE Defense Nuclear Facilities.....	40
1. Production Facilities.....	41
2. Utilization Facilities.....	43
3. Nuclear Waste Storage Facilities.....	44
D. Enabling Act Exclusions.....	45
REPORT ON NEED FOR INDEPENDENT EXTERNAL OVERSIGHT OF ADDITIONAL DOE PROGRAMS AND FACILITIES.....	46
ENDNOTES.....	50
APPENDIX	

---

## Part 1

# REPORT OF BOARD ACTIVITIES DURING FIRST FULL YEAR OF OPERATION

## INTRODUCTION

### A. Overview of Board Functions

The Defense Nuclear Facilities Safety Board (Board) was created to provide advice and formal recommendations to the President and the Secretary of Energy regarding public health and safety issues at Department of Energy (DOE) defense nuclear facilities. By statute, the Board is required to review and evaluate 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. 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 all new defense nuclear facilities before construction begins, and recommend modifications necessary to protect health and safety. Board review and advisory responsibilities continue throughout the construction, testing, and operation of new facilities.

More broadly, the Board reviews operations, practices, and occurrences at DOE defense nuclear facilities and makes appropriate recommendations to protect health and safety. In the event that any aspect of operations, practices, or occurrences reviewed by the Board is determined to present an imminent or severe threat to public health or safety, the Board transmits its recommendations directly to the President.

All of the ancillary functions of the Board and its staff are related to the accomplishment of the Board's primary function, which is to assist in identifying and correcting health and safety problems at defense nuclear 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. The Secretary of Energy and contractors at the various facilities are required to cooperate fully with the Board.

**B. Reporting Requirements Under 42 U.S.C §2286e and §2286e Note**

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 statute also required that the Board, during its first year of operation, study the question of whether or not DOE facilities outside the statutory definition of defense nuclear facilities should be subject to independent external oversight. The Board was required to report on its findings at the time of the annual report.

This report is intended to fulfill the Board's Congressional reporting requirements in all these areas.

**REPORT TO CONGRESS REGARDING SAFETY AND HEALTH**

**A. Board Activities During 1990**

During 1990 the Board made seven formal sets of recommendations with a total of 35 individual recommendations to the Secretary of Energy pursuant to 42 U.S.C. §2286(a)(5). All of the Board's 1990 recommendations are included in this report for completeness and to provide an account of the many developments that have occurred since the recommendations were issued. The Secretary has responded to, and accepted, each of these sets of recommendations. Attachment I-1 lists the status of all Board recommendations and DOE's implementation of those recommendations.

The Board's recommendations involved (1) site visits by the Board, its staff, and its contractor personnel; (2) review of documentation concerning particular problems at the

---

---

site; (3) review of DOE or Board contractor reports in appropriate cases; (4) discussions with DOE officials and DOE contractors; and (5) deliberation and technical review by the Board. A review of the Board's site visits and other activities leading to the development of formal recommendations is included later in this report.

**1. Recommendations**

**a. Recommendation 90-1, Operator Training at Savannah River Facilities Prior to Restart of K, L, and P Reactors**

The Board has given high-priority attention to the contemplated restart by DOE of the three Savannah River reactors that remain operable. The Board's review of these reactors and of related operations at the Savannah River site is compatible with the intention of the Board to perform its duties on a schedule consistent with the Department's defense missions, to the extent such harmonization of activities remains compatible with the Board's statutory obligations.

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 Board recommended the following actions:

- That DOE determine and specify the qualifications that reactor plant operators and supervisors will be required to demonstrate before restart of the K, L, and P reactors;
- That DOE identify any differences between its approved qualifications and those prescribed by NRC for analogous positions in the civilian nuclear power field; that where differences, if any, exist, DOE identify any supplemental measures that have been adopted in view thereof;
- That DOE conduct a comprehensive review of the current level of qualifications of each reactor operator and supervisor employing both written and oral examinations, to insure that the scope and content of the prescribed training program is capable of imparting the knowledge necessary for restart;
- That the reactor plant operator and supervisor training programs be modified as necessary to take into account the required qualifications and the current state of knowledge and experience of the operators and supervisors as indicated above;

- 
- That DOE accelerate implementation of a configuration management program to help assure that as-built drawings of safety-related systems are available for training of operators and supervisors in procedures and for discipline of operations (e.g. valve line-ups); and
  - That the operators and supervisors be qualified in use of the revised procedures that will be in place for normal operations and for emergency situations.

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 Board has requested quarterly reports on DOE's progress in implementing Recommendation 90-1. The Secretary intends to issue a supplement to the implementation plan on February 6, 1991; the supplement is intended to rectify deficiencies which the Board has identified in the initial response and implementation plan for Recommendation 90-1. The Board will recommend any necessary corrective action to DOE on its final implementation plan and continue to monitor DOE progress in the area of operator training at Savannah River during the coming year.

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

The Board's enabling legislation requires review and evaluation of the content and implementation of standards relating to the design, construction, operation, and decommissioning of DOE defense nuclear facilities, including all applicable DOE orders, regulations, and requirements. Based on these reviews, the Board is required to make recommendations on necessary changes in the content and implementation of such standards, as well as matters on which additional data or research is needed, to ensure that public health and safety are adequately protected.

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, 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 at these facilities. The Board received the Secretary of Energy's response on June 11, 1990, containing a commitment that the Department's Task Force on Nuclear Safety Directives would establish a DOE-wide foundation for nuclear safety requirements at all DOE defense nuclear facilities. Based on Board comments on

---

DOE's response, DOE 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. As discussed later in this report, the Secretary has changed and strengthened the arrangements for managing DOE's nuclear standards program and provided a briefing to the Board pertaining to those modifications.

**c. Recommendation 90-3, 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 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. 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. These led to certain recommendations:

- That a study be undertaken of the possible chemical reactions that could be the source of heat generation locally or globally in the single-wall tanks, thereby elevating the temperature to a level where explosive ferrocyanide reactions can take place rapidly.
- That the DOE develop a program for continuous monitoring of those conditions in the single-shell tanks that can serve to indicate development of conditions indicating an onset of instability in their contents. These conditions might include such features as abnormal temperatures in local areas, physical deformation of

---

the surface of the waste, or unusual components of the surface of the waste, or unusual components (including hydrogen) in the cover gas within the tanks.

- That the instruments used in monitoring the tanks be provided with alarm indicators at a location where decisions can be made and action taken to start a series of measures to neutralize a perceived abnormality.
- That an action plan be developed for the measure to be taken to neutralize the conditions that may be signaled by alarms.

The Recommendation also stated that the Board considers the conditions in the double-walled tanks experiencing slurry growth and associated hydrogen generation to be potentially serious.

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, as discussed later.

**d. Recommendation 90-4, Operational Readiness Review at 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.

In May 1990, the Board issued Recommendation 90-4 which urged that DOE conduct an operational readiness review at Rocky Flats prior to resumption of plutonium processing operations. The Board recommended that the readiness review 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 modification of vital safety systems and 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 outage periods.

In June 1990, DOE accepted this recommendation. The Board reviewed a draft implementation plan, and on September 24, 1990, provided comments for the plan's improvement prior to DOE's issuance of the final plan.

**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. The Board recommended that the Rocky Flats SEP address all outstanding safety issues and include, but not be limited to, consideration of the following items:

- Effects of several external events, with particular emphasis on seismic events and high winds;
- Effects of severe internal events, with particular emphasis on fire;
- Ventilation system performance under severe external and internal events, including redundancy considerations;
- Interaction of equipment and structures due to severe internal and external events; and

- 
- The basis and procedures for making backfit decisions on which the facility changes identified under the new program will or will not be implemented and, where appropriate, the schedule for completion of these improvements.

In June 1990, DOE accepted this recommendation. The Board, its staff, and DOE met several times during the summer regarding the development of DOE's implementation plan, which was submitted on October 17, 1990.

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

In June 1990, the Board issued Recommendation 90-6 which recommended that DOE prepare a written program with commitments 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. The short-term objectives of the recommended action are to prevent a criticality accident and to make an initial reduction in the amount of fissile material in these ducts to protect the public health and safety. The long-term objective of the DOE program is to remove or substantially reduce the remaining amount of fissile material in the ducts. This program should also address and include the following:

- Description of remediation actions, including the scheduling and basis for same, that are deemed necessary prior to resumption of plutonium operations by DOE.
- Descriptions and justification for non-destructive assay techniques, calibration, modeling, and assay methodology.
- Estimation of radiation levels in areas of occupancy, both from gamma rays and fast neutrons.
- Determination of the effects of accumulation of fissile and other materials on the functionality of the ventilation ducts and related systems which must act to protect the health and safety of the public, including plant operating personnel.
- Description and justification of procedures and schedules, both short term and long term, for removal or reduction in amount and concentration of existing fissile and other unidentified debris in the ventilation ducts and related systems.
- Determination of any design and operational changes in the ventilation ducts and related systems necessary to prevent further accumulation of significant amounts

---

of fissile and other materials therein and to ensure continued operability of systems installed to protect the health and safety of the public including plant operating personnel. This includes a thorough study of the glovebox filters and ventilation and alarm systems.

- Establishment of a monitoring program for the ventilation ducts and related systems to establish that design and operational changes and modifications are effective in preventing significant additional accumulation of fissile and other materials.

In July 1990, DOE accepted this recommendation. Members of the Board visited Rocky Flats several times subsequent to receipt of the response and discussed aspects of the problem. DOE's implementation plan was submitted on November 11, 1990.

**g. Recommendation 90-7, Safety at the Single-Shell Hanford Waste Tanks**

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 made a number of additional recommendations, that were more specific than those provided in Recommendation 90-3:

- Immediate steps should be taken to add instrumentation as necessary to the single-shell tanks containing ferrocyanide that will establish whether hot spots exist or may develop in the future in the stored waste. The instrumentation should include, as a minimum, additional thermocouple trees. Trees should be introduced at several radial locations in all tanks containing substantial amounts of ferrocyanide, to measure the temperature as a function of elevation at these radii. The use of infra-red techniques to survey the surface of waste in tanks should continue to be investigated as a priority matter, and on the assumption that this method will be found valuable, monitors based on it should be installed now in the ferrocyanide bearing tanks.

- 
- The temperature sensors referred to above should have continuous recorded readouts and alarms that would signal at a permanently manned location any abnormally high temperatures and any failed temperature instrumentation.
  - Instrumentation should also be installed to monitor the composition of cover gas in the tanks, to establish if flammable gas is present.
  - The program of sampling the contents of these tanks should be greatly accelerated. The proposed schedule whereby analysis of two core samples from each single-shell tank is to be completed by September, 1998, is seriously inadequate in light of the uncertainties as to safety of these tanks. Furthermore, additional samples are required at several radii and at a range of elevations for the tanks containing substantial amounts of ferrocyanide.
  - The schedule for the program on study of the chemical properties and explosive behavior of the waste in these tanks is indefinite and does not reflect the urgent need for a comprehensive and definitive assessment of the probability of a violent chemical reaction. The study should be extended to other metallic compounds of ferrocyanide that are known or believed to be present in the tanks, so that conclusions can be generalized as to the range of temperature and other properties needed for a rapid chemical reaction with sodium nitrate.
  - The Board had recommended "that an action plan be developed for the measures to be taken to neutralize the conditions that may be signaled by alarms." Two types of measures are implied: actions to respond to unexpected degradation of a tank or its contents, and actions to be taken if an explosion were to occur. Your implementation plan stated that "the current contingency plans ... will be reviewed and revised if needed." We do not consider that this proposed implementation of the Board's recommendation is adequately responsive. It is recommended that a written action plan founded on demonstrated principles be prepared as soon as possible, that would respond to indications of onset of abnormal temperatures or other unusual conditions in a ferrocyanide-bearing tank, to counter any perceived growth in hazard. A separate emergency plan should be formulated and instituted, covering measures that would be taken in event of an explosion or other event leading to an airborne release of radioactive material from the tanks, and that would protect personnel both on and off the Hanford site. The Board believes that even though it is considered that the probability is small that such an event will occur, prudence dictates that steps be taken at this time to prepare the means to mitigate the
-

---

unacceptable results that could ensue. On December 3, 1990, the Secretary accepted the recommendations in 90-7. The Board is now awaiting the implementation plan.

## **2. Board Criteria for Judging the Adequacy of DOE Responses and Implementation Plans**

In addition to issuing seven sets of health and safety recommendations during 1990, the Board developed a policy statement which established criteria for reviewing the adequacy of DOE responses to recommendations and of subsequent DOE implementation plans.

The Board issued its first formal policy statement entitled "Criteria for Judging the Adequacy of DOE Responses and Implementation Plans for DNFSB Recommendations," on October 19, 1990. The statement will guide the Board and its staff in evaluating the adequacy of DOE responses and implementation plans, as well as assist the Board in structuring appropriate follow-up action in the event a recommendation is not fully or adequately addressed in DOE's response and implementation plan. Furthermore, the statement formally identifies, for the benefit of DOE and the public, the Board's expectations regarding the elements the Board believes are necessary for an adequate response and implementation plan. Due to the importance of this policy statement to the continuing operation of the Board, a copy is appended as Attachment I-2.

