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Ref: 92-F-2453

Mr. Sherman Frankel
Professor of Physics
University of Pennsylvania
School of Arts and Sciences
Department of Physics
David Rittenhouse Laboratory
Philadelphia, PA 19104-6396

Dear Mr. Frankel:

This letter responds to your November 16, 1992, Freedom of Information Act (FOIA) request.

Due to the size and complexity of the Department of Defense (DoD), there is no central repository for all DoD records. This Directorate is responsible for responding to requests for records of the components of the Office of the Secretary of Defense (OSD) and Joint Staff (JS), including ARPA. The several Components of the DoD, including the Military Departments, Unified Commands and separate Defense Agencies, operate their own Freedom of Information offices to respond to requests for records for which they are responsible. These procedures are provided in DoD Regulation 5400.7-R, as published at 32 CFR 286.

Your request was processed by the Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (ASD(C3I)), which had provided the enclosed document as responsive to your request. After extensive consultation with other Agencies, including the Department of Energy, Defense Nuclear Agency and Information Security Oversight Office, Mr. Nathaniel Cavallini, the Deputy Assistant Secretary of Defense for Plans and Resources, an Initial Denial Authority for ASD(C3I), has determined that the release of portions of the document must be denied pursuant to 5 USC 552:

-(b)(1), which applies to material which is currently and properly classified in accordance with Executive Order 12356. In this instance, some of the denied information is classified according to Section 1.3(a)(1), concerning military plans, weapons or operations; 1.3(a)(2), concerning the vulnerabilities or capabilities of systems, installations, projects or plans related to the national security; and 1.3(a)(6), concerning scientific or technological matters relating to the national security. Additional information which is unclassified when standing alone has been denied as classified in accordance with Section 1.3(b), concerning information, the release of which in

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the context of other information reasonably could be expected to cause damage to the national security.

-(b)(3), which applies to information specifically exempted by a statute establishing particular criteria for withholding. In this instance, the statutes are 10 USC 128, which provides authority to withhold unclassified special nuclear weapons information, and 42 USC 2161-2168, which provides authority to withhold information regarding atomic energy, restricted and formerly restricted data under the Atomic Energy Act if 1954.

You have the right to appeal the decision to deny this information. Any such appeal should offer justification to support reversal of the initial denial and should be forwarded within 60 calendar days of the date of this letter, to:

Office of the Assistant to the Secretary of
Defense for Public Affairs
Directorate for Freedom of Information
and Security Review, Room 2C757
1400 Defense, Pentagon
Washington, DC 20301-1400

There chargeable costs for processing your request have been waived in this instance.

Sincerely,

D. J. Blakeslee
Acting Director
Freedom of Information
and Security Review

Enclosure:
As stated
CYT:HUETE:mch:92-2453:940607: gr___ pk___ ye___ wh___

DELETED UNCLASSIFIED PARAGRAPHS HAVE BEEN REMOVED TO PRECLUDE REVEALING CLASSIFIED INFORMATION BY COMPILATION. THIS ACTION WAS TAKEN IAW: DoD INFORMATION SECURITY PROGRAM REGULATION, DoD 5200.1-R, PARAGRAPHS 2-202; 2-211; AND 4-203.

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FINAL REPORT

OF THE

FEDERAL ADVISORY COMMITTEE

ON

NUCLEAR FAILSAFE

AND

RISK REDUCTION

(FARR) (U)

EXCISED UNDER THE PROVISIONS OF THE FREEDOM OF INFORMATION ACT 5USC552
(b) 1, 3

Information exempt from public release under the Freedom of Information Act, Exemptions 1 (b) (1), 3 (b) (3)

"FORMERLY RESTRICTED DATA" "Unauthorized disclosure subject to administrative and criminal sanctions. Handle as Restricted Data in foreign dissemination. Section 114b, Atomic Energy Act, 1954."

DEPARTMENT OF DEFENSE UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION exempt from mandatory disclosure (5 U.S.C. 552 (b)(3), as authorized by 10 U.S.C. 128)

Classified by: ASD(C3I)

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ACRONYMS USED IN THE NUCLEAR FAILSAFE AND RISK REDUCTION REPORT* (U)

CCD	Coded Control Device
CINC	Commander-in-Chief of a Unified or Specified Command
DoD	Department of Defense
DOE	Department of Energy
EAM	Emergency Action Message
FARR	(Nuclear) Failsafe and Risk Reduction
ICBM	Intercontinental Ballistic Missile
NCCS	(U.S.) Nuclear Command and Control System
PAL	Permissive Action Link (a CCD in a warhead)
PRP	Personnel Reliability Program
SLBM	Submarine Launched Ballistic Missile
SSBN	Strategic Ballistic Missile Submarine

UNCLASSIFIED

TABLE 1

* See Appendix for a glossary of Nuclear Command and Control System Terms.

PREFACE (U)

(U) On December 20, 1990, Secretary of Defense Cheney chartered a five-person independent Federal Advisory Committee to assess the current and programmed U.S. Nuclear Weapons Command and Control System's (NCCS) capability to meet the dual requirements of assurance against unauthorized use of nuclear weapons and assurance of timely, reliable execution when authorized, and to identify opportunities for positive measures to enhance failsafe features. In addition, the Advisory Committee was specifically tasked to explore the desirability and feasibility of placing coded control devices on U.S. nuclear weapons at sea; the desirability and feasibility of placing post-launch destruct devices on U.S. nuclear weapons as an additional safeguard against an unauthorized or inadvertent launch; and potential measures to reduce the risk of nuclear war occurring as the result of an accident, misinterpretation, miscalculation, terrorism, unexpected technological breakthrough, or deliberate act. The period of interest was stated as 1991 to 2011.

(U) Ambassador Jeane J. Kirkpatrick, former U.S. Ambassador to the United Nations, was selected to serve as Chairperson. Other members of the Committee were Honorable Stephen J. Hadley, Assistant Secretary of Defense (International Security Policy); Honorable Duane P. Andrews, Assistant Secretary of Defense (Command, Control, Communications and Intelligence); Admiral R.L.J. Long, USN (Ret.), former Commander-in-Chief, U.S. Pacific Command and Vice Chief of Naval Operations; and Honorable Arthur B. Culvahouse, Jr., former White House Counsel.

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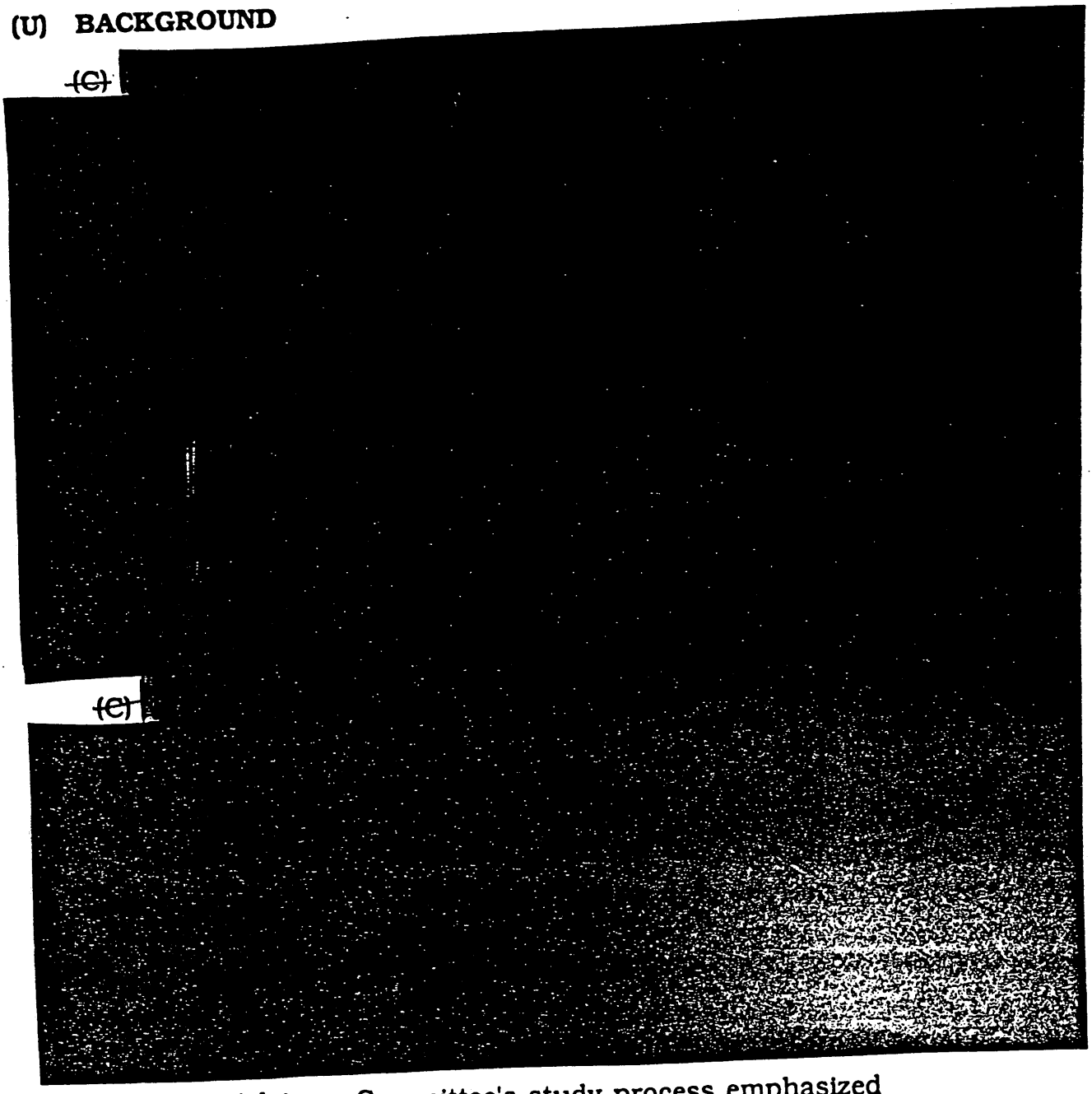
EXECUTIVE SUMMARY (U)

(U) BACKGROUND



(U) The Advisory Committee's study process emphasized independence, objectivity, and thoroughness. The Advisory Committee received familiarization briefings on all aspects of nuclear command and control, including risk reduction, intelligence support, and system oversight. Furthermore, the Advisory Committee, its Study Staff, and/or its various Working and Study Groups visited many installations and sites to ensure that the information germane to the review was current and completely understood. When questions were raised or the need for

additional information was identified, follow-on briefings or visits were made. Each Working and Study Group periodically presented potential issues, candidate criteria of merit and assessments. Recommended enhancements were identified for the Advisory Committee's evaluation and approval.

(U) Three mechanisms ensured the independence of analysis and a balanced perspective by the Working and Study Groups: the use of briefings from leading authorities outside government on various Advisory Committee agenda; the maximum use of "red teams" in evaluating the effectiveness and security of NCCS safeguard procedures, installations and equipment; and the Advisory Committee's insistence on receiving any minority views on all issues and reports offered by the Working and Study Groups.

(U) Changes in the last five years and especially the dramatic changes since the formation of this Advisory Committee have led to reductions in the historical threat which has shaped U.S. post-war security concerns as well as to the emergence of new threats, concerns and uncertainties. These recent events have reduced the traditional risks of nuclear war between the United States and the former Soviet Union. They also provide opportunities to increase the failsafe characteristics of the NCCS.

(U) The threat of a massive surprise attack on the U.S. or its allies in the present security environment has virtually disappeared. However, this well-defined threat has been replaced by a more diffused and less familiar threat environment. This fluid security environment is characterized by potential instability in Russia and other states with powerful nuclear arsenals, as well as by the accelerating proliferation throughout the Third World of nuclear weapons technology, other weapons of mass destruction and the means to deliver them. Moreover, we are increasingly aware of the limited effectiveness of measures to detect, check and reverse this dangerous proliferation which is fueled by the spread of knowledge and advanced technology as well as by the commitment by Third World states of substantial resources to obtain these weapons.

(U) Nuclear proliferation takes on increased importance in long-term U.S. security concerns as the primacy of the East-West nuclear confrontation subsides. The shift away from a bipolar world is resulting in a more fragmented and unpredictable system. New international and regional actors, issues, and threats should be addressed as we develop relevant doctrines, procedures, force capabilities, and institutions capable of dealing with a wider range of threats, some of which may spring from new nuclear powers that oppose the United States.

