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Joint Report by the U.S. Department of Defense and the U.S. Department of Energy

Nuclear Weapons Surety

Annual Report to the President

1987

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MEMORANDUM FOR THE PRESIDENT

SUBJECT: Joint DoD/DOE Annual Nuclear Weapons Surety Report

Attached is the joint Department of Defense/Department of Energy Annual Report to the President on Nuclear Weapons Surety for 1987. It summarizes progress made during 1987 and reports issues where appropriate. The Department of Defense and the Department of Energy will continue to emphasize improvements in the safety, security, and control of nuclear weapons.

Frank C. Carlucci
Secretary of Defense
Date: 14 JUN 1988

John S. Herrington
Secretary of Energy
Date: July 15, 1988

Attachment
As stated

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Joint Report by the U.S. Department of Defense
and the U.S. Department of Energy

Nuclear Weapons Surety

Annual Report to the President

1987

Prepared by:
The Office of the Assistant to the
Secretary of Defense (Atomic Energy)
Department of Defense

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JOINT DEPARTMENT OF DEFENSE/DEPARTMENT OF ENERGY
ANNUAL REPORT TO THE PRESIDENT ON NUCLEAR WEAPONS SURETY, 1987
EXECUTIVE SUMMARY

~~(CNSI)~~ At the request of the President, the Department of Defense (DoD) and the Department of Energy (DOE) report annually on the status of nuclear weapons surety. [redacted] b3 DOE

(U) The Nuclear Weapons Council (NWC) is now a key player in nuclear weapon surety. The NWC gives consideration to safety rules for nuclear weapon system operations prior to Secretary of Defense approval. The NWC Stockpile Improvement Program Review examines those nuclear weapons planned for retention by the Department of Defense. They review all deployed weapons, their operating environment, present stockpile improvement efforts, and Service retirement plans/replacement programs and then make recommendations to the Secretaries of the two Departments as appropriate.

(U) Both DoD and DOE have programs to enhance the safety, security, and positive control of nuclear weapons and special nuclear materials. These include: (1) continued upgrade of security equipment and facilities; (2) installation of electronic intrusion detection systems; (3) commitment to new weapon and weapon modification programs having nuclear weapon safety and use control improvements; (4) enhanced security personnel training programs; (5) a well exercised accident response capability; and (6) continued involvement with our Allies to proceed with modernization of theater nuclear systems.

[redacted]

(U) Significant 1987 efforts include:

[redacted] b3 DOE

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[redacted]

(U) During 1987, the NWC endorsed the initiation of engineering development for warheads for SRAM II and Small ICBM, both to include a full complement of design features for nuclear explosive safety, radioactive material dispersal safety, and warhead use control. The NWC will continue to review and ensure that the SRAM II warhead will maintain compatibility with SRAM A as a backfit contingency.

~~(CRD)~~ Progress has been achieved on each of the continuing issues reported in last year's Nuclear Weapons Surety Report.

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[redacted] Helicopter Accident Resistant Containers (HARC) have been fielded for the M454/W48 (155mm) artillery projectile. An air shipment container for M753/W79 (8") and XM785/W82 (155mm) projectiles is under development and will be fielded in FY88. A delineation of joint DoD/DOE responsibilities for nuclear weapon system safety, security and use control is being developed by the National Security Council staff to reaffirm and consolidate prior national policy and joint Department agreements.

~~(SFRD)~~ Security improvements are continuing in all areas where nuclear weapons are deployed by the DoD - CONUS.

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DOE

[redacted] Progress on all fronts is limited chiefly by fiscal constraints.

(U) Continuing long-term issues that were addressed in 1987, include the following:

(SFRD) [redacted]

(CNSI) The funding available to improve the DoD physical security program is decreasing. As a result, some program completion dates are slipping.

(SFRD) The DoD and DOE recognize that the existence of nuclear weapon systems is necessary for national security and that extraordinary measures for the protection of the public health and safety are required. There are no significant issues of disagreement between the DoD and DOE concerning dual-agency judgments and responsibilities for safety, security, and control of nuclear weapons. [redacted] b3 DOE

Significant progress has been made in nuclear surety during the last year and both Departments believe that the nuclear security posture is satisfactory and the risk to public health and safety is acceptable.

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TABLE OF CONTENTS

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I. (U) Introduction. At the request of the President, the Departments of Defense and Energy report annually the status of safety and security of nuclear weapon systems. The first joint report covered calendar year 1980. Subsequent annual reports provided updates. [redacted] b1 DoE

A. (U) Nuclear Weapons Security: The prevention of unauthorized actions, vandalism, sabotage, malevolent damage, and unauthorized access to nuclear weapons; and the prevention of theft, or diversion of a nuclear weapon, or a nuclear component.

B. (U) Nuclear Weapons Safety: The protection against accidental or unauthorized actions involving nuclear explosives which may result in detonation (high explosive or nuclear). This includes minimizing the possibility of dispersal, or release of hazardous radioactive materials to preclude endangering public health.

1. (U) Nuclear Detonation Safety: The protective measures taken against accidental, or unauthorized actions involving nuclear systems which may result in a nuclear detonation.

2. (U) Radioactive Material Dispersal Safety: The protective measures taken to minimize the possibility of endangering the public health by the accidental dispersal, or release of hazardous radioactive materials in nuclear weapons.

C. (U) Nuclear Weapons Use Control/Use Denial: The system design features and devices incorporated into nuclear warheads and their supporting delivery systems that ensure authorized use of nuclear weapons while inhibiting unauthorized nuclear detonations and preventing unauthorized use of nuclear warheads.

D. (U) Personnel Reliability Program: The program that ensures the suitability and reliability of individuals who perform nuclear weapon duties.

E. (U) Emergency Response: The capability to respond to accidents or incidents involving nuclear explosives, including improvised nuclear devices, and to neutralize, or minimize the adverse consequences.

F. (U) Inspection/Evaluation Programs: The programs that ensure compliance with Department and Service nuclear surety regulations.

(U) Nuclear safety, security, and control is a DoD and DOE shared responsibility. The views of the Department of Defense are primarily contained in Section II and those of the Department of Energy are in Section III. Joint emergency response activities are provided in Section IV.

II. (U) Department of Defense Programs

A. (U) Security

1. (~~S~~RD) Background.

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[redacted] These weapons are deployed in support of both strategic and non-strategic plans and in support of deterrence objectives of both the United States and its Allies. These deployments are not, however, risk free. Because these nuclear weapons must be readily available to the combat commander, and because the deterrent value of nuclear weapons requires that a significant portion of them will survive attack, we cannot hide them away in a few indestructible, impenetrable fortresses. Further, we must balance the day-to-day risk of terrorist attack against operational requirements. We believe the standards and criteria established for the storage and transport of nuclear weapons provide that balance. However, we are mindful of the fact that the capabilities of individual or state-sponsored terrorist groups and adversarial sovereign nations are constantly increasing. We are also mindful of the fact that FY89 and beyond resources are falling. Therefore, we are constantly striving to enhance our security posture while reducing operating costs and manpower requirements.