## **3. Public Hearings, Public Comment, and Interaction with Board**

From the start of operations in the Fall of 1989, the Board has been sensitive to the need for public involvement and awareness of defense nuclear issues. The Board's enabling legislation contains a detailed outline of the formal process whereby the Board makes recommendations to the Secretary of Energy for his consideration, and promptly publishes each recommendation in the Federal Register for public comment. Each recommendation to the Secretary is published in its entirety in the Register, triggering a 30-day public comment and a 45-day period for receiving the Secretary's written response to the Board's recommendation. The response of the Secretary is also published in the Federal Register with an additional 30 days for public comment on the Secretary's response. The Board has carefully adhered to these requirements during the development of its seven sets of recommendations during 1990, and has considered all of the comments received.

---

Consistent with its public health and safety mandate, the Board has also provided opportunities for interested groups or persons, both public or private, to express their concerns about the DOE facilities directly to the Board members in informal and in open discussions near the sites. These discussions were held with federal, state, and local officials, labor leaders, DOE facility workers, and area residents to exchange information and to assure that the Board's review plans were known to all parties. The Board conducted the first of these public discussions in Boulder, Colorado, in January 1990, regarding the Rocky Flats Plant. During this discussion, the Board listened to comments and accepted information from a wide range of participants, including union representatives, environmental groups, state officials, and concerned residents and workers. Additional public discussions with the Board Members on public health and safety concerns at Rocky Flats were held in Boulder, Colorado in February and May 1990.

The potential danger to the public of the Hanford waste storage tanks has been a matter of concern to the communities in and around Richland, Washington. During the Board's visits to the area on April 10-11 and July 12, 1990, members of the Board met with the press and interested members of the public to exchange information concerning the problem. The several detailed DOE and contractor briefings of the Board and its expert advisors have included, by invitation of the Board, representatives of the Governors of Oregon and Washington, in addition to the State and Federal Environmental Protection Agencies and the GAO to insure that responsible government officials are fully informed.

In June 1990, the Board held a public hearing in Aiken, South Carolina, on Recommendation 90-1 concerning the training of reactor plant operators and supervisors at the Savannah River site. This hearing was attended by local citizens, employees of the facility, environmental groups, and local officials, as well as DOE officials and their contractor for the site. Interested persons or groups were invited to present comments, technical information, or data pertaining to the Board's recommendation on this subject or the Secretary of Energy's response to this recommendation.

In August 1990, the Board held a public hearing in Westminster, Colorado to receive additional public comments, technical information, and data on Recommendations 90-2, 90-4, 90-5, and 90-6 regarding DOE's Rocky Flats Plant, and on the Secretary of Energy's response to these recommendations. These recommendations covered such issues as the specific standards applicable to the design, construction, operation, and decommissioning of specific buildings at the Rocky Flats Plant, as well as criticality safety in ducts and related systems at the plant, the operational readiness review, and

---

---

the systematic evaluation program. Presentations were made by DOE and its contractor. Approximately 200 people attended this evening public hearing, with 23 groups or individuals filing additional statements with the Board.

As required by law, the Board has promptly sent all its recommendations to the Department of Energy's regional public reading rooms. To ensure that the Board's recommendations are readily available to the public, the Board's staff has confirmed their availability in the reading rooms.

The Board has accumulated extensive technical files that are open to public review at the Board's offices in Washington, D.C. Numerous requests for documents have been met by the Board's staff on a routine basis. In the first year of operation, the Board logged more than 1,300 documents, and has responded to more than 60 oral or written requests for information concerning the Board's health and safety reviews.

#### **4. Official Site Visits**

From the establishment of the Board in October, 1989 through December 31, 1990, Board Members, its staff, or its contractor experts have made 64 site visits to DOE defense nuclear facilities. 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 Site, and the Waste Isolation Pilot Plant. Board Members have also visited 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 to begin the Board's initial assessment of health and safety issues at these facilities.

The Board has reviewed firsthand the health and safety issues at each of these sites. In 1990 the Board spent more than 20 percent of its time in travel associated with these reviews. During these visits, the Board has attempted to avoid unduly interfering with DOE's program to manage the site or facility, while preparing the basis for its recommendations to the Secretary of Energy and monitoring the implementation of recommendations that have been made.

---

## B. 1991 PLANS FOR EXPANSION OF ACTIVITIES

The Board intends to expand its activities during 1991 within the scope of its current jurisdiction. During its first year of operation the Board coordinated its activities with priorities of the Secretary of Energy and the Congress. This action resulted in the Board focussing 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. 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 seven sets of recommendations issued by the Board. Continuation of Board review of operations at the four sites listed above is expected to result in further recommendations.

Issues requiring Board attention at the SRS in 1991 include, but are not limited to, standards, seismic design, training of plant operators, waste operations and storage, discipline of operations, vessel and piping integrity, thermal hydraulics, closure items, and reactor power level. 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.

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

- Non-reactor facilities at the Savannah River 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
- Idaho National Engineering Laboratory (INEL)

The Board has also begun a review of the DOE design criteria for the New Production Reactor. As required by law, the Board intends to review DOE standards relating to the

---

---

design, construction, operation, and decommissioning of other DOE facilities, paralleling its current standards evaluation program at the SRS, the Rocky Flats Plant, the Hanford Site, and the Waste Isolation Pilot Plant. The Board's standards evaluation will include an assessment of the development and implementation of standards for common natural phenomena such as earthquakes and floods, at all DOE defense nuclear facility sites.

Should an imminent or severe threat to public health and safety be identified at a DOE facility, the Board will respond and change the priorities of other work as necessary. 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 assessing priorities, the Board also will continue to consider problems brought to its attention by members and staff of Congress, GAO, and the public.

The Board's ability to expand its coverage is directly related to DOE 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.

In establishing its oversight program, the Board gives particular attention to those important functions such as review of the adequacy and implementation of safety standards, which are mandated in the legislation. Also, the Board makes a special effort to evaluate issues which appear to be generic in nature. Examples are lack of adequate training, lack of written procedures, or a lack of formalized disciplined approach to the operation of facilities and safety to workers.

## **C. 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 a year. The Board has worked with DOE during this period to develop an understanding of what the Board believes are adequate responses and implementation plans for its recommendations. While some progress has been made in the limited number of problem areas identified by the Board, or addressed by DOE on its own initiative, major safety and health issues remain. DOE acknowledges the serious nature of these problems. In a recent letter to the President, dated December 21, 1990, the Secretary of Energy stated:

Many of the Department's facilities have safety deficiencies that impair our ability to ensure the health and welfare of both our workers and the public. These include nuclear facility safety analyses that are out of date, flawed in their analytical methods or conclusions, and inadequate to demonstrate the required degree of protection from nuclear safety hazards. Without valid justification for continued operations, including upgraded operational practices, it is very possible that many more nuclear operations within DOE will be curtailed temporarily or permanently. In some cases, facilities that are no longer operating continue to pose safety and health risks. . . . Other deficiencies involve nonconformances with basic Occupational Safety and Health Administration standards for industrial safety, as well as fundamental tenets of radioactive contamination controls. . . .

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 the outstanding health and safety problems identified by others, 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**

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 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 assessing the performance of contractors, 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, too, has encountered problems similar to those encountered by DOE. The similarities are 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.

**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 always found it difficult to develop and implement 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 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 Nuclear Regulatory Commission. The Board's assessments of DOE nuclear standards include appropriate comparative evaluations of DOE standards and requirements with those of the NRC. 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 directives that are substantially more numerous than the rules planned for issuance. DOE recognizes both the need for rules and for 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 protracted formal processes.

Beyond the problem of developing the rules and directives themselves, there is 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 structures or otherwise compensating for inability of those facilities to meet current standards. This policy would be similar in purpose to the "back-fitting" policy used by NRC for commercial nuclear power plants.

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

The Board's endeavors to ensure the health and safety of the public are channeled most directly through its process of issuing formal recommendations to the Secretary of Energy. Nevertheless, this is not the only way in which the Board's actions and activities have had an impact on the status of nuclear safety in the Department of Energy. 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.

In the following sections, improvements are listed in which Board recommendations, actions, and activities played substantial parts. 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.

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

#### **a. Operator Training**

The emphasis which the Board has assigned to the qualifications and training of operators at the Savannah River production reactors and of workers at the plutonium fabrication facilities at the Rocky Flats Plant has contributed to raising qualification requirements and strengthening training programs and methods at both sites. As a consequence, DOE sees the need to give more attention to such matters across the full range of its defense nuclear facilities.

At the Rocky Flats Plant, the Board reviewed DOE and contractor progress in preparing training course materials, establishing level of knowledge requirements for operator qualification, and developing revised operating procedures. The Board determined that procedures had been prepared without first insuring that the configuration of the process work areas covered by the procedure was correctly taken into account. These discrepant procedures, therefore, had to be revised extensively. Similarly, training materials prepared, and training conducted based on those procedures, had to be redone. DOE and the contractor are now developing procedures and training materials in a more systematic manner.

#### **b. Operational Readiness Reviews**

The Board has found numerous safety-related deficiencies at the Rocky Flats Plant. Those deficiencies lead to a need for a comprehensive operational readiness review prior to resumption of operations, a step that the Board has recommended in Recommendation 90-4, which is described in this report.

---

The Board called special attention to the need for a readiness review group composed of experienced individuals whose backgrounds collectively include all facets of the unique operations involved. The names and qualifications of these individuals will be carefully reviewed by the Board.

Board evaluations of operator knowledge at Rocky Flats included reviews of examinations and also interviews of a number of operators. Based on these evaluations and those at SRS, the Board recommended that the readiness review include assessment of operator knowledge both as shown by written examination and also by selective oral examination of operators by members of the review group. The Board attaches special importance to oral examinations because they often disclose weaknesses not evident from the written examination process.

DOE has informed the Board that it also intends to carry out an operational readiness review prior to restart of the reactors at SRS.

**c. Standards**

Activities of the Board have contributed to DOE's increased attention to the development and use of standards for defense-related nuclear facilities. The impetus given by the Board is in part a result of two factors: (1) the requirement in the law that the Board review and evaluate the content and implementation of DOE standards including all applicable DOE Orders, regulations, and requirements at each of the DOE defense nuclear facilities and (2) widespread awareness of inadequacies and non-uniformities in the content and use of DOE Orders and standards affecting public health and safety.

The Board's approach has been two-fold: (1) a comprehensive review of safety standards and requirements for all DOE defense nuclear facilities as required and, (2) an immediate focus on standards at those facilities having high priority.

The Board has contracted with the MITRE Corporation for technical assistance in its review of DOE standards. Under the Board's direction, the contractor developed a comparative review of safety standards in DOE Orders and Savannah River Supplements

---

and the corresponding requirements for nuclear facilities regulated by the U.S. Nuclear Regulatory Commission (NRC). The comparative review included the following safety areas:

- design standards
- quality assurance
- safety analysis
- operations
- fire protection
- maintenance
- radiation protection
- radioactive waste management
- emergency planning
- safety issue identification, notification and resolution.

The contractor's Report to the Board identified numerous desirable corrective actions for the standards and requirements program and was transmitted in draft form to the Secretary of Energy and the Chairman of the NRC for comment on June 8, 1990, and in final form to DOE on November 2, 1990. The Board received comments on the draft Report from both DOE and NRC. The Board is currently evaluating the final report and considering what recommendations or other actions are appropriate in light of the Report. MITRE has also been tasked to support the Board and its staff in extending this initial assessment to cover, in sequential fashion, DOE's standards and requirements efforts at other defense nuclear facilities, including review of the means of implementing DOE requirements used by the Management and Operations contractors of DOE facilities. This assessment effort continues at Savannah River and is underway at the Rocky Flats, Hanford, and WIPP sites.

The second approach in the Board's standards effort, directed toward high priority facilities, was initiated by its Recommendation 90-2, referred to in an earlier section of this report. The Secretary stated his agreement with the thrust of the recommendation and later provided an implementation plan and schedule.

The actions recommended by the Board to correct the deficiencies in DOE's safety standards constitute a formidable task which will require much time and effort to complete. It will be even more difficult to assure that standards are effectively implemented at DOE defense facilities in design, construction, operation, and decommissioning. Nevertheless, that implementation is required in the new and improved safety culture which the Secretary is endeavoring to establish in DOE.

---

---

The Secretary has committed to placing safety standards on a sound foundation for DOE defense nuclear facilities. To this end, he has reorganized DOE management in an effort to focus responsibility, assigned higher priority to standard development, and kept the Board informed of actions being taken.

**d. Discipline of Operations**

Operations are conducted in a disciplined manner when facilities are constructed in full accordance with approved plans and instructions; when drawings accurately portray the facilities as they actually have been built; when approved procedures are available and are used for testing, operation, and maintenance; when training and qualification of operators are accomplished using these procedures; and when quality assurance activities provide independent confirmation that all the foregoing have been and are being accomplished. Improvements have been made in the discipline with which facilities are being readied for resumption of operations at the Savannah River reactors and the Rocky Flats plant.

Following are some examples. At Rocky Flats the Board ascertained in May 1990 that the operator and DOE did not plan to verify the operability of all systems as a prerequisite to the contractor stating his readiness to resume operations. As late as October, 1990, the plans for activities required for approval of resumption of plutonium operations included only tests of modified equipment and verification of the operability of parts of some systems stated as essential in the existing Final Safety Analysis Report. Thorough checkout and operational tests of equipment were to have been postponed until after approval by DOE to resume plutonium operations. Subsequently, and after questioning by the Board, DOE decided that all equipment that could reasonably be operated would be tested before resumption of operations is approved. This will bring Rocky Flats practice in conformity with commercial practice for resuming operations after a lengthy outage.