(U) FUTURE THEMES

(U) The changing environment occasioned the need to reassess the overall NCCS and the existing balance between the often competing "assure-

assure against" goals. This environment also provided the backdrop against which the Advisory Committee considered near- as well as long-term policy, procedural, and technological initiatives and enhancements that address new nuclear failsafe and risk reduction challenges and opportunities. Based upon the evolving security environment, the Committee concludes that four coherent "themes" should shape the future NCCS:

- (U) We will continue to rely upon nuclear weapons as an essential element of our deterrence policy. Therefore, irrespective of the number of weapons that remain in the active stockpile, the maintenance of appropriate nuclear weapons safety, security and control should remain one of the highest priorities for resources. The reduced sense of immediate threat should not be permitted to allow existing nuclear weapons safety, security and control measures to deteriorate or planned improvements to languish.

- (U) It is appropriate that we continue to enhance positive measures which strengthen safeguards against unauthorized or inadvertent use. These enhancements should be pursued in a time-phased manner as resources permit.

- (U) We should continue to ensure that U.S. nuclear forces can respond effectively and in a timely manner to Presidential direction. While we strive to improve the failsafe characteristics of our nuclear forces and adopt additional safeguards to reduce the risk of nuclear war, the U.S. should recognize the unpredictability of the international security environment and the fact that current promising relations and trends could deteriorate. The U.S. should undertake no initiatives that are irreversible or that irrevocably foreclose options and flexibility to the President.

- (U) Finally, requirements for timely and accurate intelligence community assessments of the capabilities and intentions of current, new and emerging powers possessing or pursuing weapons of mass destruction will increase.

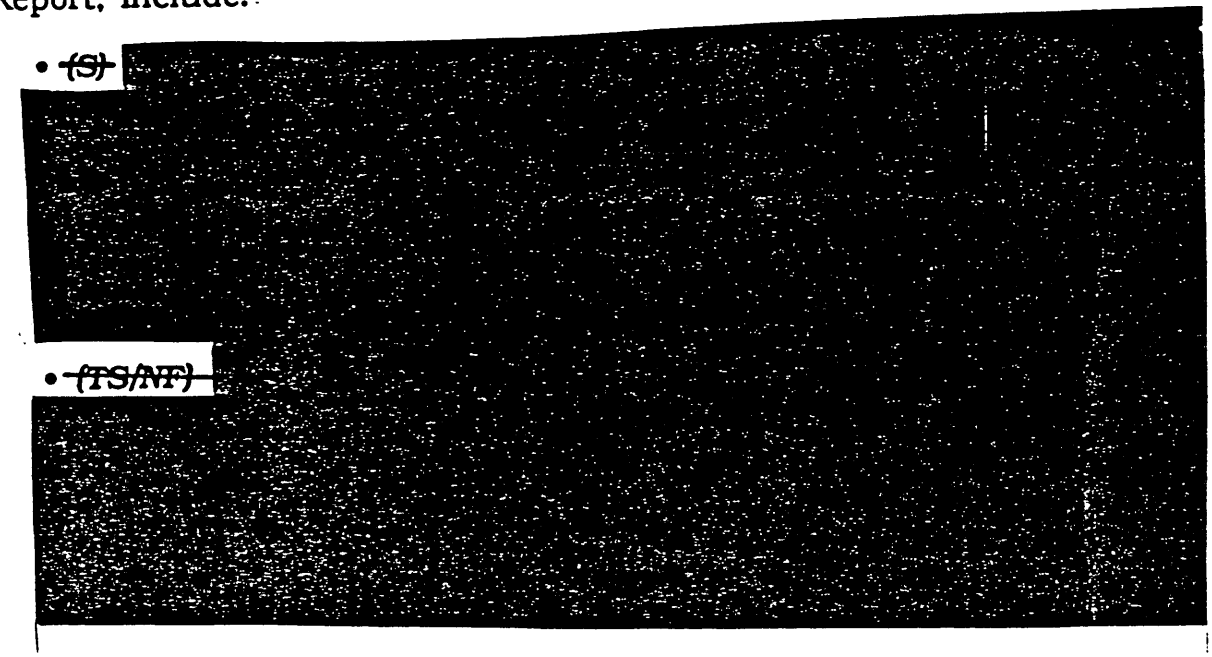
(U) OVERALL NCCS ASSESSMENT

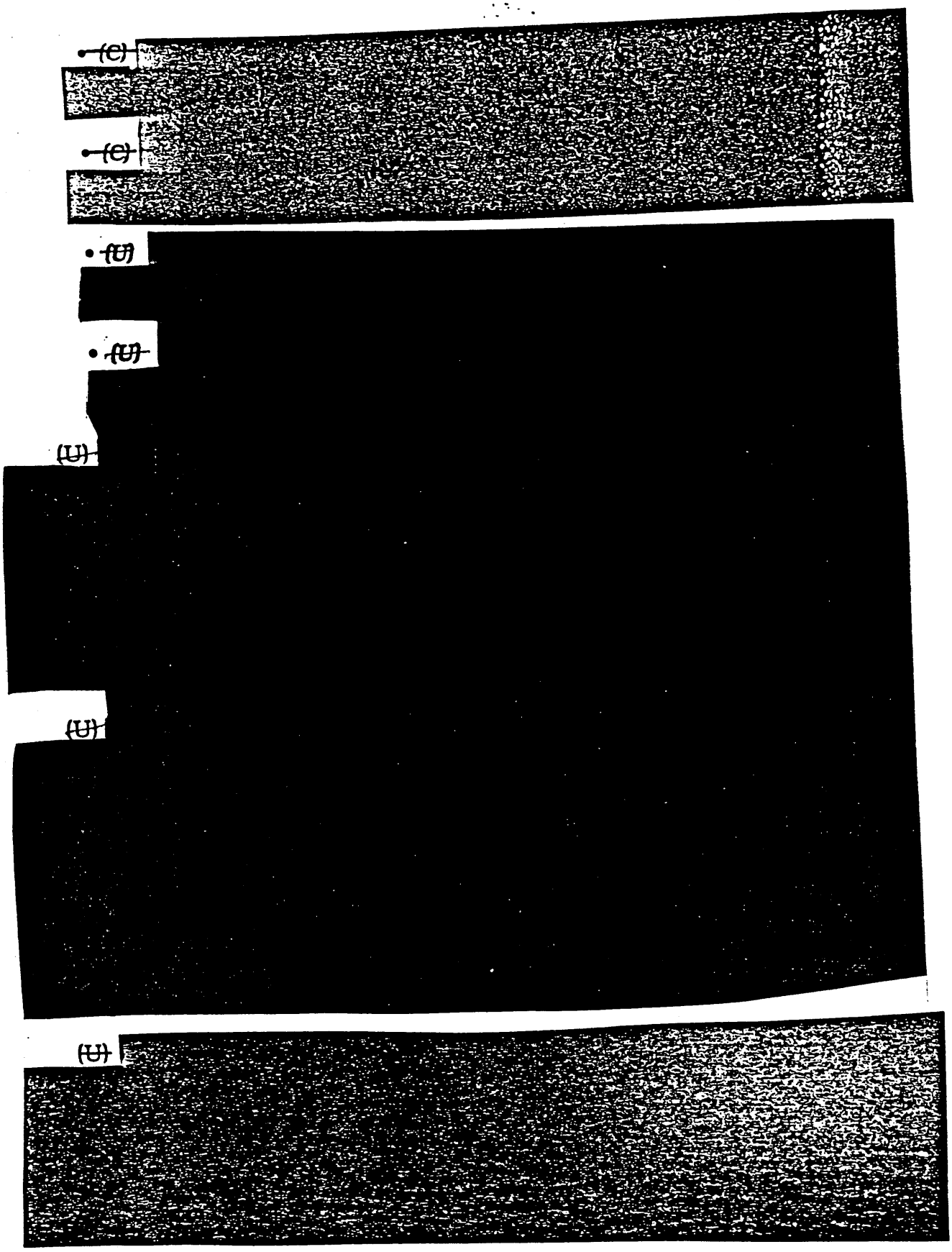
(U) The NCCS, which has evolved over the last five decades, reflects the United States' continuing goal of assuring the highest standards of nuclear weapons safety, security and control. NCCS procedures, technologies, and equipment have been developed and personnel highly trained to assure the responsive, effective, and efficient conduct of authorized nuclear operations. At the same time, numerous, redundant and mutually reinforcing layers of safeguards and positive measures addressing all aspects of the weapon life-cycle have been developed to ensure that unauthorized or inadvertent use does not occur.

(U) The Department of Defense (DoD), with extensive support from the Department of Energy (DOE), allocates significant attention, talent, and resources to maintaining effective safety, security, and control of nuclear weapons. Both departments are responding to recommendations of previous high-level panels in the areas of safety (i.e., Drell, Moe, and Clark studies) and security and control (Joint Chiefs of Staff Nuclear Command and Control Study, i.e., the Horton Report). For instance, DoD and DOE have formed a Joint Advisory Committee on Nuclear Weapons Surety to advise the Secretary of Defense and the Secretary of Energy on matters related to protecting against inadvertent nuclear detonation or plutonium scatter. These efforts are contributing to the multi-layered system of safeguards and controls. Furthermore, DoD and DOE are implementing the President's September 1991 and January 1992 Nuclear Initiatives, which themselves were a response to the radically changed security environment and are making their own positive contributions to safety, security and control. These actions, along with other longer-term initiatives, are making the nuclear stockpile and our nuclear forces safer and more secure. As part of its review, the Advisory Committee worked closely with responsible offices and identified areas requiring improvements. Action is already being taken in many of these areas by appropriate agencies.

(U) FAILSAFE AND OVERSIGHT ENHANCEMENTS ARE POSSIBLE

(U) Nevertheless, in light of the evolving security context and technological advances, important additional enhancements are feasible to strengthen all layers of the existing safeguards against unauthorized or inadvertent use. These potential enhancements, identified in the body of this Report, include:





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(~~S~~) [redacted]

(~~U~~) [redacted]

(U) RISK REDUCTION ENHANCEMENTS ARE POSSIBLE

(U) The demise of the Soviet Union and the accelerating proliferation of nuclear weapons technology and associated means of delivery present the U.S. with significant nuclear risk reduction opportunities and challenges. In addressing these complex issues, we should balance responsiveness to today's opportunities with prudence that reflects the highly uncertain and changeable nature of tomorrow's security environment. For this reason, the Advisory Committee recommends the development of several risk reduction measures that deal with the range of scenarios the U.S. may face in a proliferated world.

(~~TS/NF~~) [redacted]

[redacted]

- ~~(S)~~ [redacted]

- *(U) The establishment of government-to-government communications designed for contingency use by heads of state or governments to assist in nuclear weapons accident notification and other areas of crisis management;*

- *(U) The encouragement of bilateral and regional risk reduction measures by nations in areas of greatest proliferation concern; and*

- *(U) Transfer and/or exchange, in appropriate cases, of nuclear weapons safety technology, use control/denial concepts, and physical security concepts and technologies.*

~~(S/NF)~~ [redacted]

~~(S/NF/WN)~~ [redacted]

~~(S)~~ [redacted]

KEY NUCLEAR FAILSAFE AND RISK REDUCTION ISSUES AND RECOMMENDATIONS (U)

(U) This section identifies the key nuclear failsafe and risk reduction issues and sub-issues investigated by the Advisory Committee, summarizes its significant findings and recommended enhancements on each major issue, and lists the FARR Final Report's recommendations by issue.

(U) Following initial review and research, the Advisory Committee formulated six major issues to support its investigation of the NCCS. Working and Study Groups were then assigned to assess each issue. Based upon the results of this detailed assessment, specific sub-issues were deemed appropriate for further investigation. Both the overall issues and specific sub-issues are listed below.