2. (U) Programs

a. (U) Europe

(1) (~~S~~RD)

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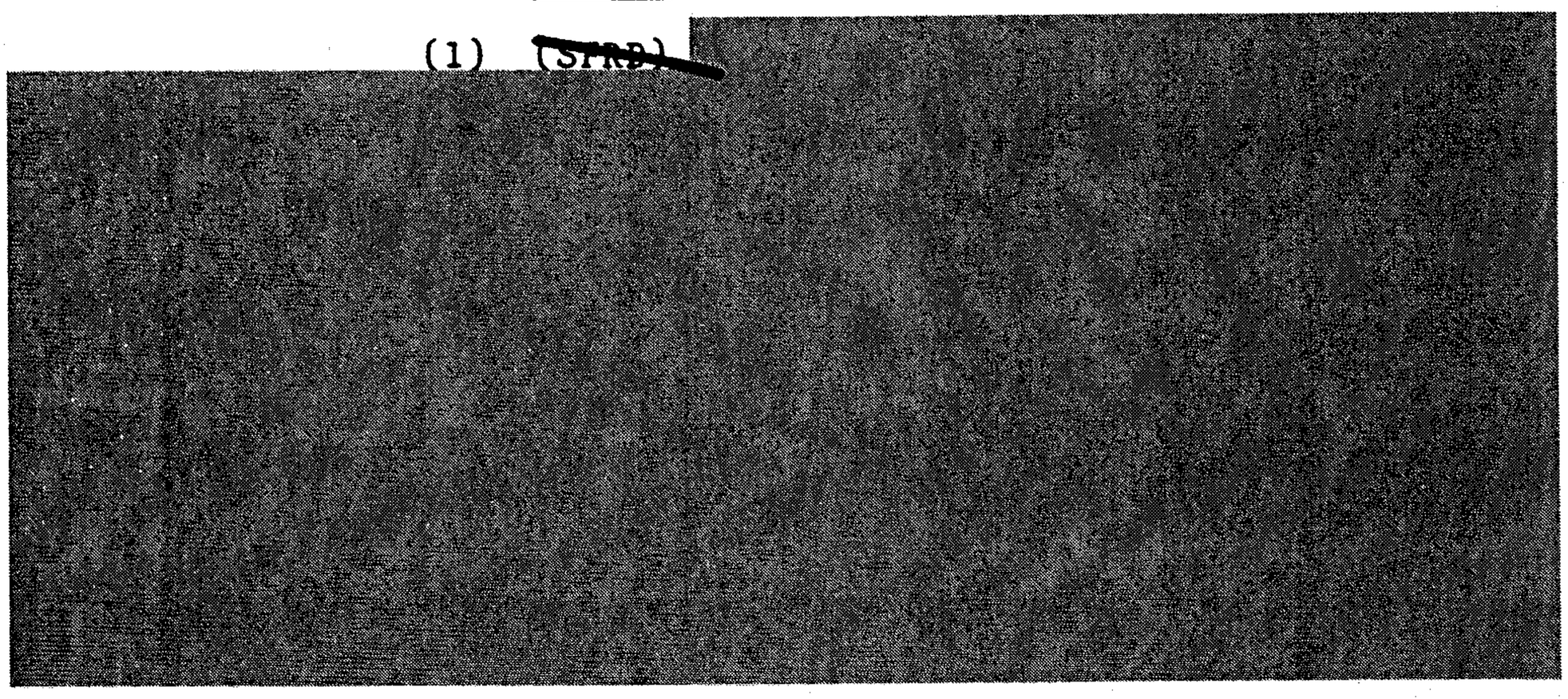

(2) ~~(SFRD)~~ The Air Force has developed a vault system to store aircraft-delivered nuclear weapons. [redacted] In 1987, research, development and operational tests and evaluation efforts were completed. Contract awards are expected in June 1988. To speed execution of this program the Air Force requested funds in FY88 to prefinance installation. Congress approved funding in the FY 1988 Authorization and Appropriation Bills but included legislation that prohibits the Air Force from installing the system in Europe until the Secretary of Defense certifies to the Congress that the system is eligible for NATO common infrastructure funding, and that all steps are being taken to speed the NATO funding process. Because the INF agreement signed in December 1987, will place greater reliance on NATO's dual-capable aircraft, this program has been singled out by SACEUR, the NATO Military Committee, and NATO Ministers as a program that should have the highest priority. NATO has responded to this Congressional pressure by speeding the approval process. However, the NATO funding process is extremely complex and time consuming.

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(3) ~~(SFRD)~~ Although progress is slower than we would like, NATO continues to make progress toward completing the installation of electronic intrusion detection systems (IDS). [redacted]

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(4) ~~(SFRD)~~ The Army program to install weapon access delay systems to enhance protection for nuclear weapons, particularly artillery projectiles (which are man-portable), continues to make progress. [redacted] This

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work is scheduled for completion in August and September 1988, respectively.

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[redacted]

~~(SFRD)~~

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[redacted]

(5) (U) To complement advances in facility and sensor upgrades, NATO security directives have been revised. The new Allied Command Europe (ACE) directive published in November 1987 requires security forces to conduct more realistic training (including periodic force-on-force exercises), calls for the development of equipment and procedures to defeat the vertical threat and requires installation of systems to screen storage structures from stand-off threats.

(6) (U) On individual initiative and without program funding, many U.S. and NATO security units have made noteworthy improvements. They have modified terrain features and constructed vehicle barriers, anti-personnel obstacles, earthen berms to protect storage bunkers, anti-helicopter obstacles, and above- and below-ground deployment routes for security forces. We are seeing more and more of these low-cost, high-return force multipliers in use throughout the European theater.

[redacted]

(7) ~~(CFRD)~~ The Army is continuing efforts to develop a Survivability Overpack Container (SOC) for artillery-fired projectiles. The container will be hardened against small arms fire and fragmentation, and will be compatible with a wide variety of U.S. and NATO vehicles. The SOC container, which is being designed to provide increased survivability on the battlefield, will also provide enhanced security and safety for weapons in storage and transport in peacetime. Initial adversary tests and a European demonstration were conducted from April to August 1987 with successful results. The SOC production program is currently unfunded. If funds can be identified, fielding of SOCs could be scheduled for FY92.

[redacted]

(8) ~~(SFRD)~~

been provided to each of the allied nations responsible for security of U.S. nuclear weapons.

(9) (U) The civil works and sensor upgrade programs currently being carried out in Europe were conceived in the late 1970s and based on a 1970's terrorist threat estimate. During 1987, the NATO Senior Level Weapons Protection Group (SLWPG) began an assessment of the current terrorist threat to determine if significant vulnerabilities still remain, and if so, to develop recommendations for NATO Ministers. Currently, the SLWPG plans to forward its report to Ministers in the fall of 1988.

b. (U) Pacific

(1) ~~(SFRD)~~ [redacted] b3 DoE

(2) ~~(SFRD)~~ All of these sites have completed civil works and intrusion detection system upgrades. [redacted] b3 DoE

(3) ~~(SFRD)~~ [redacted] b3 DoE

Current plans call for installation of these vaults in FY90, but the actual installation dates are dependent on the contract award date and completion of the installation in Europe, which has a higher priority.

c. (U) Continental United States

[redacted] b3 DoE

(2) ~~(SFRD)~~ [redacted] b3 DoE

Recommendations of the evaluation report, published in May 1987, are being implemented by the Army. [redacted] b3 DoE