There is a process, used in the commercial nuclear field, called configuration control. That process includes maintaining the drawings and written descriptions of the plant and its components and keeping them up to date. For older plants it was necessary to confirm that the configuration of the plant was correctly reflected by the drawings and the descriptions and, where this was not the case, to correct the erroneous information. This process is called configuration control.

At Rocky Flats the Board found that the contractor's program to confirm the validity of the as-built configuration of systems, essential to satisfying the requirements for the

---

---

Final Safety Analysis Report, was flawed. Subsequent to this finding, DOE and the contractor replaced the existing program with a new one and the Board will evaluate the new program's adequacy.

At Savannah River it was observed that there was no adequate plan for systematically transferring operational control of systems and equipment to the Reactor Operations Department at the completion of outage work. The Board's continuing queries about this problem were a factor in the development of a procedure for establishing proper system conditions for operation following an outage.

Also at Savannah River reactors, it was observed that there had been a pattern of failure to maintain a current master copy of drawings and diagrams as plant modifications were made over a span of several years. The contractor had developed an ambitious plan to correct this deficiency. As a result of the Board's review, the contractor introduced priorities into this plan. The sequence of corrective actions has now been focused in such a way as to better support restart, by placing greater and earlier emphasis on those system diagrams and descriptions needed to develop operating procedures and to prepare plans and materials for training.

**e. Seismic Engineering for Nuclear Waste Tanks**

The Board is examining 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, and the remainder of the DOE complex.

The design, construction, and contractor evaluations of the nuclear waste tanks at the Savannah River Site and the Hanford Site are being examined to assess the adequacy of these tanks to resist seismic events. This requires establishing the standards which were used for the original design and construction and those used for upgrades and modifications. The Board and its experts will continue this activity; to date, the activity has been effective in impressing upon DOE the importance of adequate designs.

At the Board's suggestion, DOE has initiated an effort to develop a common rationale for the design, construction, operation, maintenance, and decommissioning of nuclear waste tanks across the complex. Seismic engineering is the first focus. This was initiated by a workshop involving the Board, the Savannah River Site, the Hanford Site, the Oak Ridge Site, the Idaho Site, the West Valley Site, and DOE Headquarters. Continuing this activity will enhance nuclear safety across the complex. The Board is reviewing the design and construction of the new waste tanks being constructed at the Idaho Site.

---

---

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

##### **a. Systematic Evaluation Program**

It is expected that DOE's actions related to establishment of a Systematic Evaluation Program (SEP) at Rocky Flats and at the Savannah River Reactors will result in significant safety improvements if these programs are suitably implemented. The purpose of such programs is to provide a framework within which long term safety improvements to existing facilities can be evaluated, coordinated, and prioritized, taking into account, among other factors, the length of time the facility will continue to be operated. This addresses the problem referred to earlier, of devising a process for upgrading old facilities that were not built to meet current standards. The Board recommended on May 18, 1990, that a SEP be established at Rocky Flats (see Recommendation 90-5 above), and was informed by the Secretary of Energy in letters dated June 13 and October 15, 1990, that DOE not only agreed with the Board's recommendation to establish a SEP at Rocky Flats, but also that DOE would, on its own motion, establish and implement a similar program at Savannah River.

In doing so, the Secretary demonstrated that he shared the Board's expectation that establishment and implementation of suitable Systematic Evaluation Programs at the Rocky Flats and Savannah River Reactor Facilities would lead to significant safety improvements.

##### **b. Safety Analyses**

In discussions between the Board Members and representatives of the Rocky Flats contractor, the Board made clear that it does not find the existing safety analyses of the Rocky Flats facilities to be satisfactory or convincing. The analyses develop estimates of the probable annual rate of consequences from accidents, but they do not provide an estimate of the effects of single accidents that are thought to have small though non-zero possibilities of occurrence. Furthermore, the analyses do not extend to the largest of the natural events that are considered possible, such as earthquakes and storms. Finally, in places they assume the mitigating effects of equipment that in a number of cases has been found to be inoperative or unreliable.

As a result of the Board's concerns in this area, DOE and its contractor have convened a group of expert advisers to review and improve the safety analyses. The tentative results of their review of Building 559, the analysis laboratory at Rocky Flats, is presently under review by the Board, its staff, and its technical advisers. It is expected that this

---

review, when extended to the rest of the Rocky Flats establishment, will have a significant impact on safety of the Rocky Flats Plant.

**c. Plutonium Removal Program**

DOE's actions to remove fissile and other material from the duct work at the Rocky Flats Plant will improve nuclear safety. These DOE actions are in response to the Board's Recommendation 90-6. Completion of actions required by the accompanying implementation plan should prevent a nuclear criticality event in the ducts, reduce the potential for adversely affecting the health and safety of the public, and reduce the potential radiation exposure to the plant work force. Included in the actions are an ALARA (as low as reasonably achievable) program. Hence, safety will be improved at the site.

**d. Seismic Engineering Programs**

The Rocky Flats facilities were designed and constructed using early building codes and standards. Several seismic and structural upgrades have been implemented over the years to improve seismic safety. However, these upgrades have not been implemented through a systematic review and evaluation. As part of DOE's response to Recommendation 90-5, the seismic capabilities and upgrades are to be assessed and improvements undertaken as necessary. Proper implementation of this program should improve safety at the site.

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

The Board has concentrated on several technical issues that require resolution prior to restart. These are, primarily, operation of the Emergency Cooling System (ECS), the integrity of the vessel and piping systems containing the coolant for the reactors, and the ability of the reactors to resist seismic events. Other technical issues are also under review: the adequacy of the probabilistic safety assessment and the insights to be gained from it, the reliability of the electronics used for control and safety systems, and the character and adequacy of the Supplementary Safety System (SSS). The Board has also been giving careful attention to the closure of the numerous issues that the Savannah River contractor has identified as requiring resolution before restart and later, and to Unusual Occurrence Reports arising from operations about the reactors. The focus by the Board on all of these matters has had a significant impact on the attention being devoted to them by DOE and its contractor.

---

**a. Emergency Cooling System**

The effectiveness of the ECS to cool the reactor after an accident caused by breaking of a large pipe would depend on the power level of the reactor over the period preceding the accident. If that power level were too high, the effectiveness of the ECS would not be sufficient to prevent damage from being so severe as to destroy the core of the reactor, with extensive release of fission products. It is important to determine a maximum power level at which the reactor can be allowed to operate without risking such a result. Members of the Board and its staff and technical experts have had numerous briefings by personnel represented by DOE and its contractor, to explore the technical basis for a maximum power level for future operation of the Savannah River reactors. This crucial issue has not yet been resolved to the satisfaction of the Board, and DOE and its contractor are being pressed to provide and justify a high level of assurance.

**b. Vessel and Piping Integrity of the K, L, and P Reactors**

The vessels to contain the cores of the K, L, and P reactors are being examined by ultrasonic means to determine if they have flaws or cracks that might grow to become leakage paths for the reactor coolant. Similar ultrasonic examination is being made of the stainless steel piping in the process water system. Members of the Board, its staff, and its technical experts have met frequently with representatives of DOE and its contractor to ascertain the methods and the results of these examinations. A meeting was held with members of an expert review committee which DOE had convened to advise on the adequacy of this program. The Board has not yet reached a judgment relative to the adequacy of the examinations and the acceptability of their results. Nevertheless, the recognition that the Board considers this general topic to be one that must be resolved prior to restart has increased the attention being given to it by DOE and its contractor.

**c. Seismic Engineering**

Since the formation of the Board, considerable Board attention has been focused on the ability of the K, P, and L nuclear reactors at the Savannah River Site (SRS) to resist seismic and other external events. Considerable efforts are being made by DOE's contractor to confirm and establish the seismic design adequacy of these nuclear reactors prior to restart. Members of the Board and its staff meet with DOE and its contractor on seismic topics at least once a month. This allows a detailed examination and understanding of the seismic program and upgrades being implemented by the DOE.

---

---

Both a short-term and a long-term detailed seismic engineering program had been established at the Savannah River Site prior to the formation of the Board. The Board has been effective in enhancing safety by careful examination of the details of the SRS program. As a result, DOE has moved to adjust and accelerate the program. Included in these actions for safety enhancements are:

- Acceleration of the procurement of seismically upgraded containment filters and installation of the upgraded filters as soon as available. The new filters are expected to be available in approximately 18 months (42 months previously).
- Continuation of the efforts to upgrade the current filter design by means of bracing and testing, during the short term pending procurement of new design filters.
- Acceleration of the walkdown of the confinement system to begin no later than July 1, 1990. The modifications resulting from these walkdowns would be initiated prior to restart and the modifications would be complete in the 3 year time frame (5 years previously).
- Implementation of a soils characterization program at SRS. Comments concerning "grout take" tests and "resonant column" tests will be incorporated into the work, and the Board will be kept informed on the status and results of this effort.
- Performance of additional analysis of the cooling water basin. This analysis was to be completed in approximately 5 months.
- Performance of stress analyses of the cooling water system piping and other safe shutdown system piping prior to restart and keeping the Board informed on the status of this effort.
- Documentation of the bases for selection of the Design Basis Earthquake at a level of content similar to Section 2.5 of commercial reactor safety analyses reports. This documentation will include the evaluation of the Pen Branch fault.
- Provision of an expanded evaluation of the margins of safety indicated by calculations for the allowable bearing pressure under the basement of the Stack and Reactor buildings.

- 
- Establishment of a baseline for applicability of codes, standards and engineering practices applied in the restart effort. This effort will include review of past and current activities to preclude inappropriate use of partial code requirements.
  - Review and revision of the load combinations for seismic evaluation to assure that loadings typically analyzed under an operating basis earthquake loading for commercial reactors are adequately considered.

Recommendation 90-5 resulted in the development and establishment of a Systematic Evaluation Program at the Rocky Flats Plant. In its response to the Board for this recommendation, DOE also committed to develop and establish a Systematic Evaluation Program at the Savannah River Site. Included in this program will be the long term seismic engineering program.

#### **6. Board Activities Leading to Improvements at the Hanford Waste Tanks**

Two safety problems stand out at the Hanford Site regarding storage of high level waste from reprocessing activities in the past. The first concerns certain single shell tanks which contain a ferrocyanide residue from extraction of fission product cesium a number of years ago. It was suggested some years ago that under certain circumstances the ferrocyanide might explode, causing large amounts of residue containing fission products to be ejected from the tanks. The second problem involves some double-walled tanks, where a phenomenon known as slurry growth occurs. This process is especially pronounced in one tank, 101-SY, where periodically large amounts of hydrogen and the oxidant nitrous oxide are generated and released. This mixture is flammable, and potentially explosive. At least partly in response to concerns expressed by the Board's members, staff, and technical experts during a number of discussions over the past year, DOE has assembled a high level advisory group to monitor all issues concerning high level waste tanks at DOE establishments, and has formed a project staff to oversee the programs for resolution of problems. The Hanford contractor has reorganized and elevated the importance of the groups assigned to surveillance of high level waste tanks and resolution of problems associated with them.

##### **a. Single Shell Tanks**

The Board's activities regarding the single shell tanks containing ferrocyanide compounds are discussed in other sections of this report. Two sets of recommendations on the single shell tanks, numbered 90-3 and 90-7, were transmitted to the Secretary of Energy during the year. In effect, it was pointed out that the Board considered the

---

---

probability of an explosion in the ferrocyanide tanks to be low, but in the light of consequences that might be high, recommended an extensive monitoring program to ensure that conditions increasing the chance of an explosion will not develop. More extensive sampling of the contents of the tanks and enlargement of a related research program needed for better evaluation of the probability and consequences of an explosion were also recommended. The research is especially needed because of the results of a GAO-sponsored review of the single shell tank issue, which found that the consequences of an explosion in these tanks could be greater than the DOE and the contractor had earlier believed. The DOE and the Hanford contractor are now committed to introducing the monitoring, sampling, and research programs recommended by the Board. The Board continues to follow this program, and in discussions between some of its members and the DOE staff has made it clear that the schedule for implementation as it has been formulated so far is not rapid enough.

**b. Double-Walled Tanks**

Although the slurry growth problem was recognized internally by the Hanford establishment, it was questions by the Board's technical experts that brought it out into the open and led to an intensive program to address it. The technical problem of resolving this slurry growth issue has been made more difficult by the inability to identify a single specific phenomenon as its cause, and by uncertainty as to the chemical composition and physical distribution of material within the tanks, especially 101-SY. In particular, it is necessary to make sure that the thick crust in the tank does not have a chemical composition that might also cause the crust to ignite or explode if a hydrogen event took place. In discussions with representatives of the DOE and the Hanford contractor, members of the Board have made it clear that they believe sampling should be done as soon as possible, to find out why the slurry growth phenomenon occurs and to lay to rest any concerns that the crust may burn or explode. Samples have now been taken of the surface of the crust and they show that if the remainder of the crust has the same composition as the surface, concerns as to its adding to any explosive release are allayed. The Board is still of the opinion that the implementation of the sampling program at Tank 101-SY is too slow, and that it is being delayed by a safety analysis process that is too complex.