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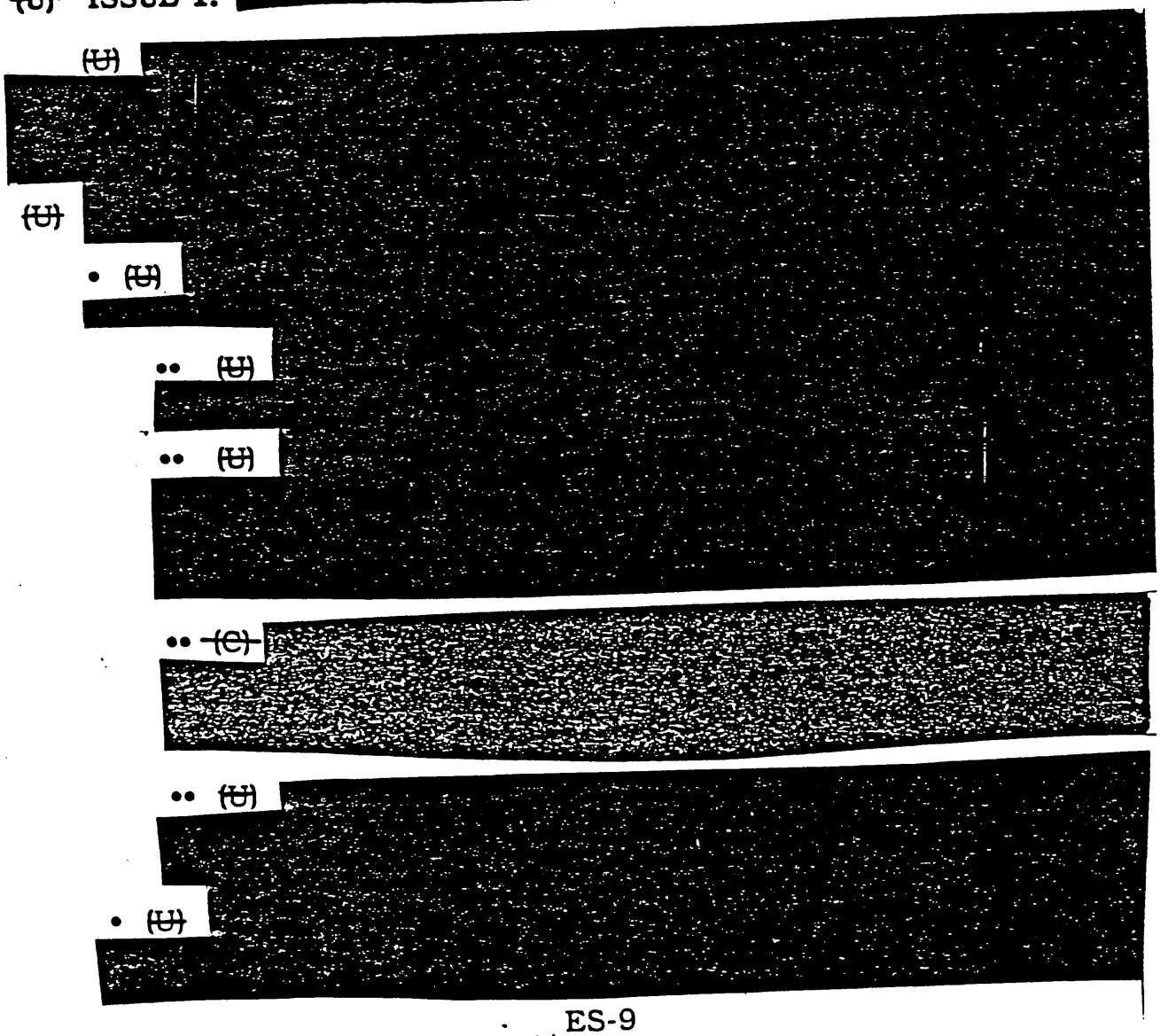

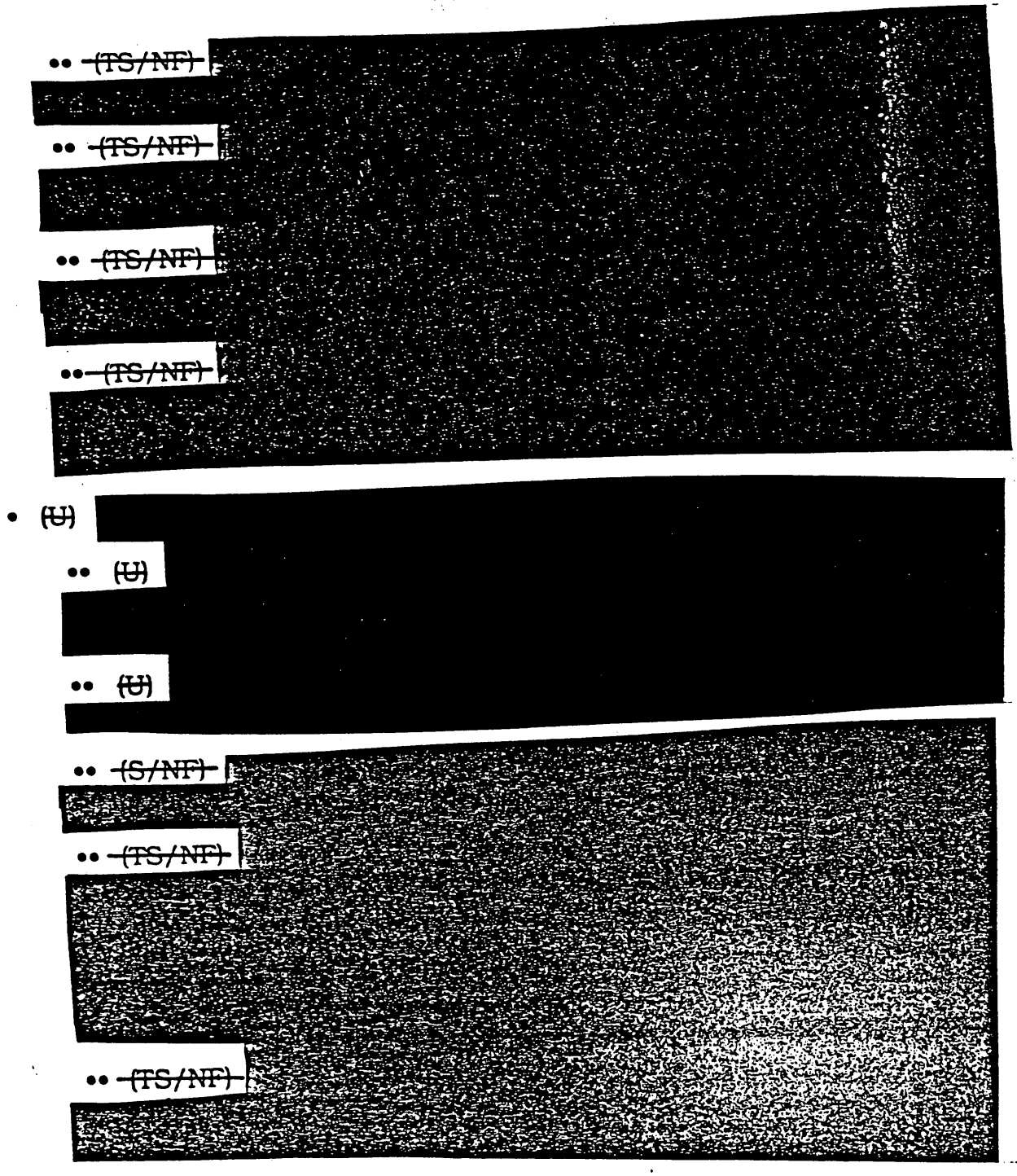

~~(S)~~ **SUB-ISSUE 1-1:**

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~~(S)~~

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(U) Recommendations

- ~~(C/NF)~~ [redacted]
- ~~(S/NF)~~ [redacted]
- ~~(S/NF)~~ [redacted]

~~(S)~~ **SUB-ISSUE 1-2:** [redacted]

(U) Issue

~~(S)~~ [redacted]

(U) Recommendations

- ~~(S)~~ [redacted]

~~(S)~~ **SUB-ISSUE 1-3:** [redacted]

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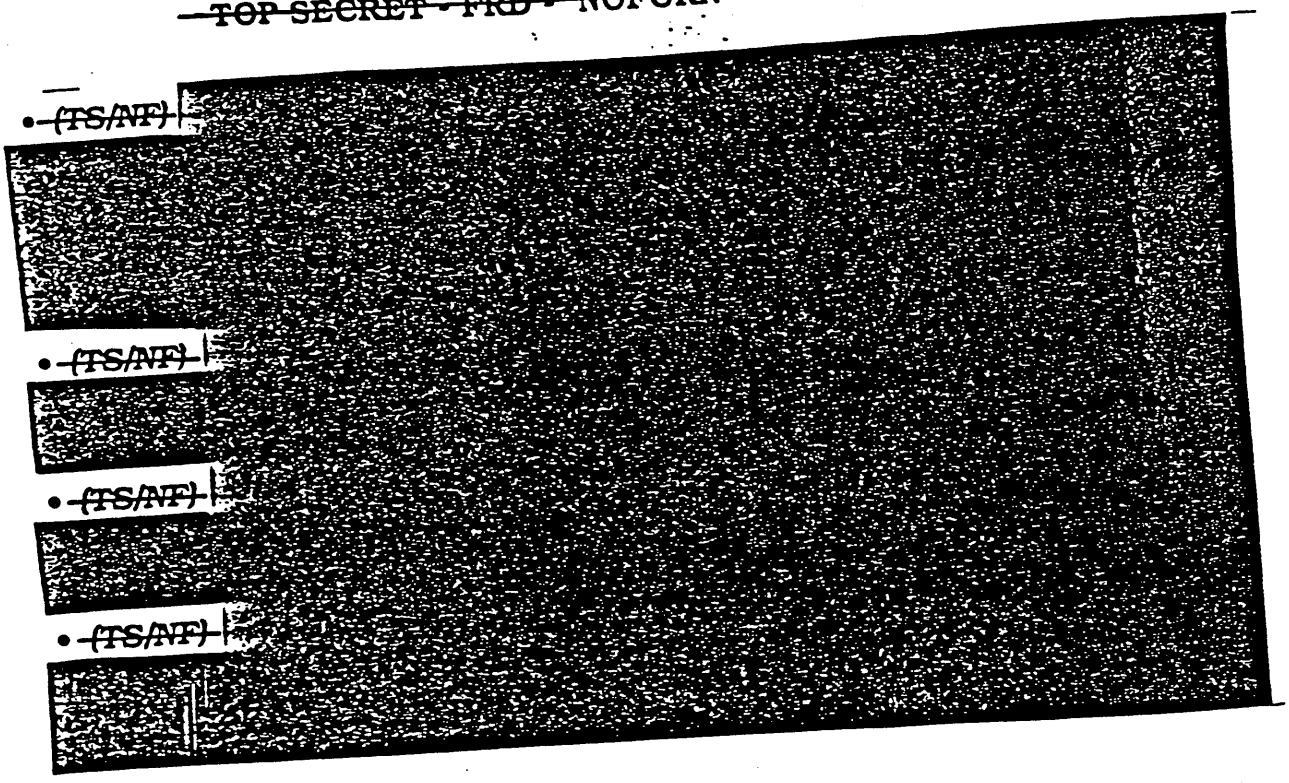
(U) Recommendations

- ~~(TS)~~ [redacted]



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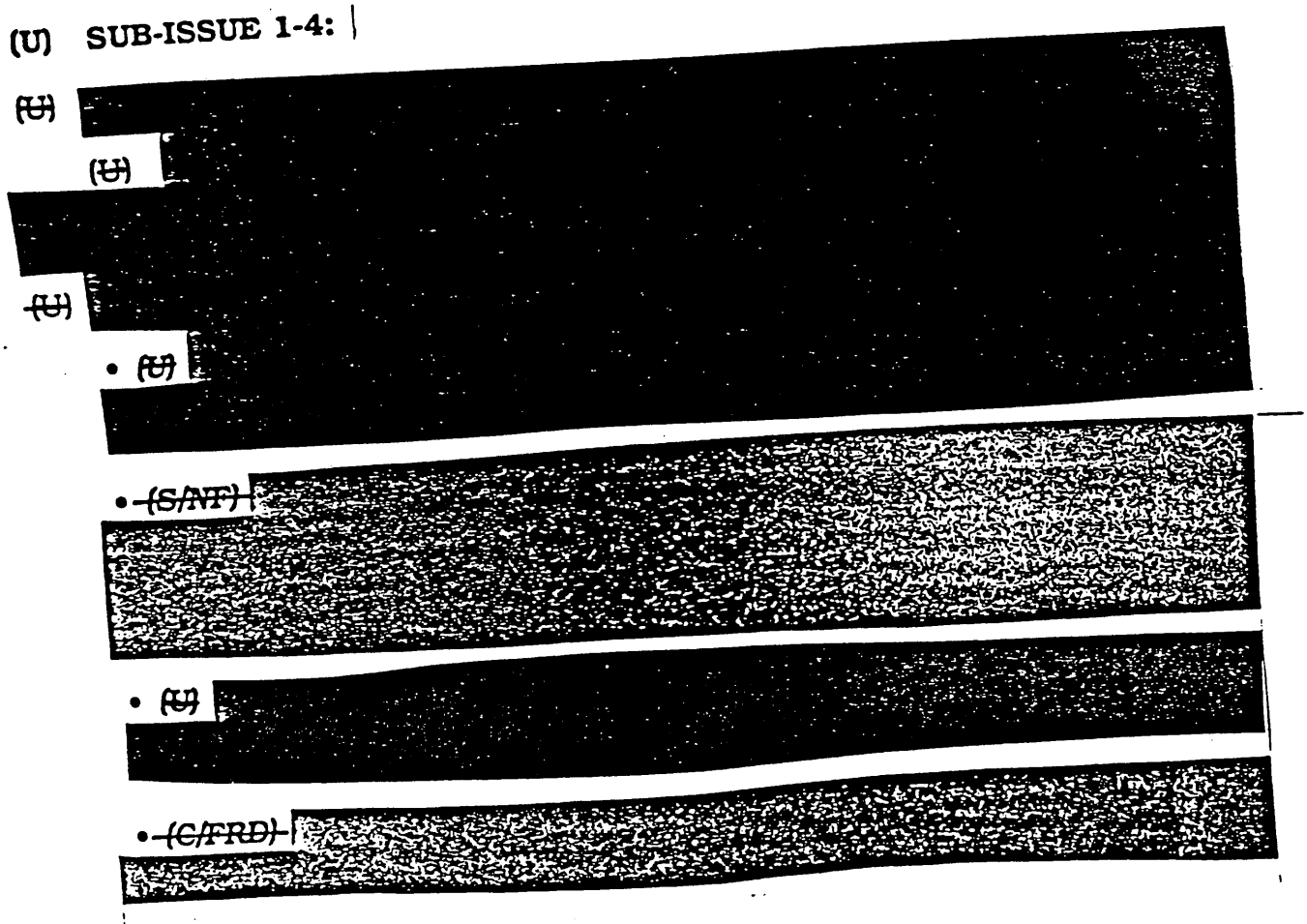