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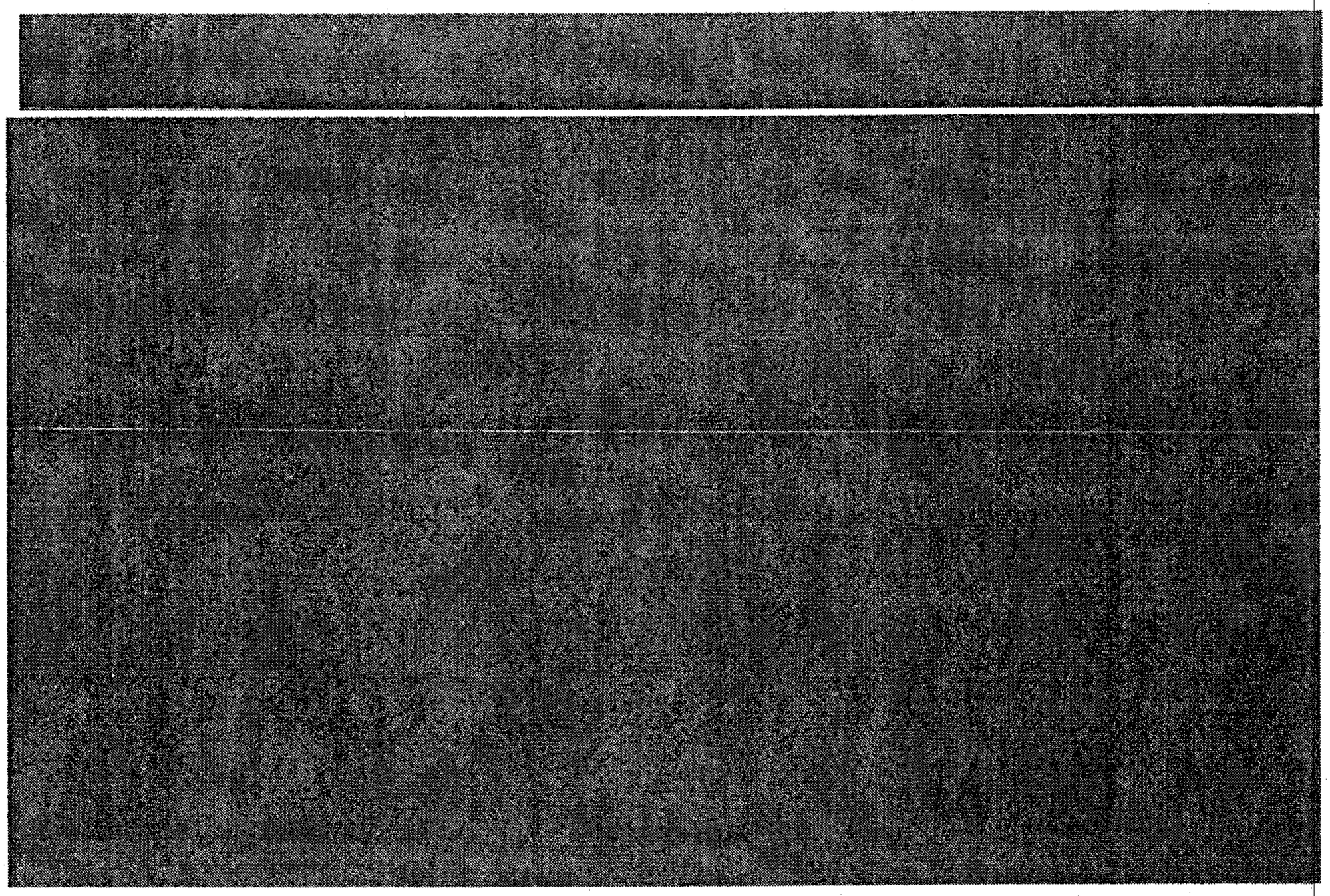
DOE



(5) ~~(SRD)~~

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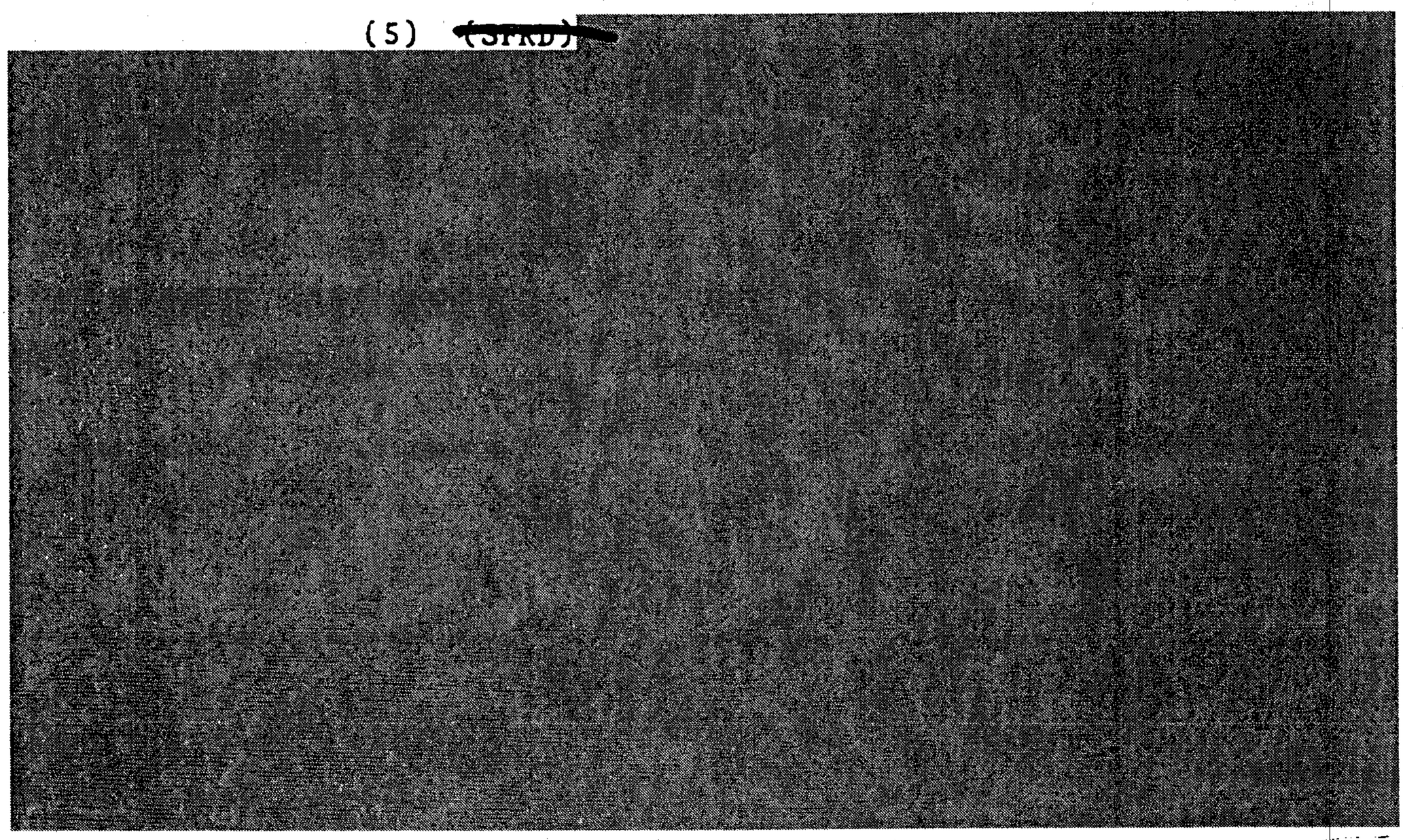

projects is included in the FY 1989 President's budget: three alert taxiway barriers, one alert-aircraft screening project, and two flightline-fencing projects.

(SNSI) Although this activity seems ambitious, the program has been impacted by budget cuts. Five projects were cancelled in FY 1987, and only one was reprogrammed. Three additional projects have been cut from the FY 1989 budget, and recent budget cuts resulted in three more projects being cut from the FY 1990-1994 POM. As a result, SAC has been forced to stretch out the program well into the next century.

(6) (SNSI)

[redacted]

(7) (SRD)

[redacted]

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d. (U) Weapons Afloat

[redacted]

Reductions in FY 1989 program budget of $11,777K eliminated planned procurements for that fiscal year and will require reprogramming for procurement of the remaining 113 required communications units in later years.