**7. Secretary of Energy's Initiative to Improve Safety and Health Programs at DOE**

There are a number of areas where the Secretary of Energy has independently attempted fundamental improvements in DOE's health and safety culture. In September of 1989, the Secretary issued Notice (SEN-11-89), "Setting a New DOE Course". This Notice

---

---

established a comprehensive set of objectives, many of which must be achieved to assure protection of public health and safety at defense nuclear facilities. These objectives provide a useful framework against which to measure DOE safety accomplishments in the future.

Addressing the issue of DOE accountability for such matters as health and safety, the Secretary noted that "the very large majority of our work in the field is actually carried out by contractors." "But," he continued, "this fact in no way relieves DOE managers of their governmental responsibilities to assure that contractors' primary duties are performed in accordance with expected high standards of professional excellence." This acknowledgement of DOE responsibility is of fundamental importance to assuring health and safety. It is a much-needed reversal of traditional DOE perceptions and practices, which placed inordinate reliance on contractor intentions and capabilities. During 1990, the Secretary and key management made significant progress in developing recognition among DOE staff of their responsibilities for health and safety.

The Notice emphasized the need for Federal employees in line managers to have sufficient skills. "Accordingly," the Secretary wrote, "I intend to establish permanent positions and put in place DOE people with capabilities necessary to support line managers in the execution of their oversight responsibilities in both field and headquarters positions." It is evident to the Board that during 1990 many well-qualified individuals have been added to DOE defense nuclear organizations, both from outside DOE and by reassignment from within DOE. Also, the Secretary has established a new organization to strengthen the acquisition, training, and development of such personnel. DOE cannot be expected to bring technical capabilities of DOE defense nuclear organizations up to needed levels in a year's time. Rather, where appropriate technical strength has been achieved in DOE, as, for example, in the Naval Reactors organization, the effort to reach this goal has been sustained over a period of years by determined top management, giving priority attention to personnel selection and training.

Another objective of the Secretary was to "[s]trengthen independent internal oversight responsibilities within Environment, Safety, and Health (ESH) and other designated offices ... as required to monitor effectiveness of DOE management in execution of policies set by DOE, particularly in areas of environment, safety, health, and security." Progress toward achieving this objective has been evident. For one thing, there is improved understanding of the proper relationship between line organizations in achieving safety and health objectives, and the internal oversight organizations in providing independent confirmation that objectives are being pursued or have been achieved.

---

Complementing the objective concerning internal oversight, the Notice called for effort to "Work constructively with external oversight bodies to build a system that will provide proper external checks of the Department's line and oversight management practices." In working toward this objective the Secretary, key managers, staff, and contractors have all given the Board their full cooperation.

The Notice called attention to the need for a "major overhaul" in the DOE's system for reporting, analyzing, and following up on abnormal situations affecting, or with the potential for affecting, environment, health, safety, and security. The stated purpose was to "minimize unwarranted surprises and maximize operational effectiveness." A new system was developed promptly and promulgated by DOE Order 5000.3A on December 21, 1990. Progress toward effective implementation has been observed and the Board has called DOE's attention to areas where further progress is needed.

The requirement for a strong incident reporting system as set forth in the DOE Order is itself a significant safety step forward. It has the potential for providing both DOE and contractor management with a tool of major importance in assuring safe operation of defense nuclear facilities. Although this potential has been well known in principle, DOE and its predecessors had not taken advantage of it previously.

### **C. Administrative and Management Issues**

While addressing the complex task of selecting both the DOE sites and the safety issues at these sites on which the Board concentrated its early reviews and evaluations, the logistics associated with the organization of a new Executive Branch establishment proved to be equally challenging. Issues such as personnel hiring authority, office space, records management, procurement of technical experts, and travel to DOE sites required immediate attention if the Board was to quickly initiate its health and safety review activities.

During 1990 the Board made significant progress in building the support structure needed to ensure that the management and administrative necessities of a new organization were properly in place to support the full range of technical review activities required in our enabling legislation.

#### **1. Budget**

The Board's fiscal year 1990 funding availability was \$8,865,000. Obligations totaled approximately \$6,956,000 and were divided into four major categories:

- 
- Salaries and benefits totaled \$1.4 million or nearly 20 percent of all expenditures.
  - Fixed costs, such as building rents and utilities, and other support costs, such as postage, telephones and telecommunications, data processing and printing, and supplies and materials amounted to \$1.5 million or about 22 percent of obligations.
  - Contracts, primarily for technical expertise and interagency support agreements, amounted to \$3.9 million or almost 56 percent of obligations.
  - Travel to the DOE defense nuclear facilities for site reviews and investigations totaled \$168,000.

## **2. Recruitment of Technical Personnel**

One of the most critical administrative challenges that the Board encountered during "start-up" was the recruitment of senior scientific and engineering staff with expertise in one or more fields, as well as experienced administrative personnel.

As a starting point, the Board arranged for the temporary use of two senior managers and a senior trial attorney from the Federal Energy Regulatory Commission to plan and organize the required administrative support functions of the Board. The Board entered into an interagency support agreement with the General Services Administration for logistical support in areas such as payroll processing, accounting, commercial payments of vendors, official travel, and the processing of personnel actions. The Board also arranged with the National Science Foundation for support in the preparation of the Board's contracts for technical experts, and with the U.S. Nuclear Regulatory Commission (NRC) for the testing of applicants and employees for illegal drug use.

The task of locating and hiring essential technical personnel proved to be formidable. The technical nature of the work, coupled with a short supply of talent, placed the Board in direct competition with other government agencies and with private industry for individuals possessing the required technical skills. Under these circumstances, the ability to extend immediate job offers to selected individuals with the requisite technical expertise is important to the operation of the Board.

The Board found that the competitive hiring and job classification rules of the Civil Service System could not support the Board's accelerated recruiting program. The

---

---

Board was limited to the salary level for senior scientific and engineering personnel to the GS 15, Step 10 pay level.

In late December 1989 the Office of Personnel Management (OPM) granted the Board temporary direct hire authority as an interim solution to the Board's recruiting problems. While this authority was a step in the right direction, it did not convey some of the benefits of "excepted service" appointments that other technical agencies such as the NRC have used to attract their scientific and engineering staff. The need for this appointment authority and its impact on the Board's ability to build a highly competent staff were emphasized in our FY 1991 appropriations and oversight testimony. 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. That statute now provides the Board with the necessary excepted appointment authority.

The recruitment of scientific and engineering experts will continue to challenge the Board, but considering the serious national health and safety issues that must be addressed, the task of hiring personnel with the prerequisite experience and skill must be a deliberate one. With the "exempted appointment" authority to hire scientific and engineering staff given to the Board by Congress in the FY 1991 Defense Authorization Act, the Board has significantly strengthened its ability to compete with other Federal agencies and the private sector for the talent to properly perform its mission.

### **3. Contracting for Technical Expertise**

The need for scientific and engineering expertise to assist the Board in its oversight of the defense nuclear facilities required the immediate use of specialized contractor experts. During this "start-up" phase, the Board initiated 14 technical contracts with leading experts in such fields as thermal hydraulics, seismic engineering, probabilistic risk assessment, system piping integrity, and safety of waste tanks. Each technical expert with which the Board contracts is carefully screened for possible conflicts of interest.

These experts have provided valuable assistance to the Board on public health and safety issues while the Board actively recruits staff with the desired technical experience to meet the Board's statutory mission. While the Board will continue to make every effort

---

to hire staff as quickly as is reasonable, the technical nature of the subject matter and issues that the Board must address warrant continued use of outside experts.

The Board has a broad mandate to carry out oversight functions to help assure public health and safety. While the Board intends to recruit and maintain a capable and diversified technical staff, it is not practical or desirable to have permanent staff skilled in every specialty for which needs might occur. For example, the evaluation of safety at the Hanford tanks requires, among other factors, a knowledge and understanding of the explosive potential of materials in those tanks. But, such skills are not needed for the Board to make evaluations, except in rare cases. Thus, we see the need on a continuing basis to obtain contractor support in highly specialized areas or other areas where the staff resources of the Board are insufficient.

#### **4. Management Reviews and Audits**

In August 1990, the Board contracted with the Institute of Public Administration (IPA), a not-for-profit entity, for a review of the Board's statutory charter and for recommendations that would foster maximum management effectiveness. The IPA review was conducted by a team of former senior level Federal government officials. The review centered on the Board's start-up activities, including such areas as personnel, procurement, and general administrative services of the Board. Specific attention was focused on the Board's system of internal financial controls.

The IPA review presented the Board with an excellent examination of the areas outlined above. The report contained specific recommendations on areas where the Board could strengthen its operations through internal actions or through legislative initiatives. The Board received IPA's formal written report in November 1990, and is carefully evaluating their findings and recommendations on ways to improve or strengthen the operations of the Board.

#### **5. Litigation**

Shortly after the Board was created, the Natural Resources Defense Council and the Energy Research Foundation notified the Board, on January 23, 1990, that those groups intended to bring suit against the Board for alleged noncompliance with the Freedom of Information Act (FOIA) and the Government in the Sunshine Act (Sunshine Act). When the groups actually brought their civil action in Federal District Court in Washington, D.C. on March 8, 1990, they sought, among other relief, a preliminary injunction enjoining the Board from meeting until the Sunshine Act was complied with,

---

including the promulgation of Board regulations governing meetings pursuant to 5 U.S.C. §552b(g). At the time the complaint was filed, the Board was formulating recommendations regarding the potential for explosion in certain Hanford tanks, and was also considering serious health and safety issues at the Rocky Flats Plant, the SRS, and other defense nuclear facilities. Since injunctive relief would have seriously damaged the Board's ability to ensure health and safety at defense nuclear facilities, the Board and its staff expended considerable time in successfully opposing the imposition of the preliminary injunction.

This case is the only judicial action filed against the Board to date. In the complaint, the plaintiffs requested that the Court declare that the Board (a) was subject to the Sunshine Act but was not complying with any of its requirements; (b) was subject to the FOIA but was failing to promulgate regulations and make agency records available to the public as required by FOIA; and (c) was unlawfully withholding and unreasonably delaying agency action, and was acting arbitrarily, capriciously, and contrary to law, in violation of the APA. Plaintiffs later amended their unconditional demand that the Court enjoin Board meetings until the Board had first published rules. In March of 1990, the Board agreed to treat all FOIA requests for documents as if that Act applied.

On March 30, 1990, the District Court granted the Board's motion for summary judgment and dismissed the complaint, stating neither the Sunshine Act nor FOIA applied to the Board because it was not an "agency". The Court of Appeals reversed the district court, holding that the Board was an "agency" for purposes of FOIA and Sunshine Act.

After reviewing the Circuit Court's opinion, the Board requested the Department of Justice (DOJ) to seek a rehearing on those portions of the decision relating to the Sunshine Act. Constructive consultation with the Office of the Solicitor General and DOJ indicated that although the Board's position was sound, the Board's best interest would not be served by arguing the extent of the Act's applicability to Board activities within the framework of the record developed for this case. Accordingly, the Board receded from its request for further appellate review. The Board awaits the District Court's order.

Pending the decision on rehearing, the Board took a number of steps to fully comply with all applicable law. While the Board believed that the Court erred, and that rehearing was warranted, it nevertheless promptly took steps toward implementing the Sunshine Act. The Board's General Counsel began reviewing other agency regulations as possible models for the Board's FOIA and Sunshine Act regulations; he advised the

---

---

Board of the changes in Board operations that would be necessitated by full implementation of those two laws. The Board's staff explored the feasibility of installing permanent recording devices for its meetings. The Board arranged for an attorney to be detailed to the Board from the Nuclear Regulatory Commission to, among other things, assist in taking the necessary actions to bring the Board into compliance the Circuit Court's ruling.

Since the decision to not seek rehearing, the Board has issued its proposed Sunshine Act regulations in the Federal Register and is awaiting public comment. The Board has conducted public meetings pursuant to the Sunshine Act. The Board anticipates that its proposed FOIA regulations will ready for Federal Register notice by March, 1991. In the meantime all requests for non-public Board records will continue to be treated in accord with FOIA requirements.

#### **6. Regulatory Agenda**

The Board has developed a regulatory agenda which calls for the promulgation of regulations mandated by law in addition to the Board's FOIA and Sunshine rules. Preliminary work has been completed for rules covering the Board's hearing practices and procedures, the Privacy Act, conflicts-of-interests, the Equal Employment Opportunity Act, and employees standards of conduct.

#### **7. Office Space in Washington D.C.**

The process of locating sufficient office space to accommodate the needs of the Board and completing the design and construction process proved to be a slow and difficult task. In September 1990, after almost a year in temporary quarters as a result of two interim moves, the Board began operations from its new facilities at 625 Indiana Avenue, N.W., Suite 700, Washington, D.C. The Board now has the necessary office space to accommodate the Board's technical, legal and administrative staff and to provide sufficient space for conferences, meetings, and hearings, as well as its technical library.