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- ~~(U)~~ [redacted]
- ~~(U)~~ [redacted]
- ~~(S)~~ [redacted]

~~(S)~~ **SUB-ISSUE 1-5:** [redacted]

(U) Issue

~~(S)~~ [redacted]

(U) Recommendations

- ~~(U)~~ [redacted]
- ~~(TS/NF)~~ [redacted]

WEAPON	NEAR TERM	MID TERM	LONG TERM	COMMENTS
(U) [redacted]	(U) [redacted]	(C/FRD) [redacted]	(S) [redacted]	(S) [redacted]
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(U) [redacted]	(S/NF) [redacted]	(S) [redacted]	(S/FRD) [redacted]	

~~(S)~~ **SUB-ISSUE 1-6:** [redacted]

(U) Issue

~~(S)~~ [redacted]

~~(U)~~ Recommendation

- ~~(U)~~ [redacted]

~~(S)~~ **SUB-ISSUE 1-7:** [redacted]

(U) Issue

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~~(S)~~ **SUB-ISSUE 1-8:** [redacted]

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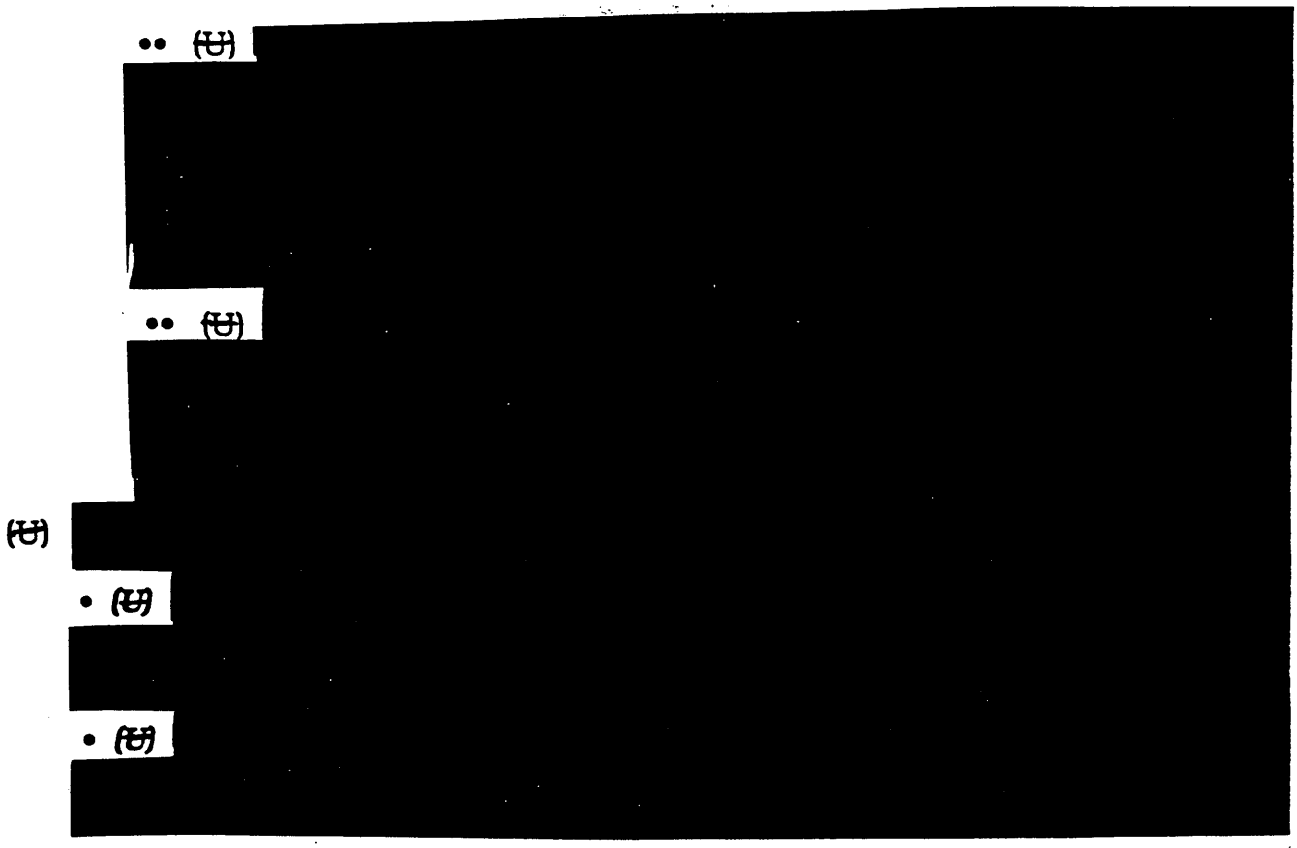

(U) ISSUE 3: NCCS SAFETY, SECURITY AND CONTROL

(U) Are current DoD procedures, equipment, and facilities adequate to maintain the required standards of nuclear weapons safety, security, and control under the full range of stockpile conditions? (Page IV-52)

(U) Advisory Committee significant findings:

- (U) The layered approach of personnel actions, procedures, physical security safeguards, and nuclear weapons design features effectively maintains positive control over nuclear weapons. The combination is important since no single factor can be made perfect.

- (U) Loyal and capable personnel compose the most important layer in the system of positive measures.

- ~~(DoD UCNI)~~ [redacted]
- ~~(S/FRD)~~ [redacted]

(U) Advisory Committee key enhancements:

- (U) Continue to support the highest personnel reliability standards.
- (U) Maintain appropriate plans and effective procedures to support any redeployment of nuclear weapons.
- ~~(DoD UCNI)~~ [redacted]
- (U) Set and maintain high security standards for all automated systems and software.
- ~~(S/NF)~~ [redacted]
- ~~(S/NF)~~ [redacted]

(U) SUB-ISSUE 3-1: PERSONNEL RELIABILITY

(U) Issue

(U) What enhancements should be made to the DoD Personnel Reliability Program to provide the required level of protection to nuclear weapons? (Page IV-56)

(U) Recommendations

- *(U) Maintain strong continuing commitment to the highest personnel reliability standards. Specifically maintain a vigorous Personnel Reliability Program (PRP) for DoD and contractor personnel involved in all aspects of nuclear command and control (weapons handling, maintenance and transportation, software read/write access, control/access to nuclear command and control code material, etc.).*

- *(U) Continue vigorous opposition to current legal challenges to certain background questions on DD Form 398 (DoD Personnel Security Questionnaire (BI/SBI)) and DD Form 398-2 (DoD Personnel Security Questionnaire (National Agency Check)) for those personnel assigned nuclear command and control responsibilities. Current and pending lawsuits, if litigated successfully against the DoD, would prohibit the use of behavioral inquiry in the consideration of personnel for security clearances to sensitive nuclear command and control responsibilities.*

- *(U) Emphasize the equal importance of initial investigation and reinvestigation in both the selection and the retention of personnel with NCCS responsibilities.*

- *(U) For personnel assigned to the NCCS, ensure every appropriate precaution is taken to enhance personnel reliability. In accordance with national guidance, administer random and aperiodic counter-intelligence scope polygraph examinations to those individuals who are assigned to "specially designated nuclear command and control positions."*

(U) **SUB-ISSUE 3-2:** [redacted]

(U) Issue

~~(U)~~ [redacted]

(U) Recommendations

- ~~(U)~~ [redacted]

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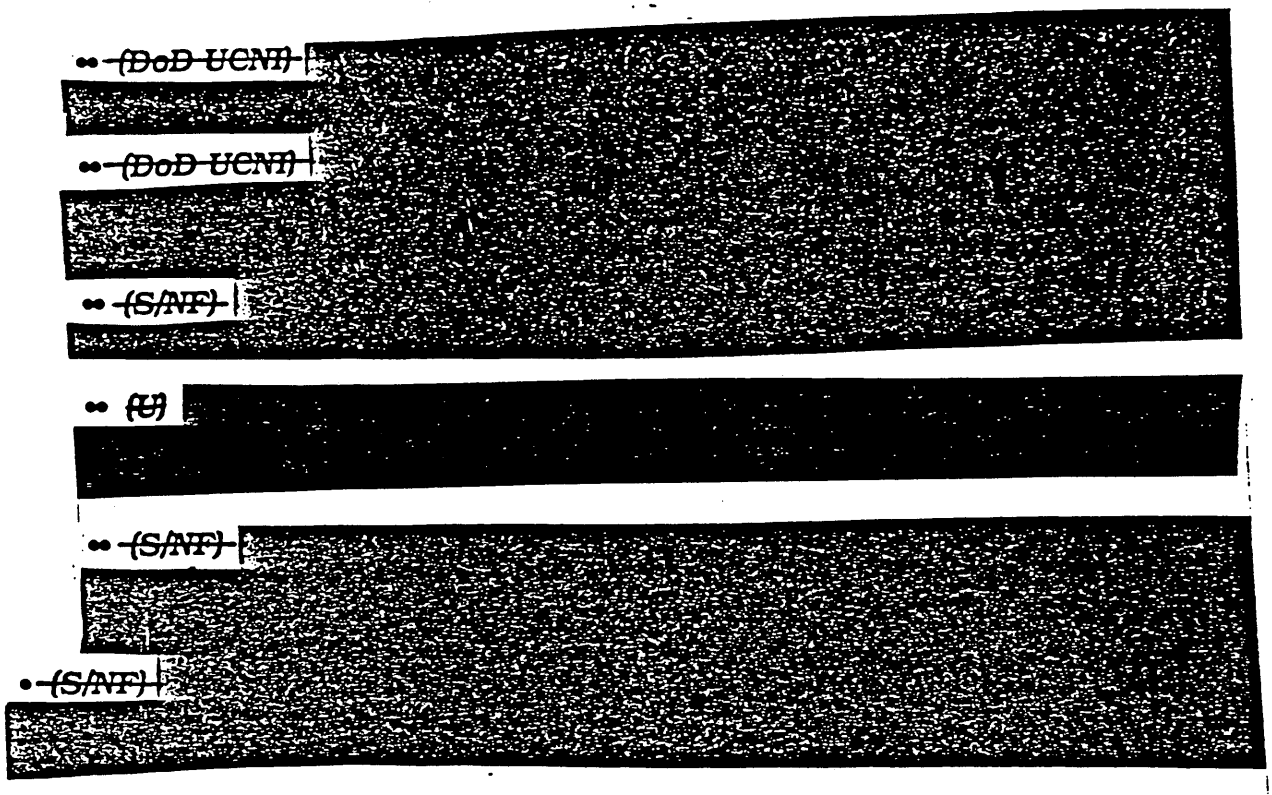