(2) (SERD) [redacted]

e. (U) Ongoing Research. In support of the Service security programs, the Defense Nuclear Agency (DNA) conducts research, through exploratory development and/or proof of concept, to develop technologies and techniques to improve the security of nuclear weapons. During FY 1987, DNA continued work on 12 ongoing projects and initiated seven new ones. [redacted]

3. (SERD) Appraisal. The nuclear weapons security posture of the DoD is satisfactory. [redacted]

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[redacted] Each of these areas will be given high priority during 1988 although funding may not be supportive. New initiatives such as the unfunded Army SOC program and other research being conducted by DNA have the potential to enhance nuclear weapon security even more. [redacted]

[redacted]

B. (U) Nuclear Safety

1. ~~(SFRD)~~ Nuclear Detonation Safety. During 1987, the overall nuclear detonation safety of the stockpile continued to improve. [redacted] b3 DoE

Deployment of the Ground Launched Cruise Missile (to be terminated in 1988 by the INF agreement), TOMAHAWK Sea-Launched Cruise Missile, Air-Launched Cruise Missile, Trident I, and Peacekeeper systems continued. All new nuclear warheads in development have modern nuclear detonation safety. They will provide safer, more predictable responses in accident environments. Until such time as the whole stockpile is modernized, striving to use only modern weapons for those peacetime operations with higher accident potential or terrorist vulnerability will continue. For example, the intent is to use the most modern weapons for alert aircraft, allowing the less modern weapons to be kept in more secure storage environments.

a. ~~(CFRD)~~ SRAM-A, an alert aircraft weapon that does not have modern nuclear detonation safety features, has been a special concern of DoD/DOE. [redacted] b3 DOE

b. ~~(CFRD)~~ The operational need and nuclear safety of the B28FI bomb, a second alert aircraft weapon that does not meet modern nuclear safety requirements, was reviewed by the DoD (in April 1988). [redacted]

c. ~~(SFRD)~~ [redacted] b3 DOE

2. (U) Radioactive Material Dispersal Safety

a. ~~(CFRD)~~ Nuclear warheads contain radioactive material in combination with high explosives. An accident or terrorist attack causing detonation of the high explosives in these weapons would result in radioactive contamination of the

surrounding area. The traditional approach to this potential problem has been to prevent accidents by careful control of all nuclear weapon operations, and to provide a secure environment that precludes successful attacks by adversaries. No radioactive material dispersal incidents have occurred since 1968. Conventional high explosive nuclear weapons that are either on aircraft alert or are helicopter transported present the greatest risk to material dispersal.

b. (C/RD)

[redacted]

c. (U) The joint Technical Assessment and Operational Impact Groups (TAG and OIG), previously associated with the Military Liaison Committee's DoD/DOE Plutonium Dispersal Steering Group, continue to function and advise the NWC. During 1987, the TAG and OIG reevaluated plutonium storage limits of three current NATO storage sites and one new CONUS storage site. The groups also reviewed the transportation protection equipment (ARC, HARC, and SOC) reported elsewhere in this report.

3. (U) Helicopter Safety. The vulnerability of rotary wing aircraft transporting nuclear weapons to collisions with aircraft flying at low altitudes was highlighted in the 1986 Nuclear Weapons Surety Report. In a continuing effort to ensure the risk of plutonium (PU) dispersal incidents is minimized, the Army began use of the Helicopter Accident Resistant Container (HARC) overseas for the M454/W48 artillery projectile. From the viewpoint of Pu scatter, use of the HARC has made movement of this system considerably safer. This is not without cost. The use of HARCs is time-consuming and manpower intensive. An Interim Transportation Overpack Container (ITOC) will be introduced in Europe in FY88 to provide similar transportation protection for the M753/W79 and XM785/W82 projectiles.

[redacted]

[redacted]

5. [redacted]

[redacted]

6. (U) Nuclear Safety Studies and Operational Safety Reviews. During 1987, 16 nuclear weapon system safety studies (3 Army, 7 Navy, and 6 Air Force) and 7 operational safety reviews (2 Army, 3 Navy, and 2 Air Force) were conducted. Recommendations to improve safety were provided to the Service Headquarters. All the Services are using a reporting process that periodically provides the status of study and review findings and recommendations to appropriate agencies within both Departments.

7. (U) Nuclear Weapon System Safety Rules.

a. (U) Nuclear weapon system safety rules govern all operations with nuclear weapons. Their consideration is one of the responsibilities of the NWC. They provide the procedural safeguards necessary to ensure that the weapon systems meet DoD nuclear weapon system safety standards. Safety rules are developed during formal safety studies and safety reviews conducted by safety study groups made up of specialists from the military department fielding the weapon system, the DOE, and the Defense Nuclear Agency (DNA). These rules are coordinated by the cognizant military departments, DNA, DOE, the Joint Chiefs of Staff (JCS), and the Assistant to the Secretary of Defense (Atomic Energy), before they are approved by the Secretary of Defense. A revision to the nuclear weapon system safety directive DoDD 3150.2 is being staffed to delineate NWC surety responsibilities.

b. (U) During 1987, the Secretary of Defense approved safety rules for one new system (Tomahawk Vertical

Launching System), and revisions to eight existing nuclear weapon systems (8-inch M753/W79, LANCE/W70, 155mm M454/W48, B-52 G/H, F-111 A/D/E/F, SUBROC, SH-3D/SH-3H, [redacted] A brief description follows:

[redacted]

(9)

[redacted]

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8. ~~(U)~~ Appraisal. Significant progress was made in nuclear safety during 1987. Development and deployment of systems with modern nuclear safety features continues. Transportation and storage safety improvements have been made in 1987. Initiation of engineering development of W89/SRAM II to

replace the W69/SRAM A is a major step forward. Increased attention is being given to replacing the weapon systems having older nuclear warheads that do not meet modern nuclear design criteria.

C. (U) Use Control

1. (U) Progress

a. ~~(SRD)~~ [redacted]

b. (U) During 1987, unauthorized launch analyses were completed as described in the Safety Section.

c. (U) The SICBM/W87-1, which entered full-scale engineering development in 1987, [redacted]

d. (U) The SRAM II/W89, which is about to enter full scale engineering development (Phase 3), [redacted]

e. ~~(CRD)~~ Much work has been done to develop a comprehensive DoD use control policy. A new directive is being written to provide a comprehensive policy statement for implementation of use control and will provide a means for continuing assessment of use control applications.

f. (U) The joint DoD/DOE Use Control Project Officers Group (POG) provides a forum to review and make recommendations for the application of use control measures that best integrate policy, technology, procedures, and requirements. The POG members come from the Army, Navy, Air Force, Unified and Specified Commands that are allocated nuclear weapons, the Joint Staff, DOE, and Los Alamos, Lawrence Livermore, and Sandia National Laboratories.

2. (U) Appraisal. Implementation of improved use control measures continued in 1987. The use control community has become more cohesive, and comprehensive policy, procedures and personnel requirements are being codified.

D. (U) Personnel Reliability Program

1. (U) Progress. Every individual assigned to a nuclear duty position must be formally certified in accordance with the standards of the Personnel Reliability Program. This certification is given only after a review of personnel records, a favorable medical evaluation, an interview by the certifying official, and completion of a required security investigation. Strict adherence to this policy continued and resulted in the DoD having a total of 94,321 certified personnel in the program in 1987. A significant strength of the program is that the certification process is continuous. Continuing observation and evaluation of each individual in the program is required and this resulted in 2,524 personnel (2.68 percent) being permanently decertified in 1987. The decertification rate steadily declined from 4.95 percent in 1982 to 2.59 percent in 1986. With the percentage holding at about the same level for 1987, we may have reached a stable decertification rate of between 2.5 and 3 percent. Continuation of a 2.5 to 3 percent rate will bear out our earlier conclusion that drug testing policy and quality of our armed forces have had much to do with the overall decline in decertifications.

2. (U) Appraisal. In 1987, OSD initiated an independent review of the PRP by a civilian contractor. The review will take a year to accomplish and will investigate the decline in the percentage of people permanently decertified, the relevancy of the goals of the program and effectiveness in achieving them, and new personnel evaluation methods which are cost-effective and may warrant inclusion in the program. Meanwhile, review of the effectiveness of the Personnel Reliability Program through technical inspection programs and oversight visits continues to assure that the program is meeting required standards.