---

## Part 2

# REPORT OF THE BOARD ON DEFENSE NUCLEAR FACILITIES SAFETY BOARD JURISDICTIONAL ISSUES

## INTRODUCTION

The Defense Nuclear Facilities Safety Board's (Board) enabling statute, 42 U.S.C. §2286 et seq., September 29, 1988, establishes the boundaries of the Board's jurisdiction regarding public health and safety issues at Department of Energy (DOE) defense nuclear facilities. Delineation of the Board's current jurisdiction under its enabling legislation requires an in-depth analysis of the definitions and terms of art relevant to Board operations. The following analysis of the Board's current jurisdictional limits will serve as a springboard for an assessment, required by Congress, of "whether nuclear facilities ... that are excluded from the definition of 'Department of Energy defense nuclear facility' in section 318(1)(C) ... should be subject to independent external oversight."<sup>1</sup>

## SCOPE OF THE BOARD'S JURISDICTION

### A. Public Health and Safety Matters

The Board's jurisdiction extends to "public health and safety" issues at "United States Department of Energy defense nuclear facilities."<sup>2</sup> The various provisions of the statute and their attendant legislative history indicate that Congress generally intended the phrase "public health and safety" to be construed broadly.<sup>3</sup> For example, both Congress and the Board have interpreted the public to include workers at defense nuclear facilities.

The principal unresolved issue in this regard is the extent to which environmental issues are also public health and safety issues. While Congress refused to expressly include

---

"environment" with the term "public health and safety" in the Board's statutory grant of jurisdiction, the legislative history indicates that Congress knew that the lines between environmental and health issues were unclear.<sup>4</sup> Furthermore, the principal Senate Committee report on the Board's enabling statute indicates that Congress intended to be flexible on the issue, and allow the Board to consider environmental issues related to production operations where the Board saw connections with public health and safety issues. At the same time, the Committee emphasized that most environmental remediation or cleanup was to be conducted pursuant to other laws. The report language itself is significant enough to warrant repetition here:

### SAFETY VERSUS ENVIRONMENTAL ISSUES

Compounding this problem is the frequent confusion between production safety issues at the DOE complex and the environmental waste problem that has been building up since the Manhattan Project. There is no question that the defense nuclear complex's managers made serious mistakes, beginning years ago, in ignoring the long-term implications of disposal practices for radioactive and toxic waste. The magnitude of the problem, although not yet fully documented, is enormous.

\* \* \*

Despite the tendency to lump safety and environmental issues together, the two are distinct in existing law and should be kept so in any proposed legislation....The Governmental Affairs Committee, the GAO, and the NAS have all asserted that a safety board is needed to ensure that meeting production requirements does not overshadow the need for safe production. The Armed Services Committee agrees completely with that rationale. DOE's environmental legacy is a separate issue that is being dealt with under existing law.

\* \* \*

The Committee believes that it is both unnecessary and inappropriate to extend a safety board's mandate to include environmental restoration matters. This belief stems not from a view that the Department's environmental problems are unimportant or insignificant in scope; nor does the Committee deny that the distinction between safety issues and environmental issues can in some instances be blurred. The Committee emphasizes, however, that a distinction exists, and that other legislative remedies and oversight of environmental problems are already in existence. Environmental matters in DOE--the management of waste operations and the cleanup of existing waste sites--are already heavily

---

regulated by EPA and the states under the Superfund and RCRA legislation.

Given the existence of a comprehensive regulatory regime, it is not necessary to assign an environmental oversight role to a safety board. For one thing, the technical issues are quite different, requiring different--and additional--expertise within the Board. Second, it would needlessly dilute the focus and mission of the Board. Third, insofar as the Board's basic mission is to ensure that, in satisfying production requirements, the commitment to safety is not compromised, it is hard to discern a rationale for including environmental restoration in the Board's charter or for citing environmental problems in the justification for creating the Board in the first place.

The distinction between safety and environmental issues, in the Committee's view, should be that safety includes unintended releases from on-going production operations, which is a concept that would exclude normal waste management operations and remedial actions associated with existing waste storage sites. The Committee stresses that a safety board should not be prohibited outright from crossing that potentially elusive line; the Committee seeks only to clarify its intention that safety of production operations must be the Board's primary concern.<sup>5</sup>

Thus, Congress recognized a need for Board oversight of the environmental consequences of production operations, while reserving for other segments of the government the primary responsibility for environmental restoration and cleanup. The Board, however, has explicit jurisdiction over nuclear waste storage facilities, such as the Hanford tanks which were the subject of Board recommendation 90-3 and 90-7 reported upon in a previous section. The Board is also reviewing health and safety issues at the DOE's Waste Isolation Pilot Plant (WIPP). The scope of the Board's jurisdiction over environmental issues is subjected to further analysis in the report on the Board's oversight of certain nuclear waste storage facilities.

## **B. The Limits of Defense Nuclear Facilities**

The enabling statute limits Board purview to health and safety issues at DOE "defense nuclear facilities," the key jurisdictional term in the Act. The precise contours of the Board's jurisdiction relative to "defense nuclear facilities" can only be determined by inquiry into the definition and exclusions contained in the enabling statute:

---

As used in this chapter, the term "Department of Energy defense nuclear facility" means any of the following:

(1) A production facility or utilization facility (as defined in section 2014 of this title) that is under the control or jurisdiction of the Secretary of Energy and that is operated for national security purposes, but the term does not include--

(A) any facility or activity covered by Executive Order No. 12344, dated February 1, 1982, pertaining to the Naval nuclear propulsion program; (B) any facility or activity involved with the assembly or testing of nuclear explosives or with the transportation of nuclear explosives or nuclear material; or (C) any facility that does not conduct atomic energy defense activities.

(2) A nuclear waste storage facility under the control or jurisdiction of the Secretary of Energy, but the term does not include a facility developed pursuant to the Nuclear Waste Policy Act of 1982 (42 U.S.C. §10101 et seq.) and licensed by the Nuclear Regulatory Commission. 42 U.S.C. §2286g.

### **C. The Three Basic Categories of DOE Defense Nuclear Facilities**

A first reading of the Board's jurisdictional statement indicates there are three basic types of defense nuclear facilities covered by the enabling statute: certain production facilities, utilization facilities, and waste storage facilities.

However, not every DOE production, utilization, and waste facility falls within the Board's purview. Each of these three terms itself contains qualifiers which limit the term's reach to certain facilities within the entire DOE complex.<sup>6</sup> Furthermore, the statute contains explicit exclusions of some facilities that otherwise meet the definition of defense nuclear facilities. Therefore, to actually delineate the Board's jurisdiction requires not only a detailed analysis of the relevant definitions, together with their qualifiers and exclusions, but also a careful tracing of the definitions through their development in the Atomic Energy Act of 1954, collateral definitions, and listings of

---

facilities. The process requires an unravelling of nested definitions and terms to determine the extent of the Board's jurisdiction.

### **1. Production Facilities**

The first category of defense nuclear facilities encompasses "production facilities" that are (1) under the control or jurisdiction of the Secretary of Energy, and (2) that are operated for national security purposes.<sup>7</sup> The term "production facility" itself is defined elsewhere in the Atomic Energy Act of 1954, to which the Board's enabling statute was appended:

(1) any equipment or device determined by rule of the Commission to be capable of the production of special nuclear material in such quantity as to be of significance to the common defense and security, or in such manner as to affect the health and safety of the public; or (2) any important component part especially designed for such equipment or device as determined by the Commission.  
42 U.S.C. §2014(v).<sup>8</sup>

It is clear from this definition that a "facility" includes equipment, device, or component. Thus, a single DOE site might possess defense nuclear production facilities, even if the site is not dedicated solely to production activities. The production device or equipment must, however, be operated for "national security purposes" to meet the enabling Act's criteria for a defense nuclear facility.

As a reading of this section indicates, there are five other terms, defined by statute, that shape, by inclusion and exclusion, the profile of a DOE production facility: "special nuclear material", "common defense and security", "component", "produce", and "source material".<sup>9</sup>

The term "produce" when used in relation to "special nuclear material" means:

(1) to manufacture, make, produce, or refine special nuclear material; (2) to separate special nuclear material from other substances in which such material may be contained; or  
(3) to make or to produce new special nuclear material.  
42 U.S.C. §2014(u).

---

The term "special nuclear material" is defined as:

(1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Commission,<sup>10</sup> pursuant to the provisions of section 2071 of this title [42], determines to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing, but does not include source material. 42 U.S.C. §2014(aa).

The definition of special nuclear material excludes raw ores or other "source materials" which are defined as:

(1) uranium, thorium, or any other material which is determined by the Commission pursuant to the provisions of section 2091 of this title to be source material; or (2) ores containing one or more of the foregoing materials, in such concentration as the Commission<sup>11</sup> may by regulation determine from time to time. 42 U.S.C. §2014(z).

Since source materials are excluded from the definition of special nuclear materials, mining operations and other source material acquisition activities are excluded from the jurisdiction of the Board, because they are not production facilities.

The term "common defense and security" means:

the common defense and security of the United States.  
42 U.S.C. §2014(g).

Although undefined by statute, "components"<sup>12</sup> are included with devices and equipment in the definitions of both "production facilities" and "utilization facilities".

When all the relevant definitions are read together, and simplified for ease of understanding, a defense nuclear facility dedicated to production is a device or other equipment capable of manufacturing or producing special nuclear materials, or components, which are significant to the common defense and security of the United States. The Atomic Energy Act authorizes DOE to further delineate defense production facilities by rule, but has done so only in very limited contexts.<sup>13</sup> No definitive rule or listing of production and utilization facilities under the Board's jurisdiction has been adopted by DOE. Under Supreme Court doctrine, the Board's interpretation of the

---

scope of the jurisdiction provision contained in its enabling statute is entitled to great deference.<sup>14</sup>

## 2. Utilization Facilities

The second category of defense nuclear facilities encompasses utilization facilities that (1) are under the control or jurisdiction of the Secretary of Energy, and (2) that are operated for national security purposes.<sup>15</sup> The term "utilization facility" is defined in the Atomic Energy Act of 1954 as the following:

(1) any equipment or device, except an atomic weapon, determined by rule . . . to be capable of making use of special nuclear material in such quantity as to be of significance to the common defense and security, or in such manner as to affect the health and safety of the public, or peculiarly adapted for making use of atomic energy in such quantity as to be of significance to the common defense and security, or in such manner as to affect the health and safety of the public; or (2) any important component part especially designed for such equipment or device as determined by the Commission.<sup>16</sup> 42 U.S.C. §2014(cc).

The definition of utilization facility incorporates or excludes certain subgroups of facilities by reference to five other terms. Four of these terms are identical to the qualifiers placed on production facilities, while two others are unique to utilization facilities. The terms "special nuclear material", "source material", "component", and "common defense and security" are the definitions used to delimit both production and utilization. "Atomic weapons" and "atomic energy", when added to the four common definitions, shape, by inclusion and exclusion, the precise contours and reach of the term utilization facility.

The term "atomic energy" means:

all forms of energy released in the course of nuclear fission or nuclear transformation. 42 U.S.C. §2014(c).

The term "atomic weapon" means:

any device utilizing atomic energy, exclusive of the means for transporting or propelling the device (where such means

---

is a separable and divisible part of the device), the principal purpose of which is for use as, or for development of, a weapon, a weapon prototype, or a weapon test device. 42 U.S.C §2014(d).

Reading these various subsidiary definitions together, the Board has adopted a traditional, working definition of a utilization facility: nuclear reactors and other facilities which use atomic energy for defense purposes other than propulsion. As stated previously, atomic weapons are expressly excluded from the definition of a utilization facility. In addition, some utilization reactors are also production facilities because they are capable of producing special nuclear materials such as plutonium or uranium enriched in the isotope 233 or 235.<sup>17</sup> For example, the Savannah River reactors, which, when operational, produce tritium (which is not a special nuclear material) are also capable of producing plutonium and therefore are also production facilities.<sup>18</sup>

The most comprehensive list of production and utilization facilities subject to Board oversight was prepared by the Board and submitted in response to Congressional questioning during hearings last year. A revised version of that preliminary list is included as Attachment II-2.

### **3. Nuclear Waste Storage Facilities**

The third category of DOE defense nuclear facilities encompasses nuclear waste storage facilities that are under the control or jurisdiction of the Secretary of Energy. The term does not include a facility developed pursuant to the Nuclear Waste Policy Act of 1982 and licensed by the Nuclear Regulatory Commission.<sup>19</sup>

Congress, recognizing the need for permanent repositories for the disposal of high-level radioactive waste and spent fuel, required the President to locate appropriate sites and develop them for permanent nuclear waste disposal.<sup>20</sup> Such facilities, which presently include only Yucca Mountain,<sup>21</sup> are to be licensed by the NRC.

Most DOE defense nuclear facilities which store nuclear waste are not covered by the Nuclear Waste Policy Act of 1982:

Subject to the provisions of subsection (c) of this section, the provisions of this chapter shall not apply with respect to any atomic energy defense activity or to any facility used in connection with any such activity.<sup>22</sup>

---

Subsection (c) makes the Nuclear Waste Policy Act of 1982 applicable to "any repository not used exclusively for the disposal of high-level radioactive waste or spent nuclear fuel resulting from atomic energy defense activities, research and development activities of the Secretary."<sup>23</sup> Moreover, if the President determines that high-level radioactive waste from defense activities should be segregated into separate repositories, those repositories would also be covered by the Nuclear Waste Policy Act of 1982:

Any repository for the disposal of high-level radioactive waste resulting from atomic energy defense activities only shall (A) be subject to licensing [by NRC]..., and (B) comply with all requirements of the Commission for the siting, development, construction, and operation of a repository.<sup>24</sup>

Thus, reading these three provisions together, permanent repositories for high-level radioactive waste from atomic energy defense activities are covered by the Nuclear Waste Policy Act of 1982, and subject to NRC licensing. Therefore, they do not fall within the Board's jurisdiction.