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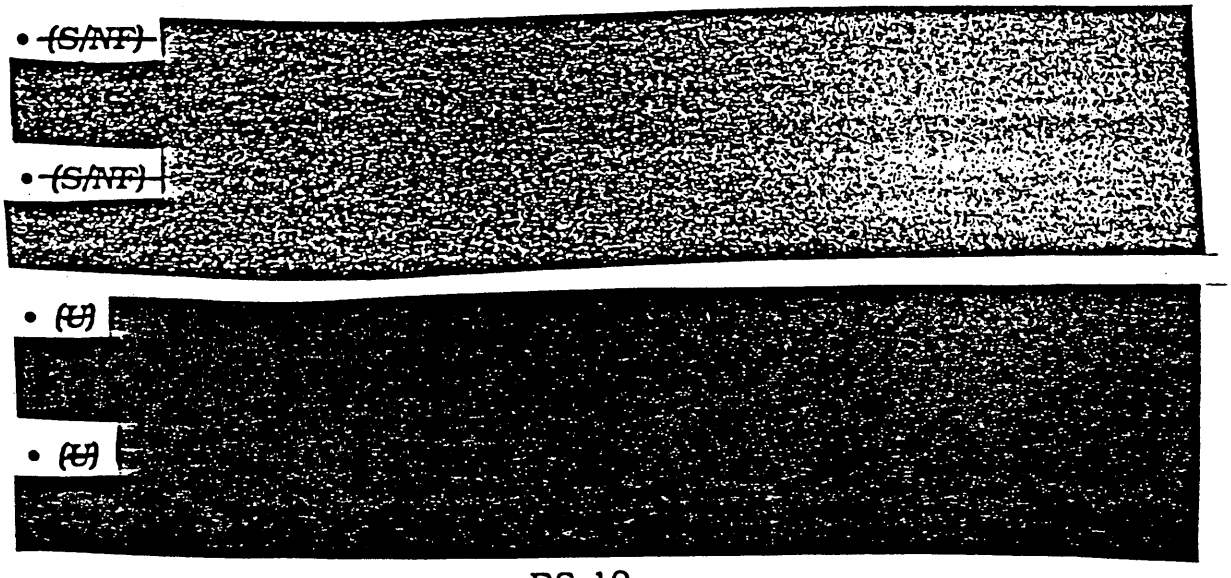
(U) Recommendations



[redacted]

- ~~(C)~~ [redacted]
- ~~(C)~~ [redacted]
- ~~(DoD UCNI)~~ [redacted]
- ~~(C)~~ [redacted]
- ~~(U)~~ [redacted]
- ~~(S/NF)~~ [redacted]

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(U) Issue

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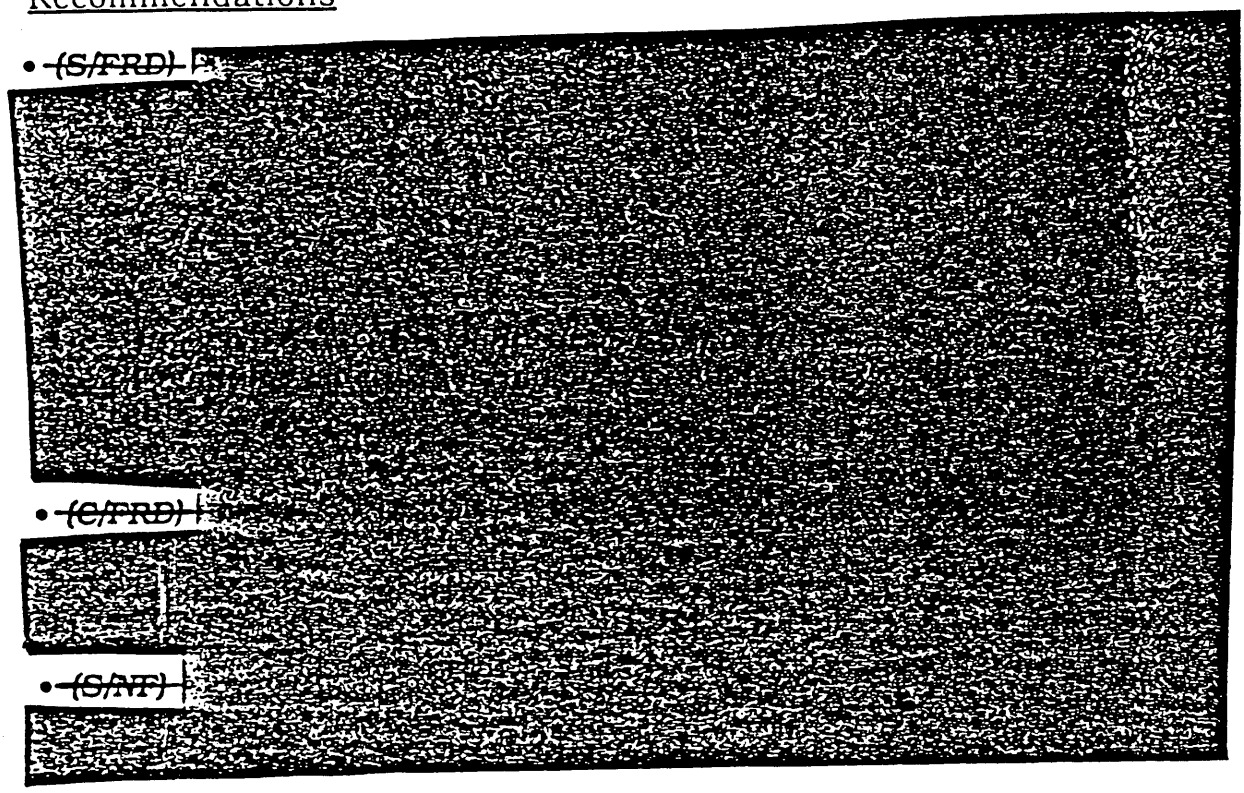
(U) Recommendations



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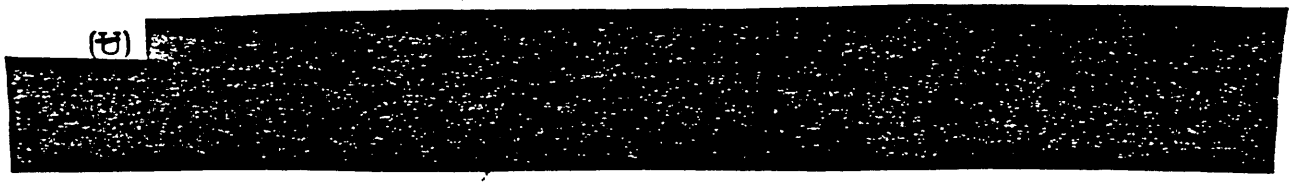
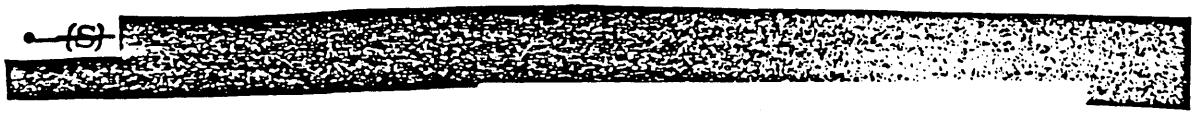
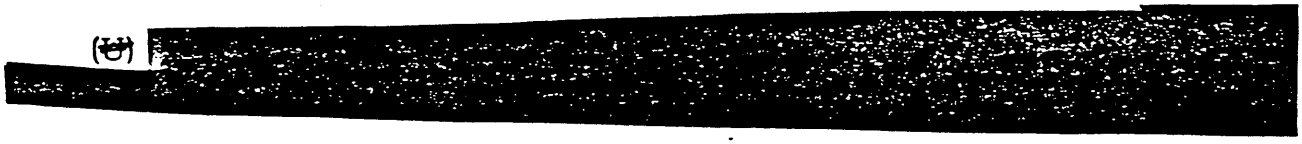


(U) Recommendations



ISSUE 4: [redacted]

(U) Issue



(U) Advisory Committee significant findings:

- ~~(U)~~ [redacted]
- ~~(C)~~ [redacted]
- ~~(C)~~ [redacted]
- ~~(C)~~ [redacted]

(U) Advisory Committee key enhancements:

- ~~(U)~~ [redacted]
- ~~(C)~~ [redacted]
- ~~(C)~~ [redacted]

(U) <u>Recommendations</u>

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- ~~(U)~~ [redacted]
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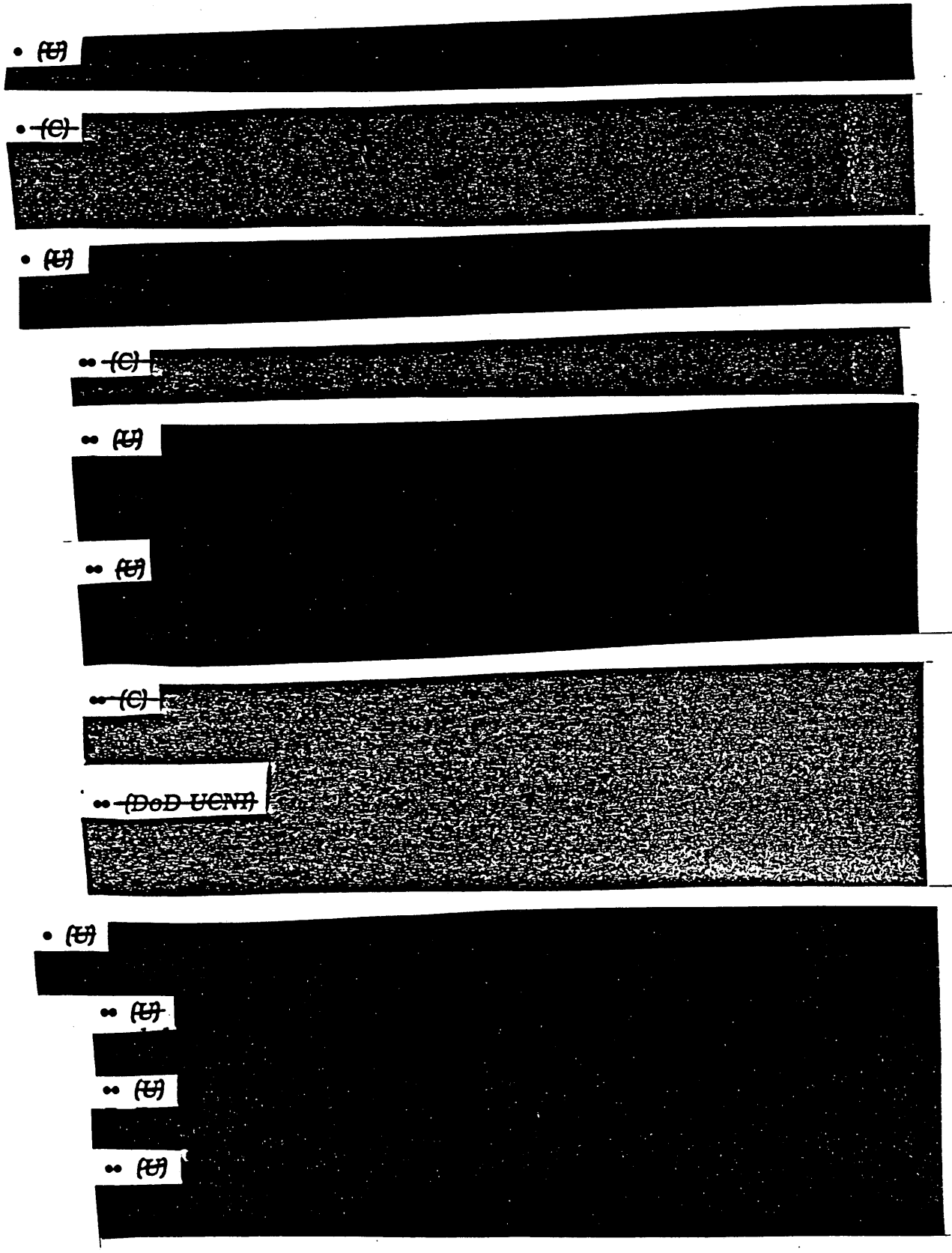

- ~~(S)~~ [redacted]

ISSUE 5: RISK REDUCTION

(U) Issue

(U) What confidence-building and predictability measures (including sharing of appropriate technologies, systems, information and procedures) should be implemented to reduce the risk of nuclear hostilities with any power? (Page VI-4)

(U) Advisory Committee significant findings:

- (U) There is a growing mutuality of interests in risk reduction and the safety, security and control of nuclear weapons between the U.S. and Russia. The U.S. and Russia have conducted substantive discussions on a wide range of nuclear command and control matters. Furthermore, an opportunity of uncertain duration exists to achieve these objectives.

- (U) The U.S. is already engaged in many bilateral and multilateral risk reduction initiatives.

- ~~(S/NF)~~ [redacted]

- (U) The U.S. should consider the transfer of selected technologies and information that could reduce the possibility of a nuclear detonation if such transfers do not degrade U.S. non-proliferation objectives, enhance the operational effectiveness of the recipient nation, or jeopardize the U.S. Nuclear Command and Control System. The DOE national laboratories can play a key role in this process.

- (U) Risk reduction initiatives should go beyond traditional arms reduction agenda.

(U) Advisory Committee key enhancements:

- (U) Establish nuclear weapons incident multilateral consultation agreements.

- (U) On a case-by-case basis, transfer selected nuclear weapons system safety, security and control technologies that are consistent with the full range of U.S. security objectives.

• (U) Pursue new dialogues and initiatives with Russia, other former Soviet republics, and emerging powers, including joint measures to reduce proliferation and to provide timely warning.