E. (U) DoD Nuclear Weapons Technical Inspection (NWTI) Program

1. (U) Progress

a. (U) The DoD Nuclear Weapons Technical Inspection (NWTI) system requires Service or Defense Nuclear Agency (DNA) inspections of nuclear-capable units. These inspections assure compliance with pertinent DoD, joint and Service publications. Inspections include, as a minimum, the examination of: management and administration; technical operations; tools, test, tie-down and handling equipment; storage and maintenance facilities; condition of stockpile; security; safety; supply support; Personnel Reliability Program; logistic movement; and special interest items as tasked by the Office of the Secretary of Defense and the Joint Chiefs of Staff.

b. (U) In addition to traditional inspection methods, the Joint Nuclear Surety Inspection (JNSI) concept was introduced in 1987 to provide a better assessment of selected Army/NATO nuclear-capable units. During the JNSI, DNA inspects the U.S. Forces and the Service team inspects the NATO host nation forces. This concept is currently employed only with selected Army/NATO custodial units.

c. (U) The Air Force and Navy have continued their respective Minimum-Notice NWTI programs. The Army has continued to conduct Minimum-Notice Physical Security Inspections of their sites.

d. (U) Memoranda of Agreement (MOAs) between the DNA and the Departments of the Army and Air Force were revised in 1987. These revisions consolidated previous agreements, introduced JNSIs, and updated terminology.

e. (U) The JCS reevaluated the need for periodic reporting of inspection data by DNA and eliminated this requirement. However, an annual report is still submitted by Field Command, DNA, to DNA.

f. (U) At the request of the Office of the Under Secretary of Defense for Policy, the following special interest items were evaluated during Defense Nuclear Surety Inspections:

(1) (U) Impact of waivers, exceptions, variances, and compensatory measures on overall security.

(2) (U) Adequacy of intrusion detection sensor systems testing.

(U) Although an interim response has been submitted, a relatively small sample size precluded a comprehensive evaluation. Consequently, these special interest items will continue to be evaluated during 1988.

2. ~~(CFRD)~~ Appraisal. DNA continues to annually inspect 20 to 25 percent of each Service's certified nuclear-capable units. The number of certified and nuclear-capable units subject to Defense Nuclear Surety Inspections during the period [redacted] Following correction of noted deficiencies and, in some cases, reinspection by the Service involved, no unit rated UNSATISFACTORY was decertified from performing its wartime mission.

III. (U) Department of Energy Programs

A. (U) DOE Responsibilities for Nuclear Surety

(U) Department of Energy Role. DOE has the primary responsibility for identification, design, development, and incorporation of the nuclear weapon hardware features that provide assured nuclear safety and use control. It has an active program for developing technology to enhance physical security and for implementing improved physical security at DOE facilities. This technology is shared, where appropriate, with the DoD for use at its facilities. High-level oversight of nuclear surety issues is provided by the DOE Safety, Security, and Control (S^2C) Committee. On a continuing basis, DOE provides members to two joint DoD/DOE safety groups, the Services' Nuclear Weapon System Safety Groups (NWSSGs), the joint DoD/DOE Plutonium Dispersal Technical Assessment and Operational Impact Groups, and weapon-specific Project Office Groups.

(U) In monitoring the Services' nuclear weapon safety programs, as part of its dual-agency responsibility, the DOE concludes that progress has been made in responding to recommendations generated by the NWSSGs per DoD Directive 3150.2. DOE weapon safety personnel will continue their monitoring role to ensure appropriate implementing actions by the Services.

B. (U) Physical Security for Nuclear Facilities

1. (U) Goals/Requirements. The continuing goal of the Department's safeguards and security program is to provide balanced, cost-effective protection for nuclear weapons under the control of the DOE. Last year it was reported that while the generic threat policy statement would continue to serve as a major element in our program, the Department was considering an assessment of risk and consequences through Master Safeguards and Security Agreements (MSSAs). The MSSAs strike a balance between inherent risk and incremental costs associated with additional protection measures for DOE's major facilities. During 1987, high level emphasis was placed on the MSSA program resulting in the development of an MSSA order and guide, the completion of several MSSAs, and the planning and development of an additional 25. Continued emphasis will be placed on the MSSA program during the next year, and the generic threat guidance will undergo a review and update, as necessary.

2. ~~(CFRD)~~ Improvements/Upgrades. During 1987, the Department continued to make progress toward improving the protection posture of its facilities and operations involved with assembled nuclear weapons and nuclear test devices. This included protection enhancements provided by short and ongoing long-term construction upgrades at the Pantex Plant in Amarillo,

Texas; the Nevada Test Site (NTS) in Mercury, Nevada; and, the nation-wide nuclear weapons transport operation administered by the Albuquerque Operation Office's Transportation Safeguards Division (TSD). Also, some 25 safeguards and security orders were updated. This assures a continued sound policy basis upon which the safeguards and security program for Pantex, NTS, and TSD must be founded. Notwithstanding the progress that has been made in the last year, several ongoing major construction upgrades will not be completed until the mid-1990 timeframe. The Department continues to be concerned about the potential threats posed by insiders. As such, in 1987 emphasis was placed on the development of programs for deterring insider actions, reducing the probability of an insider threat, detecting such a threat, and mitigating the consequences of such an act should one be attempted. Due to the uniqueness of Pantex, NTS, and TSD, a site-specific application of several additional measures will be used; such as human reliability, physical security and material control and accountability emphasis, compartmentalization of operations, and procedural enhancements.

~~(CFRD)~~ Even with the above enhancements, the Department will continue to investigate areas to further improve its facilities and operations critical to national security at Pantex, NTS, and TSD. DOE remains fully committed to assuring effective protection systems are in place to prevent acts of theft or sabotage that could disrupt or endanger the nation's nuclear weapons stockpile or threaten public health and safety. A more detailed review of these facilities and operations is contained in the DOE Annual Report to the President on Domestic Safeguards and Security.

3. (U) Technology Research and Development (R&D). The basic mission of the Department's safeguards and security technology development program is to support field managers in cost-effective application of state-of-the-art technologies for protection of DOE facilities, property, classified matter, and special nuclear materials. The strategy is directed toward reducing safeguards and security risks and operational costs, including manpower requirements and capital costs. This program anticipates future Department multi-facility needs, supports new concepts and systems for meeting these needs, and develops innovative methods to prevent obsolescence of existing plants and operations. The present thrust is to address the insider threat, reduce operational impact and costs, and provide relief from manpower-intensive measures. An integral part of the Department's technology development activity is the dissemination of developed technology, not only throughout the DOE but also to other Government agencies. Interagency contacts are maintained to take advantage of related research and development and to prevent unnecessary duplication of effort. Funding for the Department's 1987 program was $23.5M, excluding international

safeguards which receive separate funding from the Department of State. Highlights of significant tasks for 1987 are as follows:

a. (U) Field testing of a mass spectrometry explosive detector prototype unit was successfully completed at Oak Ridge, Tennessee. Continued emphasis will be placed on the development of state-of-the-art explosive detection units which can be used at the Department's critical facilities.

b. (U) Technical options were evaluated for the protection of classified information. These included techniques for preventing unauthorized removal of documents and a prototype of a paperless classified information system.

c. (U) In the nuclear materials control and accountability area, significant achievements were made to include the construction of an automated titration prototype system for high precision assay. Measurement-related safeguard activities at several key DOE facilities were evaluated and conceptual requirements were developed for an integrated safeguards and security system for the planned Special Isotope Separation Production Plant. The above activities are examples of the extensive range and scope of work that was supported in 1987 by the Department's safeguards and security R&D program.