Temporary storage of DOE nuclear waste from defense activities is not covered by the Nuclear Waste Policy Act and, therefore, falls under the Board's jurisdiction.<sup>25</sup>

The Board also interprets its enabling statute as conferring jurisdiction over permanent low-level waste storage (what the Nuclear Waste Policy Act terms a repository), if such repositories are controlled exclusively by DOE and not subject to NRC licensing under the Nuclear Waste Policy Act. Finally, the Board's enabling statute refers to nuclear waste storage<sup>26</sup> and does not distinguish between materials which eventually will be recycled, or reused for other purposes, and materials targeted for ultimate disposal. Thus, the Board interprets the Act to grant jurisdiction over waste storage regardless of the intended fate of the waste.

The MITRE Corporation has prepared a draft report for the Board which lists DOE nuclear waste storage facilities based on definitions of "storage" and "storage facility" adopted by the Department of Energy, NRC, and EPA.<sup>27</sup> That report lists sites that store five categories of nuclear waste-- high level, transuranic, low-level, mixed, and by-product wastes.<sup>28</sup>

#### **D. Enabling Act Exclusions**

Expressly excluded from the definition of defense nuclear facilities are (1) any facility or activity covered by Executive Order No. 12344, dated February 1, 1982,<sup>29</sup> pertaining to the Naval nuclear propulsion program; (2) any facility or activity involved with the

---

assembly or testing of nuclear explosives or with the transportation of nuclear explosives or nuclear material; and (3) any facility that does not conduct atomic energy defense activities. Disassembly was not specifically addressed by the statute.

These exclusions are relatively clear-cut. The Naval nuclear propulsion program is a defense-related activity which is well-defined by Executive Order 12344.

Although the Advanced Test Reactor (ATR), which is operated under the authority of the Assistant Secretary for Nuclear Energy, does work for the Naval nuclear propulsion program, it has other defense production and utilization capabilities that subject the ATR to some level of Board oversight.

The exclusion of "any facility that does not conduct atomic energy defense activities" probably carves out little more than what is already excluded by virtue of the definition of a defense nuclear facility. However, it does emphasize that DOE facilities involving non-nuclear or non-defense devices or equipment are excluded from Board jurisdiction.<sup>30</sup>

The Conference Report indicated that the exclusion regarding assembly was intended to exclude only "final assembly" of nuclear weapons and devices.<sup>31</sup> According to the Conference Report, the only facility in that category is the Pantex plant.<sup>32</sup> Also, according to the conferees, the only facility involved in the testing of nuclear explosives, under current practice, is the Nevada test site. However, as implied previously, even the Nevada site may include facilities dedicated to production or utilization activities, or provide for unlicensed storage of wastes which fall under the Board's oversight responsibility.

#### **REPORT ON NEED FOR INDEPENDENT EXTERNAL OVERSIGHT OF ADDITIONAL DOE PROGRAMS AND FACILITIES**

By virtue of section 320 of the Board's enabling statute, Congress required that the Board study the question of whether nuclear facilities "excluded from the definition of 'Department of Energy defense nuclear facility' in section 318(1)(C)" should be subject to independent external oversight."<sup>33</sup> Accomplishing the health and safety work of the Board, as detailed in Part 1 of this report, has been so demanding that it precluded a facility-by-facility investigation of the need for oversight beyond the Board's current jurisdiction.

---

Nevertheless, to fulfill its statutory reporting obligation, the Board has preliminarily studied available documents and information concerning the desirability of some form of independent oversight of non-defense DOE nuclear facilities, as well as defense nuclear facilities currently exempted from Board jurisdiction. Among other things, the Board reviewed several comprehensive analyses performed in the 1980s which assessed DOE's nuclear safety activities. The reports reviewed include, but are not limited to, the following: "A Safety Assessment of Department of Energy Nuclear Reactors" (DOE/US-0005, 1981); NAS study on production reactors in 1987; and NAS study on non-production reactors, 1988. All these reports were severely critical of nuclear safety deficiencies found in both defense and non-defense facilities.

Certain GAO reports and legislative background materials that formed the basis for the Board's enabling statute are similarly critical of both defense and non-defense DOE nuclear facilities.

With regard to nuclear weapons, it is noted that an independent Blue Ribbon Task Group, chaired by Judge William T. Clark in 1985, and the 1988 DOE Nuclear Weapons Safety Review Group reported on long-standing safety problems.<sup>34</sup> In December 1990, the Panel on Nuclear Weapon Safety, chaired by Sidney D. Drell, prepared a report for the House Committee on Armed Services which cited these earlier studies and expressed the view "...that although many problems have been, or are being fixed, still more remain to be addressed."<sup>35</sup> The three-member panel stated "We are concerned, as were these earlier panels, that serious issues that had been known for at least a decade remained unattended for so many years."<sup>36</sup>

As a general principle, the Board believes that public assurance of health and safety at DOE nuclear facilities that may pose public risks would benefit from some form of independent external safety oversight. However, any unit charged with oversight of nuclear facilities, particularly those related to weapons activity, must be carefully structured to protect national security and sensitive nuclear weapons information. Indeed, it is the Board's view that an oversight group that does not have the requisite degree of technical and administrative capability, or that lacks the sensitivity and judgment necessary to deal effectively with complex national security issues, may do more harm to public safety than good.

The Board examined other DOE documents that tend to support the conclusion that competent oversight of nuclear facilities is important and useful, including the recent report, mentioned earlier, which the Secretary sent to the President in December, 1990. The Secretary reported that DOE had completed the required comprehensive evaluation of its management control systems, which disclosed material deficiencies in eleven major categories. The report cited serious management weaknesses which impair DOE's

---

ability to ensure safety of workers and public at defense nuclear and non-defense nuclear facilities alike. It is particularly worthy of note that the nuclear safety deficiencies cited are known to have persisted within DOE for a long period of time.

As acknowledged elsewhere in this report, the Secretary has initiated many actions to correct the deficiencies cited in his report to the President. Removing these weaknesses for defense nuclear facilities can be accomplished only by the continuing strong efforts of the Secretary, the fullest sustained support from the Congress, and continued strong external oversight. Competent external oversight for non-defense facilities or defense facilities exempted from Board jurisdiction would probably accelerate and maintain health and safety improvements at those facilities.

In carrying out activities which are within its purview, the Board has gained insights which bolster its conclusion that oversight of other nuclear facilities should result in safety improvements. For example, the Board's comprehensive study of the DOE's nuclear safety standards (orders, guidelines, regulations, and the like) indicates that at least the issues related to standards are essentially the same for both defense and non-defense facilities. The Board expects that its continuing review of safety requirements and other activities related to standards will result in further improvements which will help assure that public health and safety are protected at defense facilities. However, these improvements in standards will not necessarily be translated to facilities outside the Board's responsibility.

Absent external oversight, DOE has been unable, in many instances, to establish its nuclear activities on a sufficiently sound basis to provide adequate assurance that public health and safety are appropriately protected. When DOE's nuclear activities have come under external scrutiny, as, for example, by the activities of the Board, safety deficiencies have been noted and corrective actions recommended and later commenced. In the absence of independent external oversight, concerns remain that reforms being carried out by a Secretary may not endure beyond his period of tenure. There have been reforms undertaken within DOE and its predecessor organizations in the past by the agency head and carried forward effectively, only to be canceled out by later policy reversals. Thus, the gains that result from current strengthening actions need to be institutionalized; that is, put in place so firmly that they cannot be weakened easily at a later date. Establishment of appropriate independent external oversight can help prevent erosion of nuclear safety over time.

The foregoing considerations are generally applicable, but they may require modification or extension in specific cases. There is a need for further studies to establish whether independent external oversight ought to be established for discrete categories of facilities outside the Board's jurisdiction.

---

---

The Board has observed certain characteristics which bear upon the effectiveness of any safety oversight organization. An external oversight group must possess the requisite technical and managerial competence and experience to carry out its responsibilities. The oversight organization must possess a level of technical capability at least equal to that of the organization subject to oversight. First, the oversight group must be managed and directed at its top-most level by individuals with strong technical and managerial qualifications. Second, it must be staffed at all levels by individuals with qualifications appropriate to their responsibilities. Assessments made by weak oversight organizations often permit safety deficiencies to continue uncorrected. Stated another way, unskilled or inappropriate oversight may be worse than no oversight at all.

---

ENDNOTES

<sup>1</sup>42 U.S.C. §2286e note (Sept. 29, 1988).

<sup>2</sup>42 U.S.C. §§2286a, 2286g.

<sup>3</sup>The term "public health and safety" is undefined by the Act, and therefore should be given its ordinary meaning.

<sup>4</sup>S. Rep. No. 232, 100th Cong., 1st Sess. 9, 19-20 (1987).

<sup>5</sup>*Id.* (emphasis added)

<sup>6</sup>See Attachment II-1 for a graphic illustration of how the DNFSB's current coverage of certain facilities fits into the entire DOE complex.

<sup>7</sup>42 U.S.C. §2286g(1).

<sup>8</sup>As will be seen in other definition sections of the Atomic Energy Act of 1954, Congress provided the Atomic Energy Commission (AEC) with authority to amend, by rule, the definition of "production facility". In 1974 the AEC was abolished and all functions of the Commission were vested in the Nuclear Regulatory Commission, an independent agency for regulating commercial nuclear power and an Executive Branch organization, the Energy Research and Development Administration (ERDA), with certain exceptions, by Pub. L. 93-438, Oct. 11, 1974, 88 Stat. 1233. See 42 U.S.C. §5814. The functions vested by law in ERDA or in the Administrator, officers, and components of the ERDA, were transferred to and vested in the Secretary of Energy, unless otherwise specifically provided, as part of the creation of the Department of Energy by Pub. L. 95-91, Aug. 4, 1977, 91 Stat. 565. See 42 U.S.C. §7151. Consequently, the AEC's authority to amend key definitions in the Atomic Energy Act, is now shared by both the NRC and the DOE, and both have exercised that authority in their respective jurisdictions.

While useful to our purpose, neither agency's modifications to the definitions are controlling. The NRC has acted to modify several of the terms as part of its regulation of the domestic licensing of commercial production and utilization facilities. 10 CFR Part 50 (1990). However, by its own terms these regulations are not intended to reach DOE's facilities. 10 CFR §50.11(b)(2)(i) (1990). The DOE has acted to further define these terms but for limited purposes. See, 48 CFR Part 950--Extraordinary Contractual Actions §950.7002 Definitions (1989). The DOE intends to remove and delete the terms and definitions of "production facility" and "utilization

---

facility" because the coverage (indemnity clauses of the Price-Anderson Amendment Act of 1988) cannot be limited to production and utilization facilities and must include, for example, "nuclear waste facilities". 55 FR 33730, at 33732, August 17, 1990. Further, DOE's Office of Enforcement advises that they are now developing a list of facilities (including production and utilization facilities) within their jurisdiction and that they are relying upon the definitions set forth in the Atomic Energy Act of 1954, as amended. However, they may recommend to the Secretary amending the definitions of "production facility" and "utilization facility" by rule. Additionally, DOE's Advisory Committee on Nuclear Facility Safety (Ahearne Committee) recites in the Purpose section of their public notices that: "The Committee was established to provide the Secretary of Energy with advice and recommendations concerning the safety of the Department's production and utilization facilities, as defined in section 11 of the Atomic Energy Act of 1954, as amended (42 U.S.C. §2014). See, 55 FR 28435 (July 11, 1990).

<sup>9</sup>Both the Enabling Statute and the Atomic Energy Act of 1954, as amended make use of "nested definitions." For example, "production facility" is defined in 42 U.S.C. §2014(v). Within that definition is the term "special nuclear material" which in turn is defined separately at 42 U.S.C. §2014(aa). Within that definition is found the term "source material" which in turn is defined separately at 42 U.S.C. §2014(2).

<sup>10</sup>See *supra* note 8.

<sup>11</sup>*Id.*

<sup>12</sup>But see, 10 CFR §1017.3(d). DOE has defined the term in Part 1017, Title 10 of the Code of Federal Regulations --Identification and Protection of Unclassified Controlled Nuclear Information. These regulations implement section 148 of the Atomic Energy Act which prohibits the unauthorized dissemination of certain unclassified government information. The term "component" is defined as:

[A]ny operational, experimental, or research-related part, subsection, design, or material used in the manufacture or utilization of a nuclear weapon, nuclear explosive device, or nuclear weapon test assembly.*Id.*

This regulatory definition of component probably is incompatible with the use of the term in the Board's enabling statute, since it

---

---

includes utilization of nuclear weapons and explosives. While the definition of a utilization facility includes devices, equipment, and components, it expressly excludes nuclear weapons.

<sup>13</sup>See *supra* note 8. The definitions relied upon here are those set forth in the Atomic Energy Act of 1954, as amended. All references to the "Commission" should be read, unless otherwise indicated, as referring to the United States Department of Energy and the NRC. DOE has issued rules defining the term "special nuclear material" in several different contexts; however, none are related to advancing the definitions of production facility or utilization facility. The various instances are set forth below:

Defense Programs issued regulations in connection with "... arrest authority and use of force by protective force officers". See 10 CFR Part 1047, §1047.3. The language tracks the definition of 42 U.S.C. §2014(aa).