(U) Recommendations

• *(U) Expand appropriate bilateral and regional information exchange and risk reduction measures with nations in areas of greatest proliferation concern.*

• *(U) Establish multilateral agreements for consultation in the event of a nuclear weapons incident. These measures would rely on timely and assured communications.*

• ~~(S)~~ [redacted]

• *(U) Establish crisis communications capabilities among appropriate nations of a region.*

• *(U) Transfer and/or exchange, in appropriate cases, nuclear weapon safety technology; physical security technologies, techniques, and concepts; and use control/denial concepts (with certain restrictions) to selected nations (consistent with the provisions of the Nuclear Non-Proliferation Treaty and other proliferation control agreements), to reduce the risks of an accidental or inadvertent nuclear weapon detonation, unauthorized use, or acts of terrorism that might lead to misinterpretation, miscalculation, or hostilities. This transfer and/or exchange should be conditional on mechanisms that ensure this information does not degrade efforts to prevent the proliferation of nuclear weapons, enhance the operational effectiveness of the recipient nation(s), or jeopardize the safety, security or control of U.S. nuclear weapons systems.*

• *(U) The National Laboratories can play a distinctive and important role in the process of determining appropriate technologies, procedures, systems and system data to consider.*

Former Soviet Union (U)

• ~~(S/NF)~~ [redacted]

- *(U) Establish government-to-government communications, designed for contingency use by heads of state, for states of the former Soviet Union with which the United States has signed START agreements and/or those with which we wish to establish nuclear weapon accident response notification agreements.*

- *(U) To exploit the current window of opportunity for meaningful risk reduction that now exists with Russia and the republics of the former Soviet Union, the United States should move beyond the traditional arms reduction agenda and pursue new initiatives. (DoD is already pursuing many of these initiatives.) These areas include:*

  - *(U) Joint measures (e.g., intelligence sharing) to reduce proliferation;*

  - *(U) Joint initiatives to provide timely warning;*

  - *(U) Overview of U.S. and Russian/Commonwealth of Independent States command structures;*

  - *(U) A lexicon on command and control terminology which would support future cooperative efforts and confidence building measures;*

  - *(U) A dialogue on nuclear command and control oversight, command and control assessment techniques, and use control policies and standards with the aim of improving both sides' command and control capability to prevent unauthorized launches; and*

  - *(U) Discussions on early deactivation of forces to be reduced under signed agreements.*

People's Republic of China (U)

- ~~(S/NF)~~ [redacted]

- ~~(S/NF)~~ [redacted]

Undeclared/Emerging Nuclear States (U)

- *(U) Consider a Multilateral Nuclear Incidents Agreement, open to all nations, patterned after the U.S.-USSR "Accident Measures" and*

"Prevention of Nuclear War" agreements, and neutral and silent with respect to possession/development of nuclear weapons, as a particularly attractive risk reduction model for this category of nations.

~~(U)~~ **ISSUE 6:** [redacted]

(U) Issue

~~(U)~~ [redacted]

(U) Advisory Committee significant findings:

- ~~(U)~~ [redacted]
- ~~(U)~~ [redacted]

(U) Advisory Committee enhancements:

- ~~(S)~~ [redacted]

(U) Recommendations

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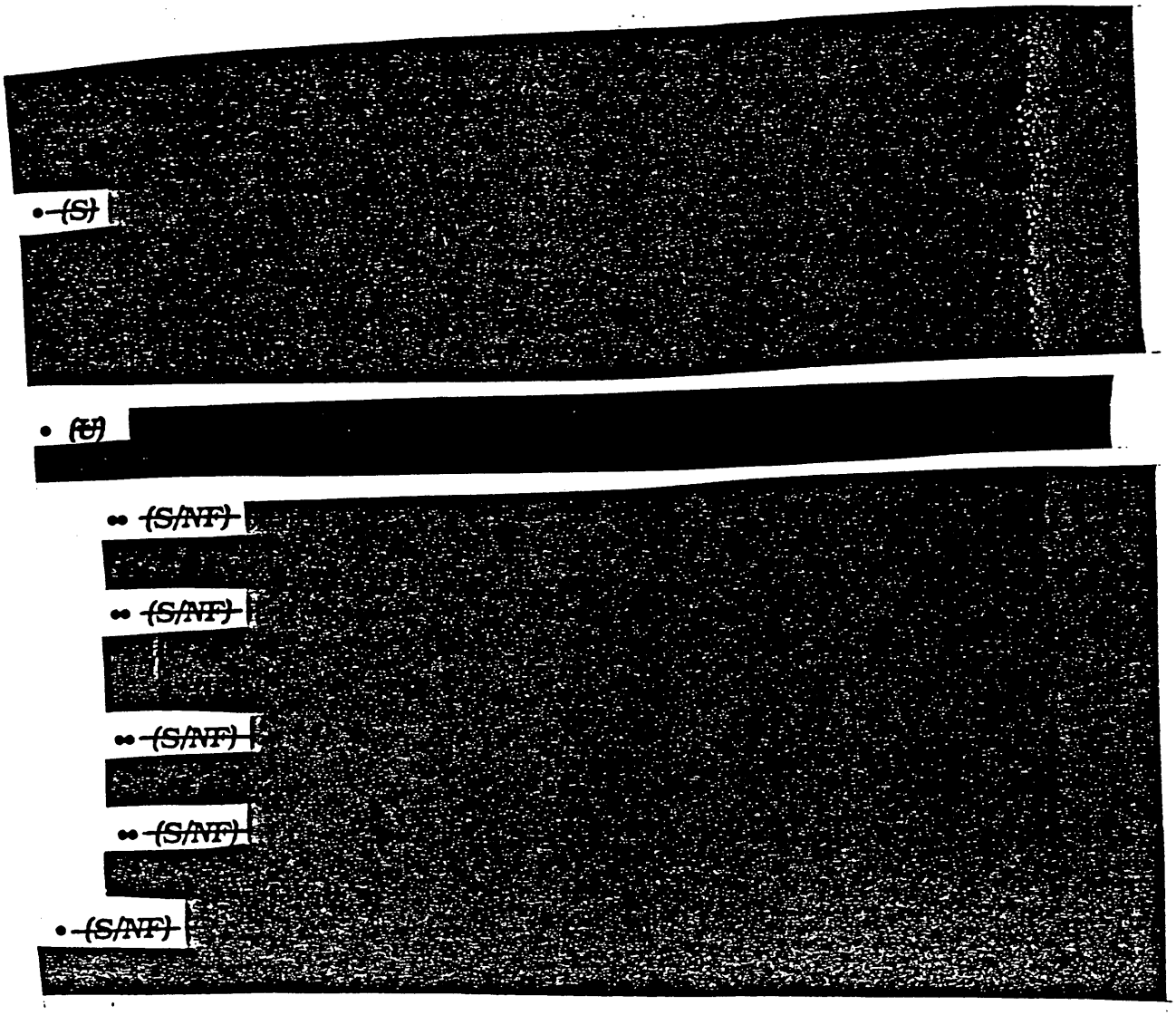

CHAPTER ONE
THE SCOPE, STRUCTURE AND PROCESS OF THE FARR INDEPENDENT REVIEW (U)

(U) THE SCOPE

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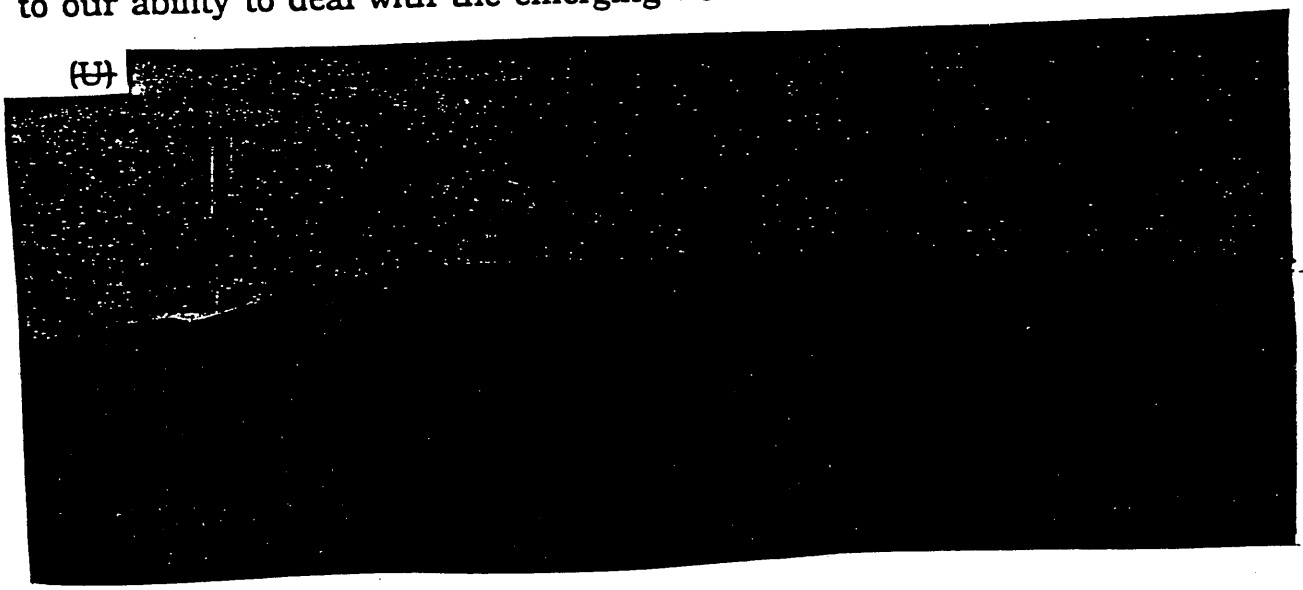
~~(U)~~ [redacted]

(U) Over the course of its investigation, the Advisory Committee's focus broadened, consistent with its charter, to address related issues (e.g., the role of coded control devices on all future weapons/weapons systems and the level of protection they should afford). Also, the failsafe aspect of the charter made it necessary to assess all aspects of the current and programmed NCCS which is enjoined to meet the dual requirements of assuring the authorized use of nuclear weapons while assuring against their unauthorized or inadvertent use. National guidance mandates an

* **Note to the Reader: A full listing of acronyms contained in this Report appears at the beginning of this document.**

appropriate balance between these sometimes competing objectives. Focusing exclusively on the latter could have resulted in undermining the former. Therefore, the Committee fully explored the "assure-assure against" balance to include the current and projected threat, operational capabilities and requirements, technological risks and opportunities, and the myriad related issues in the nuclear command and control process from the President to the individual weapons systems.

(U) The Committee also recognized that the accelerating trend toward nuclear proliferation mitigated against an exclusive focus on the Soviet Union and later Russia and the other former Soviet Republics. It became apparent that timely and accurate all-source intelligence, fused with other diplomatic and technical information, would become increasingly essential to our ability to deal with the emerging world.



(U) ISSUES INVESTIGATED

(U) Table 2 lists the broad organizing issues that evolved over the course of the review to focus and direct FARR analytical initiatives. These general issues gave rise to the many related sub-issues which are identified and discussed throughout this Report and in its supporting Appendices.

(U) THE STRUCTURE AND PROCESS

(U) Figure 1 identifies the structure of the FARR review organization. The three Working Groups, five Study Groups and the Committee Staff brought together a level of talent that is unprecedented in a nuclear command and control review. More than 150 professionals from numerous offices within the Office of the Secretary of Defense, the uniformed Services, the Joint Staff, DoD Agencies, the Department of Energy (DOE), the National Laboratories, and the Intelligence Community participated in this effort. Because of the high priority assigned to the FARR review by the Secretary of

INITIAL KEY NUCLEAR FAILSAFE AND RISK REDUCTION ISSUES (U)

1. Failsafe and Positive Measures

- What NCCS vulnerabilities exist and what improvements should be implemented to strengthen DoD positive measures to prevent accidental, inadvertent, or unauthorized use while assuring authorized use of nuclear weapons?

- Should the United States implement coded control devices on all current and/or future nuclear weapons systems? If so, what types of devices and on which weapons systems?

- Should the United States implement a system for post-launch destruct for all nuclear weapons? If so, what types of systems should be implemented? What improvements are required?

- Are current DoD procedures, equipment, and facilities adequate to maintain the required standards of nuclear weapons safety, security, and control under the full range of stockpile conditions?

2. NCCS Oversight

- Should the DoD develop a consolidated positive measures policy that addresses all nuclear weapons safety, security, and control requirements (including positive control devices, materials and procedures) to increase confidence in our ability to prevent unauthorized or inadvertent use of nuclear weapons? If so, what should be included in this policy?

- What measures should be taken to improve oversight of the Nuclear Command and Control System (NCCS)?