C. (U) Weapon Safety and Use Control

1. (~~CRD~~) Goals/Requirements. A nuclear weapon can exist in various configurations from the time it is produced until it is retired; e.g., as a bare warhead or bomb being delivered to the DoD, or as a warhead or bomb mated with the delivery system and standing alert. For each configuration, nuclear weapon system safety studies and reviews are periodically required; a safety study which results in development and approval of safety rules is always required before a proposed operation on, or involving, a nuclear weapon may be taken.

a. (U) Weapon Safety. The DoD and DOE have separate, but similar, sets of safety standards which prescribe positive measures to be taken to attain maximum safety (and security). The DoD standards defined in DoD Directive 3150.2 apply to the whole weapon system, of which the DOE warhead is a part. The combination of weapon system design safety features, operational procedures, and special safety rules ensure strict adherence to these standards. In addition to meeting the minimum requirements as stated in the standards, the goal of the nuclear weapon system safety process, as stated in the above directive, is to provide maximum safety consistent with operational requirements throughout the stockpile-to-target sequence (STS).

(U) [redacted]

~~(CFRD)~~ These quantitative requirements have been a part of all MCs for warheads developed since early 1968. Warheads with modern nuclear detonation safety design criteria meet these requirements and will respond predictably in abnormal accident environments. The first nuclear weapon meeting these more stringent requirements was the [redacted]

b. ~~(CFRD)~~ Use Control. The goal of use control is to provide high assurance that nuclear weapon systems can be detonated only if authorized by the National Command Authorities. As part of this goal, mechanical combination locks and permissive action links (PALs) have been incorporated in selected weapons since the early 1960's. Category A through F PALs are code-controlled devices incorporated in the weapon's electrical systems. [redacted]

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2. (U) Weapon Systems Review

a. (U) Stockpile (Post-Production) Concerns/Status

(1) ~~(SFRD)~~ Stockpile Improvement Program (SIP) Weapons. The Stockpile Improvement Program activities to address safety and use control concerns continued in 1987 for the following stockpile weapons:

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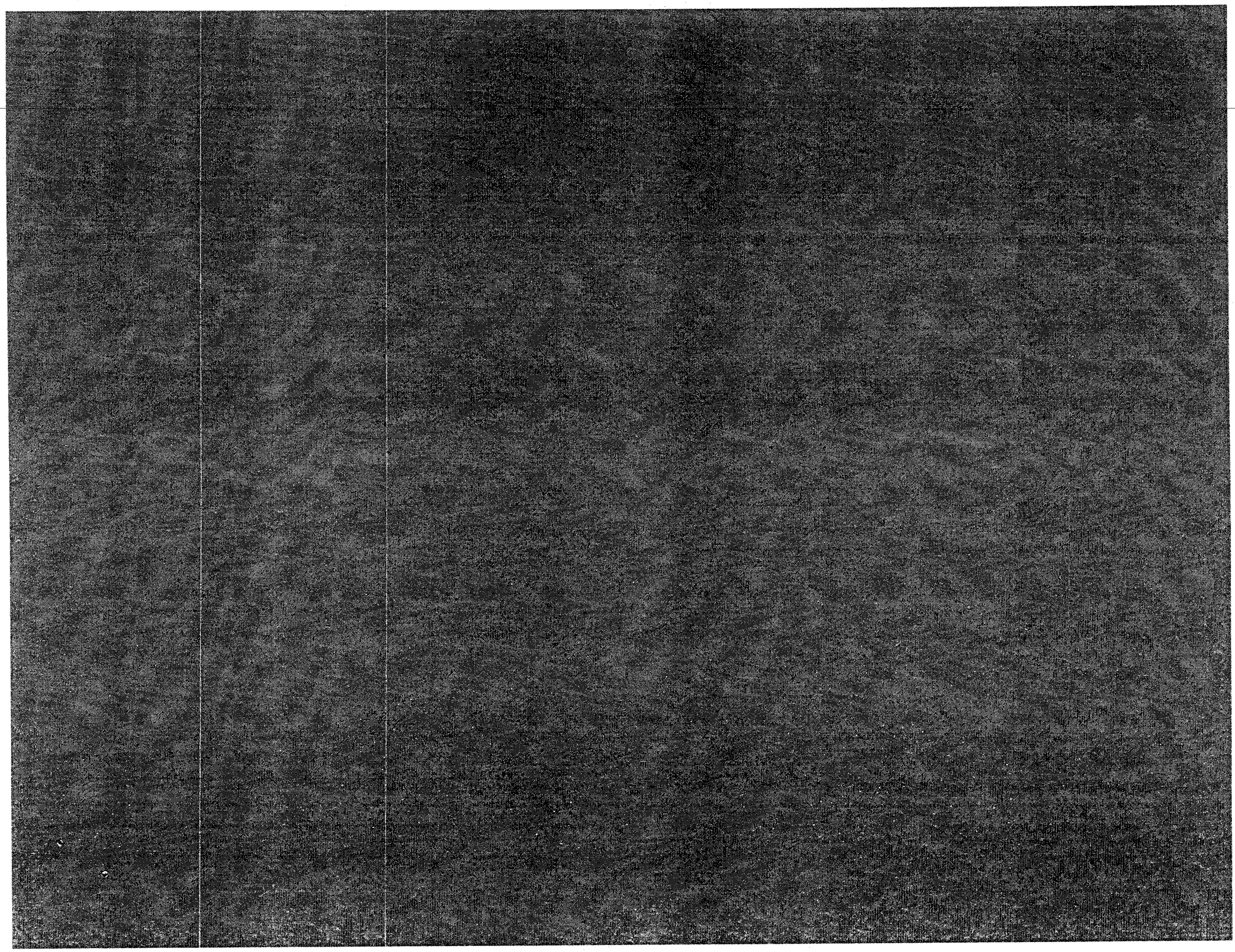
(a) ~~(SFRD)~~ [redacted] While the safety improvements are significant, the retrofitted bombs still do not fully meet the above modern



[redacted]

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(2) ~~(SFRD)~~ Other Stockpile Weapons. The following weapons, unless otherwise noted, [redacted]

[redacted]

(e) ~~(SFRD)~~

[redacted]

(f) ~~(CFRD)~~ W50. A joint Army/DOE study determined that it is technically and economically feasible to modify existing W85 warheads for use on Pershing 1a missiles. However, since the INF agreement will eliminate this system this activity has been terminated.

[redacted]

(i) ~~(CRD)~~ W55. [redacted]

(j) ~~(CRD)~~ W56, W62, W68.

[redacted]

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to finish development and testing. In addition, execution of this option will require a joint DoD/DOE integration program.

(m) ~~(CFRD)~~ W70.

[redacted] The FY87 Appropriations Act prohibited the study of a nuclear warhead for the Army Tactical Missile System (ATACMS), one of the missile candidates. The FY 88 DoD Authorization Act did allow the study of ATACMS in a nuclear role. The study for FOTL will begin in 1988.

(n) ~~(CFRD)~~ W76.

[redacted]

(o) ~~(CFRD)~~ W78.

[redacted]

(p) ~~(SFRD)~~ W79. The W79 AFAP

[redacted]

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Efforts are underway to incorporate fire-resistant protection in the Army's as yet unfunded Survivability Overpack Container (SOC) for transportation and storage.

(q) ~~(CFRD)~~ W85.

[redacted]

When Pershing IIs are withdrawn, the INF agreement will allow W85 assets, which have the most modern safety and control features, to be used for other weapon systems.

b. (U) Production

(1) (U) B61-3, 4. [redacted] Low rate production of these bombs allows replacement of B57s and B61-2s and -5s in the tactical Air Force inventory.

(2) (U) W80-0,1. The W80-0 for the Sea-Launched Cruise Missile and the W80-1 for the Air-Launched and Advanced Cruise Missiles [redacted]

(3) (U) [redacted] These bombs are replacing B43s and B28s and are needed for use with high performance modern aircraft (B-1B, B-2).