Under 10 CFR Part 710 --Criteria and procedures for determining eligibility for access to classified matter or significant quantities of special nuclear materials-- the DOE defined significant quantities of special nuclear material at §710.5.

Under 48 CFR Chapter 9, Subpart 904.70--Foreign Ownership, Control, or Influence Over Contractors at §904.7001 Applicability:

The provisions of this subpart shall apply to all offerors/bidders, contractors, and subcontractors who will or do have access to classified information or a significant quantity of special nuclear material as defined in 10 CFR Part 710. In this subpart, ... the term "special nuclear material" shall also mean significant quantity of special nuclear material as defined in 10 CFR Part 710.

Under 48 CFR Chapter 9, Subpart 945.3--Providing Government Property to Contractors, §945.303-1:

- The DOE has established specific policies concerning special nuclear material requirements needed under DOE contracts for fabricating end items using special nuclear material, and for conversion or scrap recovery of special nuclear material. These special nuclear material needs means 'uranium enriched

---

in the isotope U233, U235 and plutonium other than PU238.'

Under 48 CFR Chapter 9, Part 952--Solicitation Provisions and Contract Clauses, §952.204-2 Security requirements.

(g) Definition of Special Nuclear Material.

(The language tracks 42 U.S.C. §2014(aa).)

Under 10 CFR Part 810--Assistance to Foreign Atomic Energy Activities. This Part implements section 57b of the Atomic Energy Act which empowers the Secretary of Energy to authorize U.S. persons to engage directly or indirectly in the production of special nuclear material outside the United States. Section 810.3 Definitions

'Special nuclear material' means (1) plutonium, (2) uranium-233, or (3) uranium enriched above 0.711 percent by weight in the isotope uranium-235.

DOE Order 5633.3 (Control and Accountability of Nuclear Materials) defines special nuclear material by listing. They are as follows:

Enriched Uranium, Plutonium-242, Plutonium-239-241, Uranium-233, and Plutonium-238.

<sup>14</sup>See, e.g., *NLRB v. Hearst Publications, Inc.* 322 U.S. 111 (1944) (agency interpretation of jurisdictional provisions entitled to deference) and *Chevron, U.S.A. v. NRDC*, 467 U.S. 37 (1984). (Agency has authority to construe its statutory mandates, so long as reasonable.)

<sup>15</sup>42 U.S.C. §2286g(1).

<sup>16</sup>See *supra* note 8.

<sup>17</sup>See *supra* notes 5-14 and accompanying text.

<sup>18</sup>Of course, the Savannah River tritium facilities could be converted to the production of special nuclear material. Therefore, since it is "capable of the production of special nuclear material," it too may be a production facility within the definition of the Atomic Energy Act of 1954.

<sup>19</sup>42 U.S.C. §2286 et seq.

<sup>20</sup>42 U.S.C. §10132 et seq.

---

<sup>21</sup>42 U.S.C.A. §10101(30) (1990 Pocket Part).

<sup>22</sup>42 U.S.C. §10107(a). The term "atomic energy defense activity" includes most of the nuclear production and utilization activities subject to Board oversight:

The term 'atomic energy defense activity' means any activity of the Secretary performed in whole or in part in carrying out any of the following functions:

- (A) naval reactors development;
- (B) weapons activities including defense inertial confinement fusion;
- (C) verification and control technology;
- (D) defense nuclear materials production;
- (E) defense nuclear waste and materials by-products management;
- (F) defense nuclear materials security and safeguards and security investigations; and
- (G) defense research and development. (42 U.S.C. §10101(3)).

<sup>23</sup>42 U.S.C. §10107(c).

<sup>24</sup>42 U.S.C. §10107(b)(3).

<sup>25</sup>Neither the Atomic Energy Act nor the Board's enabling statute defines "nuclear waste" or "nuclear waste storage". The Nuclear Waste Policy Act of 1982 defines storage as "retention of high-level radioactive waste, spent nuclear fuel or transuranic waste with the intent to recover such waste or fuel for subsequent use, processing, or disposal." This particular section of the Act's definitions technically may not be operative for purposes of the Board's enabling statute.

<sup>26</sup>Neither the Atomic Energy Act nor the Board's enabling statute defines "nuclear waste" or "nuclear waste storage".

<sup>27</sup>Mitre Report, U.S. Department of Energy Nuclear Waste Storage Facilities (Draft, March 1990).

---

<sup>28</sup>*Id.*

<sup>29</sup>Executive Order No. 12344, dated February 1, 1982, is set out under 42 U.S.C. §7158.

<sup>30</sup>See *supra* notes 5-18 and accompanying text.

<sup>31</sup>H. Conf. No. 989, 100th Cong., 2nd Sess. 2602 (1988).

<sup>32</sup>*Id.*

<sup>33</sup>This reporting requirement was contained in a note to section 2286e of the enabling statute. The full text of the note reads as follows in the United States Code:

#### Historical and Statutory Notes

**Reporting Requirements.** Section 1441(c), (d) of Pub.L. 100-456 provided that:

'(c) Requirements for first annual report.--

(1) Before submission of the first annual report by the Defense Nuclear Facilities Safety Board under section 316(a) of the Atomic Energy Act of 1954 [subsec. (a) of this section] (as added by subsection (a)), the Board shall conduct a study on whether nuclear facilities of the Department of Energy that are excluded from the definition of 'Department of Energy defense nuclear facility' in section 318(1)(C) of such Act [section 2286g(1)(C) of this title] (hereafter in this subsection referred to as 'non-defense nuclear facilities') should be subject to independent external oversight. The Board shall include in such first annual report the results of such study and the recommendation of the Board on whether non-defense nuclear facilities should be subject to independent external oversight.

(2) If the Board recommends in the report that non-defense nuclear facilities should be subject to such oversight, the report shall include a discussion of alternative mechanisms for implementing such oversight, including mechanisms such as a separate executive agency and oversight as a part of the Board's responsibilities. The discussion of

---

alternative mechanisms of oversight also shall include considerations of budgetary costs, protection of the security of sensitive nuclear weapons information, and the similarities and differences in the design, construction, operation, and decommissioning of defense and non-defense nuclear facilities of the Department of Energy.'

Title I of S. 1085, as originally reported by the Governmental Affairs Committee, would have given the Board a mandate over DOE nuclear facilities, both defense-related and civil. Senate Report 100-232 at 18-19. The Armed Services Committee amendment, which was eventually passed, limited the Board's safety and health responsibilities to certain defense-related activities. *Id.* See, also House Conference Report No. 100-989 at p. 492: "Section 3141(c) requires the Board's first annual report to include the results of a study by the Board and its recommendation on whether non-defense nuclear facilities should be subject to independent external oversight."

<sup>34</sup>See "Nuclear Weapons Safety," a Report of the Panel on Nuclear Safety of the Committee on Armed Services of the House of Representatives, 101st Cong., 2d Sess. 1, 8 (Dec. 1990).

<sup>35</sup>*Id.* at 1-2.

<sup>36</sup>*Id.* at 2.

## APPENDIX

Attachment I-1	Status Report of Recommendations
Attachment I-2	Board Policy Statement, "Criteria for Judging the Adequacy of DOE Responses and Implementation Plans for Board Recommendations"
Attachment II-1	Diagram of Facilities Under Board Jurisdiction
Attachment II-2	DOE Facilities Under the Jurisdiction of the Board

RECOMMENDATIONS CALENDAR

1/17/91 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Is Received	Public Hearing Date
90-1 Savannah River, Reactor Operator Trng.	02/22/90	03/01/90	03/31/90	04/15/90	04/13/90	05/14/90	07/12/90	07/13/90 <sup>3/</sup>	06/28/90
90-2 All Sites Standards	03/08/90	03/14/90	04/13/90	06/12/90 <sup>1/</sup>	06/12/90	07/12/90	09/10/90	09/17/90	08/30/90
90-3 Hanford Future Tank Monitoring	03/27/90	03/30/90	04/30/90	05/14/90	05/23/90	06/22/90	08/13/90 <sup>2/</sup>	08/13/90	
90-4 Rocky Flats Operational Readiness Review	05/04/90	05/10/90	06/11/90	06/25/90	06/25/90	07/25/90	09/24/90	11/30/90	08/30/90
90-5 Rocky Flats Systematic Evaluation Program	05/18/90	05/24/90	06/25/90	07/09/90	06/20/90	07/20/90	09/18/90	10/17/90	08/30/90
90-6 Rocky Flats Plutonium In The Ducts	06/05/90	06/11/90	07/11/90	07/26/90	07/26/90	08/27/90	10/24/90	11/30/90	08/30/90
90-7 Hanford Modif. To Imple. Plan For 90-3	10/12/90	10/18/90	11/19/90	12/03/90	12/11/90	01/10/91	03/04/91 <sup>4/</sup>		

- 1/ Secretary's response originally due 4/25/90; Board granted 45-day extension to 6/12/90.
- 2/ Implementation plan due date figured from 5/14/90.
- 3/ Supplement plan pending.
- 4/ Implementation plan due date figured from 12/3/90.

=====

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

**Criteria for Judging the Adequacy of DOE Responses and Implementation Plans for DNFSB Recommendations**

**AGENCY:** Defense Nuclear Facilities Safety Board.

**ACTION:** Notice of Board Adoption of Policy Guidance.

**SUMMARY:** The Defense Nuclear Facilities Safety Board has unanimously adopted a policy statement which establishes the criteria that the Board will use for judging the adequacy of Department of Energy (DOE) responses to, and implementation plans for, Board recommendations.

**FOR FURTHER INFORMATION CONTACT:** Robert M. Andersen, General Counsel, Defense Nuclear Facilities Safety Board, 625 Indiana Avenue, N.W., Suite 700, Washington, D.C. 20004, (202) 208-6387.

**SUPPLEMENTARY INFORMATION:** The Defense Nuclear Facilities Safety Board issues recommendations to the Secretary of the Department of Energy and to the President regarding public health and safety at DOE's defense nuclear facilities. The Board's enabling statute requires the Secretary of Energy to either accept or reject Board recommendations and to subsequently develop implementation plans for those portions of Board recommendations which are accepted. The Board has now received DOE responses to six of the first seven recommendations made to the Secretary and has reviewed the first five implementation plans submitted by DOE.

This Defense Nuclear Facilities Safety Board Policy Statement (PS-1), the Board's first, will guide the Board and its staff in evaluating the adequacy of DOE responses and implementation plans, as well as assist the Board in structuring appropriate follow-up action in the event a recommendation is not fully or adequately addressed in DOE's response and implementation plan. Furthermore, the statement formally identifies, for the benefit of DOE and the public, the Board's expectations regarding the elements the Board believes are necessary for an adequate response and implementation plan.

**Policy Statement**

*Criteria for Judging the Adequacy of DOE  
Responses and Implementation Plans for  
DNFSB Recommendations*

The Board's authorizing statute requires the Secretary of Energy to respond to each Board recommendation and to subsequently prepare an implementation plan for

those portions of the recommendation that DOE accepts. The statute allows the Board to use its discretion and judgment in assessing the adequacy of DOE responses and implementation plans.

## I. Evaluating DOE Responses

The statute requires the Secretary of Energy to "transmit his response to the Board within 45 days after the date of publication [in the Federal Register] ... of the notice with respect to such recommendation or within such additional period, not to exceed 45 days, as the Board may grant." The Act anticipates responses which accept the Board's recommendations, and responses which reject the Board's recommendations, in whole or in part. As we have already learned from DOE's responses to the Board's first six recommendations, however, there is a whole range of possible written responses that the Board must be prepared to deal with in the future.

For example, DOE may choose to rely upon a response letter which simply states that the Secretary agrees with or accepts a recommendation of the Board. Such action constitutes an unconditional acceptance of the Board's recommendation, and acquiesces in the Board's interpretation of the recommendation's terms and requirements. Any subsequent contradiction or retrenchment from the response's unconditional acceptance in the implementation plan will ordinarily be unacceptable to the Board. Therefore, it is far preferable to air any real differences that DOE may have with the recommendation in the response itself. Moreover, preliminary discussions between the Board, its staff, and DOE prior to the Secretary's issuance of a final response can avoid confusion, disputes, misunderstanding, and wasted effort later in the process.

It should be noted that a response which rejects portions of a recommendation may be an adequate response if, in the Board's judgment, sound reasons are given for rejecting the recommendation, and alternative means of protecting public health and safety are specified. On the other hand, an evasive, nonresponsive, ambiguous, or unclear response which is labeled an acceptance by DOE is not adequate. The Board recognizes that a flawed response, if left uncorrected, will only lead to further problems in the implementation plan.

The following types of DOE responses may be encountered by the Board:

1. A response which says it is an acceptance, but by its language or terms in fact rejects part of the recommendation.
2. Ambiguous responses that could be interpreted either as acceptance or rejection of the recommendation.
3. Failure to address certain issues.
4. Unqualified rejection of the entire recommendation.
5. Silence, or no response.
6. Unconditional acceptance of the entire recommendation consistent with the terms set by the Board.

Comparing DOE responses against this list of response types will assist the Board in sorting out actual DOE acceptances from rejections. A valid acceptance is filed in a timely manner and exhibits three key features: (1) an understanding of what is being asked or recommended; (2) a commitment by DOE to take action to meet the recommendation; and (3) specification of what DOE intends to do so that the Board can determine if all material terms of the recommendation will be met, rather than avoided.