3. Risk Reduction

- What confidence-building and predictability measures (including sharing of appropriate technologies, systems, information and procedures) should be implemented to reduce the risk of nuclear hostilities with any power?

- Given the dramatically altered world situation and changing strategic threat, what measures should be taken to improve our intelligence collection and analysis such that information on nuclear weapons and devices is provided with sufficient accuracy and timeliness to enhance the full range of risk reduction measures? Additionally, what measures should be taken to refocus and integrate the efforts of all organizations responsible for both strategic and tactical warning and the tracking and control of proliferation of nuclear weapons, other weapons of mass destruction, and advanced weapons technology?

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TABLE 2

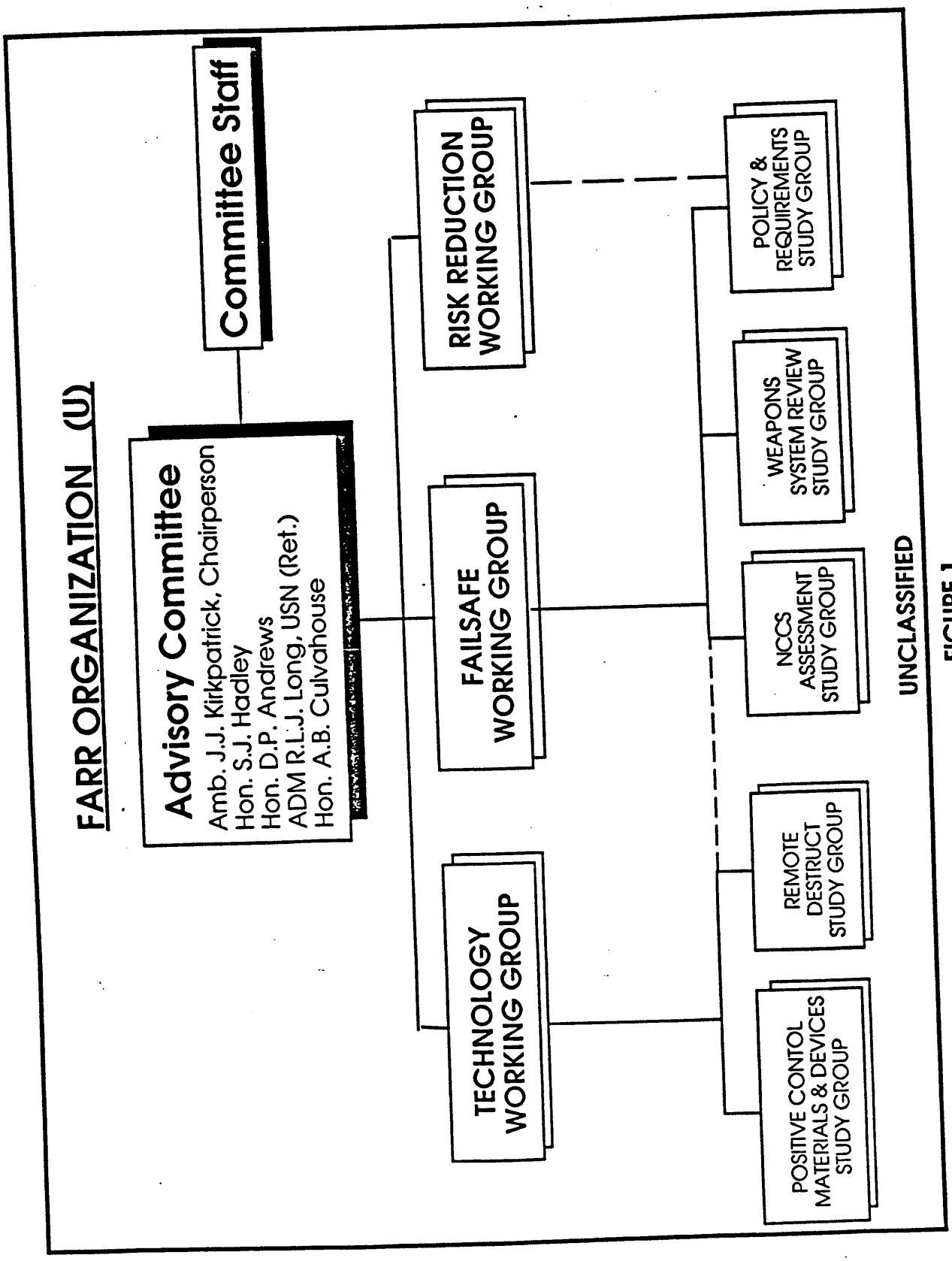
FARR ORGANIZATION (U)
Committee Staff
Advisory Committee
Amb. J.J. Kirkpatrick, Chairperson
Hon. S.J. Hadley
Hon. D.P. Andrews
ADM R.L.J. Long, USN (Ret.)
Hon. A.B. Culvahouse
RISK REDUCTION WORKING GROUP
FAILSAFE WORKING GROUP
TECHNOLOGY WORKING GROUP
POLICY & REQUIREMENTS STUDY GROUP
WEAPONS SYSTEM REVIEW STUDY GROUP
NCCS ASSESSMENT STUDY GROUP
REMOTE DESTRUCT STUDY GROUP
POSITIVE CONTOL MATERIALS & DEVICES STUDY GROUP
UNCLASSIFIED

FIGURE 1

Defense, the Committee recruited and was ably served by these organizations' leading nuclear command and control experts and most innovative thinkers. The Defense Information System Agency and the DOE Sandia National Laboratories dedicated particularly significant resources to this project and, along with the Joint Staff, made important substantive contributions to the FARR Review. In the course of this 18 month effort, the Advisory Committee conducted eight site visits in the United States and Europe, received over 100 formal briefings, and reviewed more than 25 papers developed by the Committee Staff to address specific issues. The Working and Study Groups made 97 site visits and received 243 briefings.

(U) The Advisory Committee's study process emphasized independence, objectivity, and thoroughness. The Committee received familiarization briefings on all aspects of nuclear command and control, risk reduction, non-proliferation, and the current and projected threat. Furthermore, the Committee, its Study Staff, and/or its various Working and Study Groups visited many installations and sites in the United States and Europe to ensure that all information germane to the Review was current and completely understood. When questions were raised or the need for additional information was identified, follow-up briefings or visits were made. Each Working and Study Group periodically presented potential issues, candidate criteria of merit, options and assessments. Recommended enhancements were identified for the Committee's evaluation and approval.

(U) Independence of analysis and a balanced perspective by the working groups were ensured by three mechanisms: the use of briefings to the Committee from leading authorities outside government on various FARR issues; the maximum use of "red teams" in evaluating the effectiveness of NCCS safeguard procedures, installations and equipment; and the Committee's insistence on receiving any minority or dissenting views on all issues and reports offered by the Working and Study Groups.

(U) This report contains several recommendations which include both cost and time estimates. These figures are reliable enough to support the policy judgements and recommendations with which they are associated.

(U) The Committee enjoyed excellent cooperation from all relevant nuclear command and control agencies throughout the course of its investigation. In many instances, as the Committee identified areas of concern, the agencies began developing means for improving the system in ways consistent with the Committee's own thinking. The Committee encouraged this process and as a result, some of the recommendations contained in this Report are already being implemented.

CHAPTER TWO
THE EVOLVING SECURITY ENVIRONMENT: NEW THREATS, CHALLENGES AND OPPORTUNITIES (U)

(U) [redacted]

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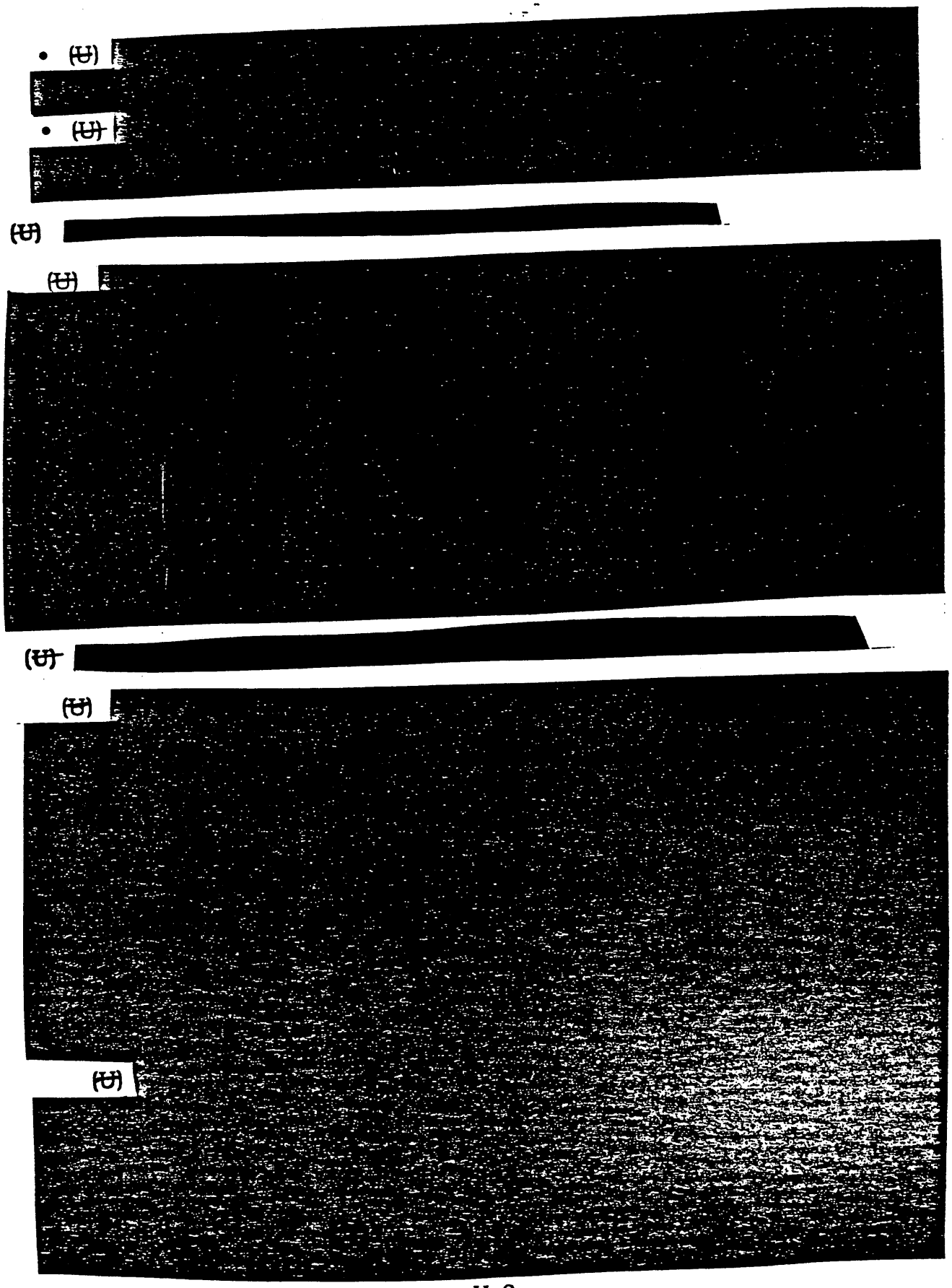