(4) ~~(CRD)~~ W84 [redacted]

(5) (U) W87. The W87 nuclear warhead for the Peacekeeper intercontinental ballistic missile entered the stockpile in 1986. [redacted]

c. (U) Development

(1) ~~(SRD)~~ W82. [redacted]

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[redacted]. Efforts are underway to improve nuclear safety during logistical shipments. The development and fielding of the Army's Survivability Overpack Container (SOC), which is currently not funded, has been requested to be fielded coincident with the initial operating capability (IOC) of the W82.

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[redacted]

[redacted] Additional technical details of the safety assessment will be evaluated in 1988 by the DoD Design Review and Acceptance Group (DRAAG) and the Nuclear Weapon System Safety Group (NWSSG).

(2) [redacted] W88.

[redacted]

(3) (U) W87-1 Small Intercontinental Ballistic Missile (SICBM). The DOE accepted the DoD request for full-scale engineering development in November 1987 and activities have begun. The warhead has been designated the W87-1 because of design similarity to the W87/Peacekeeper. As with the fielded W87-0 in the Peacekeeper application, [redacted]

(4) (U) Short Range Attack Missile II (SRAM II). Phase 2A for a nuclear warhead for the air-to-ground SRAM II, to be carried by strategic aircraft, was completed in 1987, and the start of full-scale engineering development is anticipated in 1988. [redacted] (See the W69 section for SRAM A compatibility discussions.)

(5) [redacted]

[redacted]

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[redacted]

d. (U) Weapon System Related Activities

(1) (U) DCU-254. Production of this new AMAC controller for the F-111E aircraft is nearing completion, and aircraft modification has begun. This program equips all F-111E aircraft with a capability to unlock [redacted] and to generate the intent unique prearming signal directly from the cockpit which will improve overall weapon system safety. After completion of this program and a similar one on the B-52 aircraft, all Air Force nuclear-capable aircraft except the F-111A, F-111D, and F-4 series will have the cockpit USG capability.

(2) ~~(CNWDI)~~ Code Activated Processor (CAP). This new coded switch will allow recode and verify operations to use cypher text rather than plain text Top Secret COMSEC data with its attendant security procedures and restrictions. The first applications of this new switch are scheduled on the [redacted]

[redacted]

development of a PAL code/key management system to complement the SRAM II cypher text recode capability. [redacted] b3 DOE

3. (U) Technology R&D.

[redacted]

b. (U) Coded Explosive Logic System (CELS). This concept is being developed to enhance the safety and security of nuclear weapons. [redacted] b3 DOE

Randomly applied pulses, as in a lightning strike, have a low probability of fulfilling the requirements. Unauthorized use of the weapon would be significantly delayed, if the specified CELS time code were protected. This concept is being considered in new phase 1 and 2 proposals.

[redacted]

d. (CRD) [redacted] b3 DOE

4. (U) Safety Group Activities

a. (U) Nuclear Weapon System Safety Groups (NWSSGs). During 1987, DOE participated in 42 nuclear weapon system safety studies, and operational safety reviews conducted by Service NWSSGs. Additionally, DOE participated in 19 special safety meetings with DoD and coordinated two field trips to DOE facilities for Service NWSSGs. Results of these activities are reported throughout this report.

b. (U) Nuclear Explosive Safety Study Group. The internal DOE Nuclear Explosive Safety Program has been very active during 1987. Fifty-five nuclear explosive safety studies/surveys were completed during this time frame. The studies included master studies for certain aspects of

operations, security, transportation and testers at the Pantex Plant and the Nevada Test Site. The 10-year reevaluation of weapon programs at the Pantex Plant is current for all Lawrence Livermore National Laboratory programs and is continuing on schedule for the Los Alamos National Laboratory programs.

c. (U) Safety, Security and Control (S^2C) Committee. The S^2C Committee, composed of senior DOE and design laboratory officials, was convened four times during 1987. The purpose of this committee is to review the broad Defense Programs responsibilities for nuclear weapon safety and security, and the dual-judgment and check-and-balance roles for nuclear weapons and nuclear weapon systems in the custody of the DoD. An update of the 1977 stockpile modernization study is currently under way to prioritize needed safety, security and control improvements through replacement or Stockpile Improvement Program (SIP) actions.

D. (U) Personnel Assurance Program (PAP)/Human Reliability Program (HRP).

1. (U) Personnel Assurance Program (PAP). The DOE PAP continues to provide a high level of confidence that individuals performing nuclear explosive operations are reliable. Evaluations of the program during 1987 for all participating organizations -- production facilities, laboratories and DOE -- confirmed that all programs are being well-managed and were complying with DOE orders. All personnel who could have access to nuclear explosives at the Pantex Plant, including individuals who have contingency requirements, are now in the DOE PAP. There are now about 1600 people in this program at the Pantex Plant and near 2000 in the program as a whole.

2. (U) Human Reliability Program (HRP). The HRP is a security-oriented effort to assist in dealing with what is referred to as the "Insider Threat." It is a position specific program that requires a special security clearance. Each individual in the program will be required to undergo annual clearance, medical and supervisory reviews. The DOE Order for this program is in the final stages of approval.

E. (U) Inspection and Evaluation

1. (U) Description.

a. (U) The Office of Security Evaluations (OSE) conducts a management-level, performance-oriented inspection and evaluation (I&E) program which includes inspections of DOE field operations offices and the protection systems under their administration and reviews of 59 key DOE facilities as directed by the Secretary of Energy. Reporting directly to the Assistant

Secretary for Defense Programs, OSE has the safeguards and security oversight mission for the DOE. The objective of the OSE inspection program is to provide independent assessments of the effectiveness of safeguards and security policy and protection programs. The OSE inspection program focuses on DOE operations through site-by-site reviews of facilities, programs, and work administered by the operations offices.

b. (U) During 1987, eight sites/activities under three operations offices were inspected and/or evaluated with emphasis on operations office management of these facilities. Pre-inspection planning visits were made to each operations office and facility for the purpose of requesting documentation, interviewing key personnel, and collecting information in order to prepare an inspection guide for each protection program area selected for inspection. Planning for an inspection included reviews and analyses of previous inspection results, specific vulnerability analyses and studies, operations office security surveys, DOE site specific planning policy and guidance, and other documentation relevant to each site.

2. (U) Results.

a. (U) Overall, the protective program operations, information security procedures, the control and accountability of classified material, and personnel and physical security systems employed at DOE locations generally met the identified protection needs. Although some deficiencies existed, they were not found to be serious. On balance, the protective forces possess a sound foundation of skills and knowledge which provided adequate assurance that they could provide the required level of protection of DOE interests.

b. (U) The elements of the physical security systems combined to effectively protect critical facilities, information, and materials from sabotage, deliberate destruction and unauthorized removal or compromise. Although administrative discrepancies were noted throughout inspected facilities, the cognizant operations office took appropriate actions to correct the vulnerabilities.

IV. (U) Joint Emergency Preparedness and Response

A. (U) Preparedness for Weapons Accidents

1. (U) General Assessment

a. (U) In the event that a U.S. nuclear weapon is involved in an accident, DoD or DOE (depending on custody at the time) will lead a joint response team. In the event that a U.S. nuclear weapon is lost or stolen, or that a credible improvised nuclear device (IND) or a radioactive material dispersion threat requires action, DOE's Nuclear Emergency Search Team (NEST), with all associated assets and other federal agency support will respond.

b. (U) In accordance with the provisions of the Federal Radiological Emergency Response Plan, DOE is also responsible for directing the activities of the Federal Radiological Monitoring and Assessment Center, which coordinates the monitoring and assessment of actual or potential radioactive contamination in the immediate area and downwind of the accident site and furnishes this information and guidance to state and local agencies. The Federal Emergency Management Agency (FEMA) is responsible for coordinating federal support to the state and local agencies. Significant progress in improving a coordinated federal response to nuclear weapon accidents was made in 1987 through exercises and formal training.

c. (U) Exercises concerning nuclear weapon accident, theft, and loss, as well as IND threats are conducted to improve coordination between all participating federal agencies. These exercises provide the means to develop procedures for the interaction between those agencies and state and local government organizations. In 1987, exercises were conducted to test: notification procedures; the ability of a multiagency command and control structure to function effectively; and, the capability of new technical procedures to locate and prevent detonation of lost or stolen nuclear weapons and INDs. In addition, exercises were conducted addressing the consequences of a nuclear event, i.e., post-detonation, or the release of radioactive material from a nuclear power plant or nuclear fuel facility.