DOE's response need not be detailed or long, provided the Board is satisfied that DOE understands what is being asked and intends to accomplish the recommended action in a timely manner. If a response satisfies the above three requirements, however, it need not present the details of how and when the recommendation will be met-- that is the purpose of the implementation plan.

## II. Evaluating DOE's Implementation Plan

As with responses, the statute, for the most part, gives the Board discretion to use its judgment in assessing the adequacy of implementation plans. The statutory language expresses one major substantive measure of an implementation plan's effectiveness, which is perhaps self-evident. Since the Secretary must ordinarily "carry out" and "complete" implementation in one year, it necessarily follows that the plan must schedule, and otherwise assure, that action is taken to accomplish the recommendation. The statute also imposes two procedural requirements. First, the Secretary must "transmit the implementation plan to the Board within 90 days after the date" of the Secretary's final decision on the recommendation. If additional time is necessary to write the plan, the Secretary may take an additional 45 days, provided he submits the reasons for the delay to the appropriate congressional committees. Second, if the Secretary cannot carry out and complete the implementation plan within one year, he must report the reasons for the delay to the appropriate congressional committees.

The purpose of the implementation plan is to provide a basis and a schedule for assuring that accepted recommendations are accomplished.

### *A. Substantive Criteria*

#### 1. Does DOE understand the Board's recommendation?

DOE's responses give the first indication of whether or not the Board's recommendations have been communicated and understood. If a response is adequate, the implementation plan should track the response in this regard and clearly demonstrate an understanding of the recommendation. If there is a clear restatement by DOE in the implementation plan of the recommendation's goals, or of the underlying issues or problems identified by the recommendation, the Board can then reasonably assume that its initial recommendation was understood. DOE, however, maintains latitude to implement recommendations in a wide variety of ways so long as the Board's recommendations are achieved. Ultimately, the totality of all the terms of plan will exhibit the level of DOE's understanding and acceptance of the recommendation.

#### 2. What does DOE intend to do to accomplish the recommendation?

A clear acceptance of the Board's recommendation in DOE's response is the initial indicator that DOE is committed to achieving the recommended action. On the other hand, if an initial implementation plan incorporates a response which does not signal DOE's intent to fully meet the recommendation, the Board has grounds for serious concern. A specific description of DOE's intended course of action, in the implementation plan itself, is the best indicator of whether DOE is committed to the accomplishment of the recommendation. Such a description can also resolve questions raised by ambiguous or unclear DOE responses, and clarify how DOE has chosen to interpret the recommendation.

If DOE's response meets the terms of the recommendation, and that response is incorporated in the implementation plan by reference, or restated, the Board has reason to believe that DOE intends to comply. That intent must be confirmed, however, by a full review of the details of how DOE plans to accomplish the recommendation.

3. What are DOE's baseline assumptions?

The depth and type of baseline assumptions can vary greatly depending on the recommendation. Most implementation plans will be based on engineering or technical assumptions. Some implementation plans, if not all, will embrace administrative and legislative assumptions also, i.e. compliance provided sufficient funds are appropriated. Important assumptions should be presented in the plan.

4. Has DOE adequately outlined its approach?

DOE's approach must be outlined in sufficient detail to enable the Board to independently assess the approach without doing the underlying work. The plan should address the questions of how the goals relating to safety will be achieved and maintained. The Board should be able to assess whether the approach is reasonable and achievable within the specified time period.

5. Has DOE adequately justified a course of action proposed in the implementation plan?

The plan should contain a sound evaluation of the problem first identified in the recommendation, including a root cause analysis (or summary thereof), so that it is clear why DOE is taking the proposed action. The causes of any technical problems should be identified, when appropriate, not just the administrative controls (or lack thereof) that allowed the situation to occur. Reasons should be given for agreeing with the recommendation, based on DOE's own analysis.

6. Has the plan truly called for completion or closure?

The plan should clearly provide a method for demonstrating completion or closure in a manner that can be easily verified by the Board.

*B. Procedural Requirements*

1. Has DOE submitted the plan to the Board in accordance with statutory deadlines?

2. Has DOE established a realistic and achievable schedule for completion?

Final deadlines, as well as intermediary milestones or checks and deliverables with measures of accomplishment, should be identified in the implementation plan.

3. Has DOE adequately provided for implementation course corrections or process change in appropriate cases?

Complex, long range plans must be flexible enough to accommodate change if necessary. A process should be defined for configuration management or change control so that the proposed action can be modified if additional information dictates, or changes in the assumptions occur.

4. Has DOE provided for quality assurance in appropriate cases?

The Board may require a plan to specify how the quality of the proposed action will be assured. Quality issues include qualifications of people involved, internal checks on the implementation as the task is completed, final verification, independent oversight, and chain of custody on records, samples, other critical data and documentation.

5. Does the Plan provide for adequate reporting in appropriate cases?

A reporting scheme and schedule should be specified to assure the Board remains informed of the status of the progress and any new related issues that may appear.

---

John T. Conway, Chairman

**Appendix—Transmittal Letter to the Secretary of Energy**

October 19, 1990

The Honorable James D. Watkins, Secretary of Energy,  
Washington, DC 20585

Ref: DNFSB Policy Statement No. 1: Criteria for Judging the Adequacy of DOE  
Responses and Implementation Plans

Dear Mr. Secretary: Enclosed please find policy criteria which the Board unanimously adopted for judging the adequacy of DOE responses and implementation plans for Board recommendations. We have previously circulated draft criteria with DOE staff responsible for preparing responses and implementation plans. The use of the criteria, together with the close cooperation of DOE and Board staff, have resulted in more complete and sound responses and implementation plans.

Sincerely,  
John T. Conway,  
*Chairman.*

[FR Doc. 90-25507 Filed 10-26-90; 8:45am]  
BILLING CODE 6820-KD-M

**ALL NUCLEAR FACILITIES IN THE UNITED STATES****ALL DOE NUCLEAR FACILITIES****NON-DEFENSE (CIVIL)  
NUCLEAR FACILITIES****DEFENSE NUCLEAR  
FACILITIES****ASSEMBLY AND TESTING FACILITIES  
FOR NUCLEAR WEAPONS/EXPLOSIVES****TRANSPORTATION FACILITIES FOR  
NUCLEAR MATERIALS, WEAPONS, EXPLOSIVES****\*NAVAL NUCLEAR PROPULSION PROGRAM****DNFSB JURISDICTION****DOE DEFENSE NUCLEAR  
PRODUCTION & UTILIZATION  
FACILITIES****CERTAIN DOE NUCLEAR WASTE  
STORAGE FACILITIES**

\*The Naval Propulsion Program is a joint program of the Department of Defense and the Department of Energy.

## DOE FACILITIES UNDER THE JURISDICTION OF THE BOARD\*

Los Alamos National Laboratory

- o Plutonium Processing Facility (TA-55)
- o CMR Building (TA-3-29)
- o U Storage Facility (TA-3-164)
- o Main Storage Vault (TA-41-1)
- o Waste Disposal Site (TA-54)
- o Tech Shops Addition (TA-3-102)  
Machining of uranium parts in excess of 2 kg is performed in this facility.
- o Icehouse (TA-41-1)  
Routinely handles SNM parts and tritium
- o Omega West Reactor (TA-2)
- o Critical Experiment Facility (TA-18)

Facilities not yet constructed and/or started up

- o Nuclear Materials Storage Facility (TA-55)
- o Special Nuclear Materials R&D Laboratory (TA-55)

Mound Plant

- o SW/R Complex

Sandia National Laboratories

- o Hot Cell Facility (Building 6580), SNLA
- o Annular Core Research Reactor (TA-5), SNLA
- o Sandia Pulse Reactor (TA-5), SNLA

\*Note: The Board's jurisdiction encompasses both the facilities listed herein and any piping or other systems that may connect the facilities.

Waste Isolation Pilot Plant (WIPP)

- o Waste Handling Building
- o Underground

Idaho

- o Idaho Chemical Processing Plant (ICPP), Production Facility/Nuclear Waste Storage Facility
- o Radioactive Waste Management Complex (RWMC)  
Nuclear Waste Storage Facility  
Transuranic Waste Storage Facility
- o Mixed Waste Storage Facility (MWSF), Nuclear Waste Storage Facility

Although the Advanced Test Reactor may be considered a utilization facility by definition, it technically does not "operate for national security purposes," but rather supports the Naval Reactors program which is excluded from Board oversight by E.O. 12344 and P.L. 100-456.

Proposed Defense Nuclear Facilities

- |   |                                     |  |
|---|-------------------------------------|--|
| o | CPP-691                             | Fuel Processing Restoration Facility   |
| o | High Level Waste Tank Farm Upgrade  | New CPP Nuclear Waste Storage Facility |
| o | Calcined Solids Storage Facility #8 | New CPP Nuclear Waste Storage Facility |
| o | Transuranic Storage Modules (4)     | New Nuclear Waste Storage Facility     |

Y-12 Plant, Oak Ridge

- o Building 9212 Enriched uranium operations
- o Building 9206 Enriched uranium operations
- o Building 9215 Enriched uranium operations
- o Building 9215 Depleted uranium operations
- o Building 9998 Depleted uranium casting operations
- o Building 9201-5 Depleted uranium operations
- o Building 9204-4 Depleted uranium operations
- o Building 9204-4 Weapon disassembly & weapon quality evaluation
- o Building 9204-2 Lithium operations
- o Building 9204-2 E Assembly operations

Proposed Defense Nuclear Facility

- o Low Level Waste Disposal Facility (Bear Creek)

Feed Material Production Center, Fernald, Ohio

- o Plant 1 Sampling Plant
- o Plant 2/3 Refinery
- o Plant 4 Greensalt plant (blending operations only)
- o Plant 5 Metal production plant
- o Plant 6 Metal fabrication plant (pickling & inspection only)
- o Plant 8 Scrap recovery plant
- o Plant 9 Special products plant (salt bath only)
- o K-65 silos 1 & 2 Pitch blend storage



- o Plutonium Finishing Plant Complex (200 Area)
  - 234-5Z Plutonium Finishing
  - 236-Z Plutonium Reclamation
  - 242-Z Waste Treatment
- o T Plant Complex (200 Area)
  - 2706T Canyon Building
- o Waste Management Facilities
- o Operational Tank Farms
- o B Plant Complex
- o Grout Treatment Facility
- o Waste Receiving and Handling Facilities
- o 242A Evaporator
- o 222S Laboratory

Facility not yet started up

- o Hanford Waste Vitrification Plant

#### Rocky Flats Plant

- o Plutonium Recovery (Building 371)
- o Waste Treatment (Building 374)
- o Plutonium Analytical Lab (Building 559)
- o Plutonium Manufacturing and Assembly (Building 707)
- o Plutonium Recovery (Building 771)
- o Plutonium Recovery and Waste Management (Building 776)
- o Manufacturing (Building 777)
- o Plutonium Development (Building 779)
- o Product Staging (Building 991)
- o Waste Treatment (Building 774)
- o Waste Storage/Staging (Building 664)

Lawrence Livermore National Laboratory

- o Building 332 Plutonium Facility (contains SIS Engineering Demonstration Facility)
- o Building 625 Transuranic Waste Storage Facility

Savannah River Site

- o P, K, and L Reactors Production operations
- o C and R Reactors Long-term shutdown
- o F Canyon Chemical separations
- o H Canyon Chemical separations
- o F Area Outside Facilities Ancillary operations to F Canyon
- o H Area Outside Facilities Ancillary operations to H Canyon
- o F Area A Line Reduction of U-238 UO3 to powder
- o HB Line Pu-238 Production
- o FB Line Pu-239 Production
- o Pu Fuel Form Fabrication Pu-238 heat source production
- o Actinide Billet Fabrication Rx Target material fabrication
- o Multipurpose Processing Facility Plutonium processing
- o Tritium facilities Tritium processing
- o Receiving Basin for Offsite Fuels Pool storage
- o F & H Area Tank Farms High level liquid rad. waste storage
- o Burial Ground Low level rad. solid waste disposal

- o Experimental TRU Waste Assay Facility      Certification of drummed transuranic waste for long-term storage
- o Production Control Facility      Process laboratory
- o Building 321-M      Rx fuel fabrication facility
- o Building 773-A      Savannah River Laboratory
- o Plutonium Experimental Facility      Developmental work glove box line
- o F&H Effluent Treatment Facility      Low level liquid rad. waste treatment

Facilities not yet constructed and/or started up

- o Defense Waste Processing Facility      High level liquid radioactive waste vitrification
- o Saltstone Facility      Concrete forms for low level fraction of high level liquid rad. waste
- o Uranium Solidification Facility      Uranium reclamation from Uranyl Nitrate
- o Consolidated Incineration Facility      Incineration of low level solid radioactive waste
- o Y Area Solidification and Disposal Facility      Preparation of fuel fabrication waste sludge for burial
- o Mixed Waste/Hazardous Waste Disposal Facility      Stabilization of mixed/hazardous waste forms and vault burial
- o TRU Waste Facility      Retrieval and repackaging of stored transuranic waste drums and certified for long term storage

HQ (facility design/construction)

- o New Production Reactors and nuclear facilities dedicated to supporting these reactors.
- o Special Isotope Separation