2. (U) Exercises

a. (U) JOINTEX I. This was a regional field training exercise by FEMA Region IX in May 87. The exercise was conducted in the State of California, and the participants included DoD, DOE, DNA, State of California, Sacramento County and Beale and Mather Air Force Bases. The first in the series of regional exercises pointed out the definite need for better communications between all response forces prior to an accident

and demonstrated the need for improved exercise planning and development.

b. (U) BUSY FORCE. This exercise was the Annual Air Force Service Response Force Exercise and was conducted at Smokey Hill ANG Range in Salina, Kansas, in August 1987. Participants included DoD, DOE, DNA, SAC, McConnell AFB, FEMA Region VII, and the State of Kansas. This field exercise provided an opportunity for the Joint DoD/DOE crisis management technical organization to interact with the local, state and regional civilian organizations in accordance with the Nuclear Weapons Accident Response Manual and the Federal Radiological Emergency Response Plan.

c. (CNSI) [redacted]

d. (SFRD) [redacted]

e. (SFRD) [redacted]

3. (SFRD) Training. The capabilities of DoD and DOE for responding to a nuclear weapon or component accident are maintained through effective training programs conducted primarily at the Interservice Nuclear Weapons School. Theater-specific training courses have been developed for EUCOM and PACOM. DoD, DOE, DNA and DoS continued a program to provide information and guidance for embassies worldwide on their contingency plans regarding response to an accident involving nuclear weapons.

4. (U) Response Capabilities

a. (U) Accident Response Group (ARG). The ARG consists of a group of DOE nuclear weapon specialists who

maintain a positive, continuing capability to provide immediate response to peacetime accidents and significant incidents involving nuclear weapons. The ARG program has successfully incorporated nation-wide DOE emergency preparedness and response resources into plans and operations.

b. ~~(SFRD)~~ Atmospheric Release Advisory Capability (ARAC). ARAC is a DOE and DoD-supported real-time computer-based emergency response calculational system designed to estimate the environmental and public health consequences of an accidental release of radioactive material to the atmosphere.

[redacted]

c. (U) Nuclear Emergency Search Team

(1) ~~(S NOFORN)~~ The Nuclear Emergency Search Team (NEST) is a joint DOE/DoD organization.

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[redacted]

(2) ~~(S NOFORN)~~

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5. (U) Significant Initiatives with Allies

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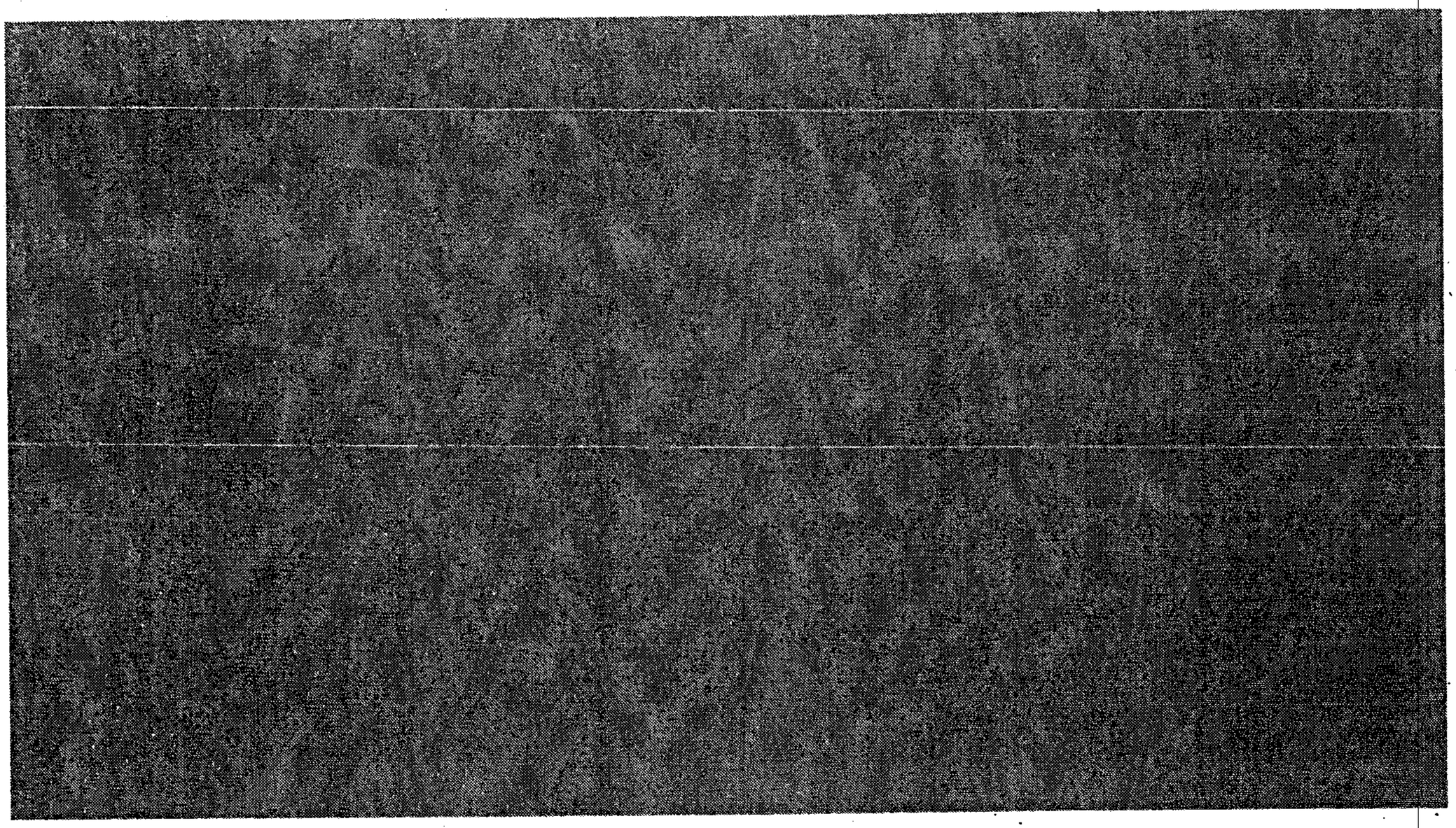
[redacted]



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B. (U) Response.

(U) Accidents and Significant Events. There were no nuclear weapon accidents or significant events in 1987. However, the 1968 accident at Thule, Greenland, has been a subject of both the international and national press. Allegations are that all the radioactive materials were, in fact, not removed and that a significant number of Danes who worked in the cleanup effort are experiencing illness directly attributable to the radiation encountered as a result of the accident. The DoD, DOE and DoS are assisting the Danish Government by providing necessary information and technical assistance.

C. (U) Threats.

(U) The Lawrence Livermore National Laboratory (LLNL) is program manager for the Credibility Threat Assessment program. This program, conceived shortly after NEST was established, was developed to preclude costly, time-consuming, and unnecessary deployments of assets and manpower. When a nuclear threat is received, it is assessed for credibility and quickly, but comprehensively, analyzed by the weapons design laboratories and psychologic/psycholinguistics experts. The LLNL Threat Assessment Center averages about 40 inquiries per year of various types, ranging from database searches to credibility assessments of nuclear threats and "black market" nuclear materials sales attempts. The only significant incident in 1987 was an eight-man DOE party deployed to Indianapolis, Indiana, to search the

Indiana National Bank for a threatened IND.

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[redacted]

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