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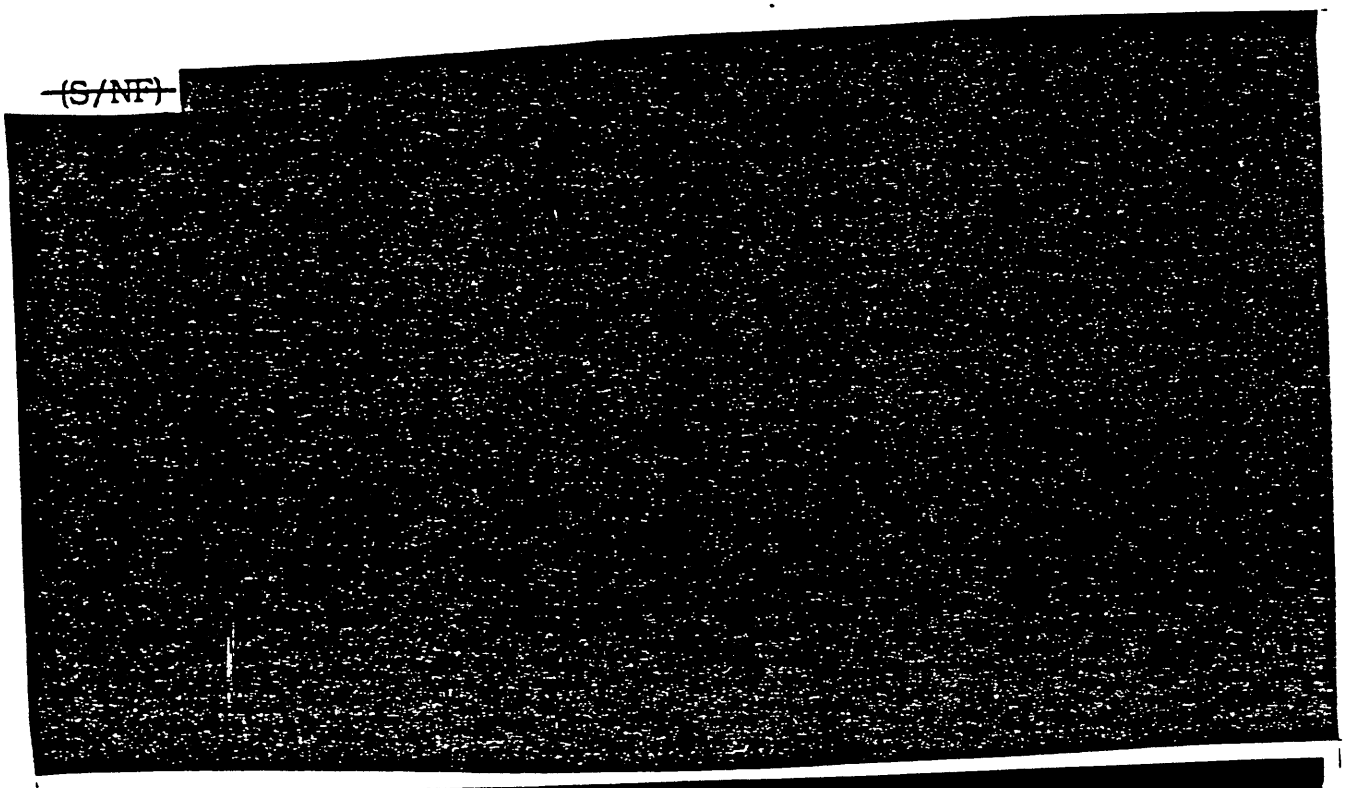

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CHAPTER THREE
U.S. NUCLEAR COMMAND AND CONTROL SYSTEM (NCCS) FAILSAFE AND RISK REDUCTION MEASURES OVERVIEW (U)

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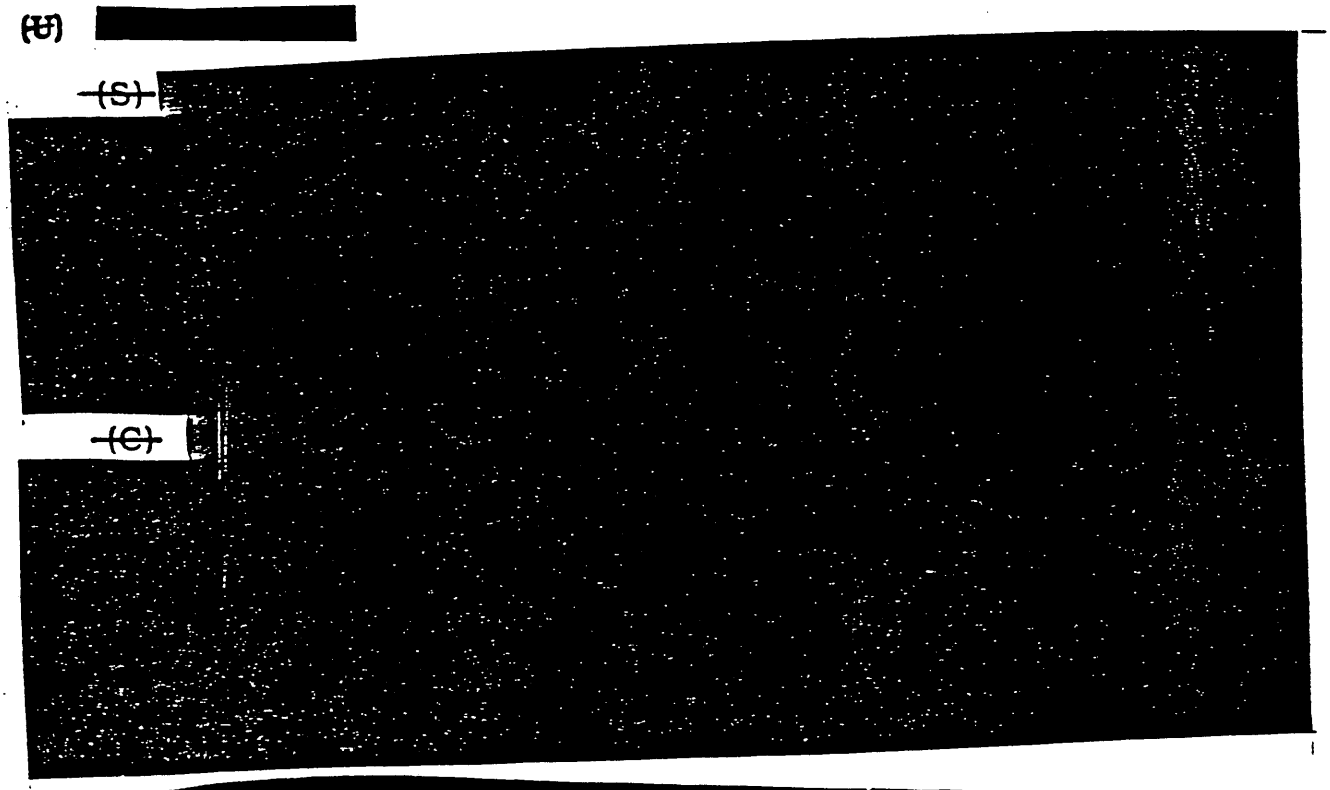

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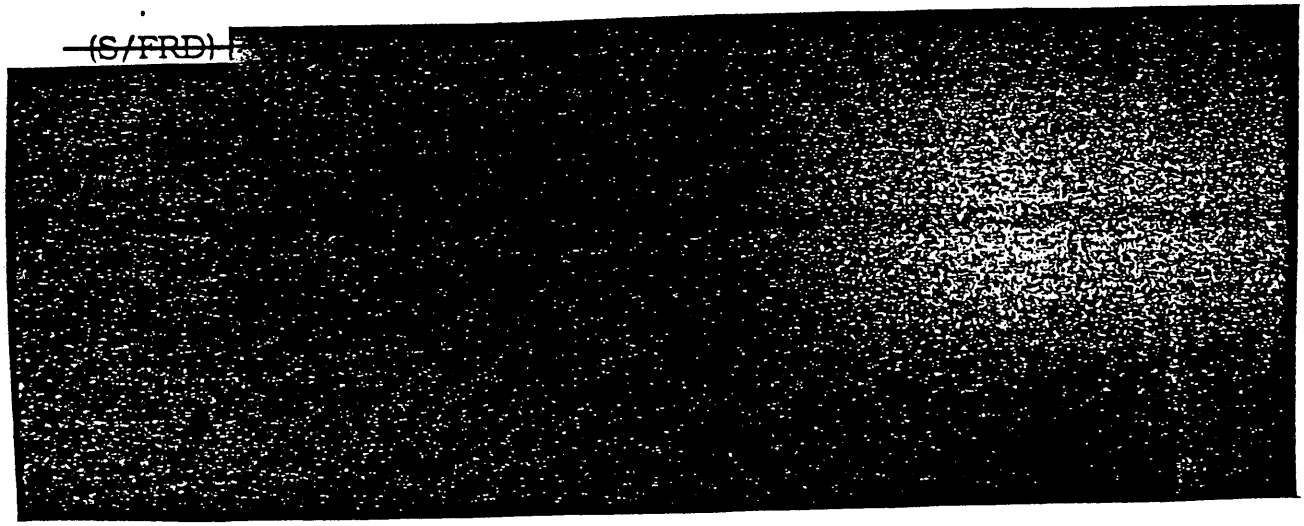

(U) The variety and complexity of the warheads and weapons systems, as well as of the deterrence and potential warfighting missions they should perform, have evolved over a period of almost 50 years. The manner in which these weapons are controlled has also evolved, sometimes along

dissimilar lines dictated by service, theater, or operational requirements, but driven always by the dual requirements for assuring use when authorized by the President while assuring against unauthorized use. The net result of this evolution has been the development of a Nuclear Command and Control System that is large and complex.

(U) FAILSAFE MEASURES

(U) A combination of procedures and design features contribute to the command and control of United States nuclear weapons. This combination includes:

- Positive Measures to Assure Authorized Use, and
- Positive Measures to Assure Against Unauthorized Use.

(U) This combination of procedures and design features supports the execution decision process and provides safeguards against unauthorized use for all elements of the nuclear command and control system. In general, these positive measures support warfighting and conflict termination, should deterrence fail, and also support the day-to-day deterrence posture of both United States nuclear weapons and the nuclear command and control system. They are interlocking, with features of each influencing the performance of the other. Together, they provide a layered system of protective features to support Presidential authority and the assure-assure against balance.

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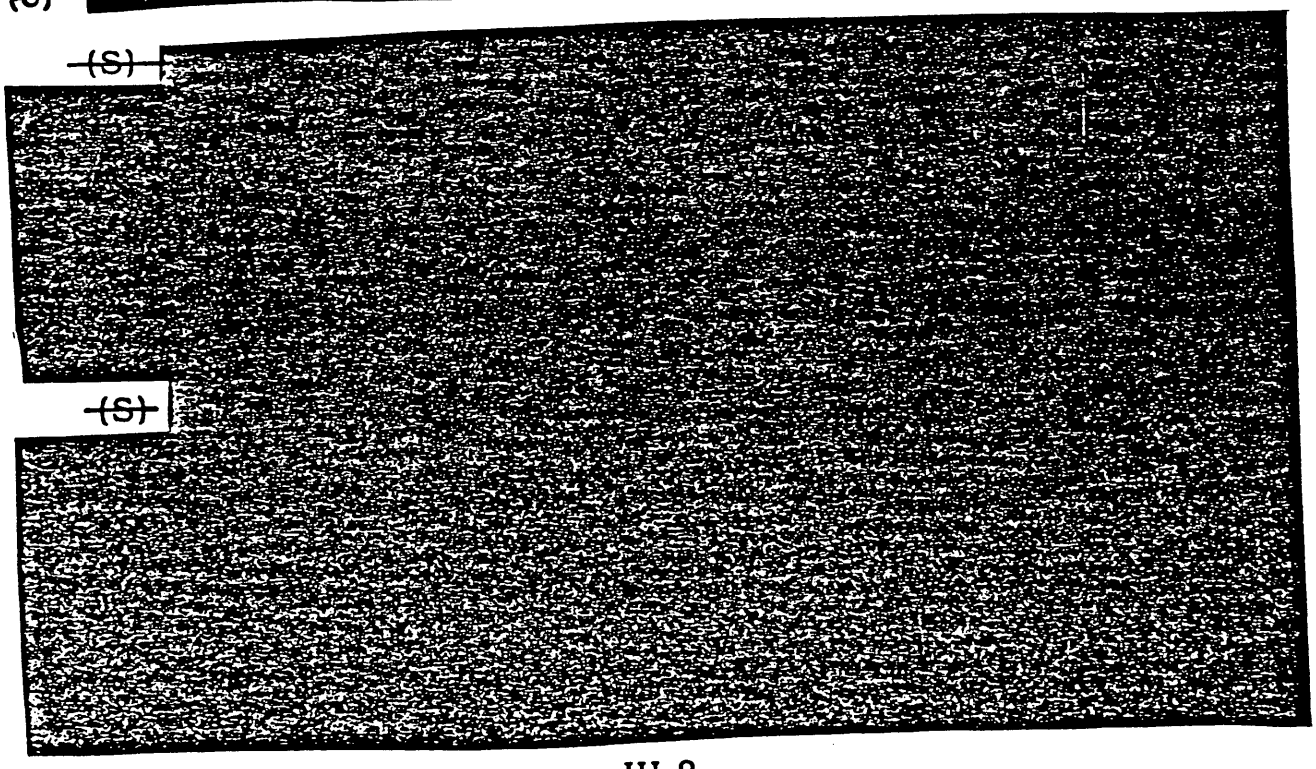

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(U) POSITIVE MEASURES TO ASSURE AUTHORIZED USE

(U) As described above, the United States nuclear stockpile consists of various weapon systems over which Presidential authority, while having the same fundamental command and control requirements, may be implemented in different ways. The most time-urgent of these weapon and nuclear command and control systems are those of the strategic deterrent forces on day-to-day alert. For this reason, this description will begin with the alert strategic forces. The failsafe measures that are in place to prevent inadvertent or unauthorized use are summarized in Table 3 and described below.

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EXECUTION PROCESS FAILSAFE MEASURES (U)

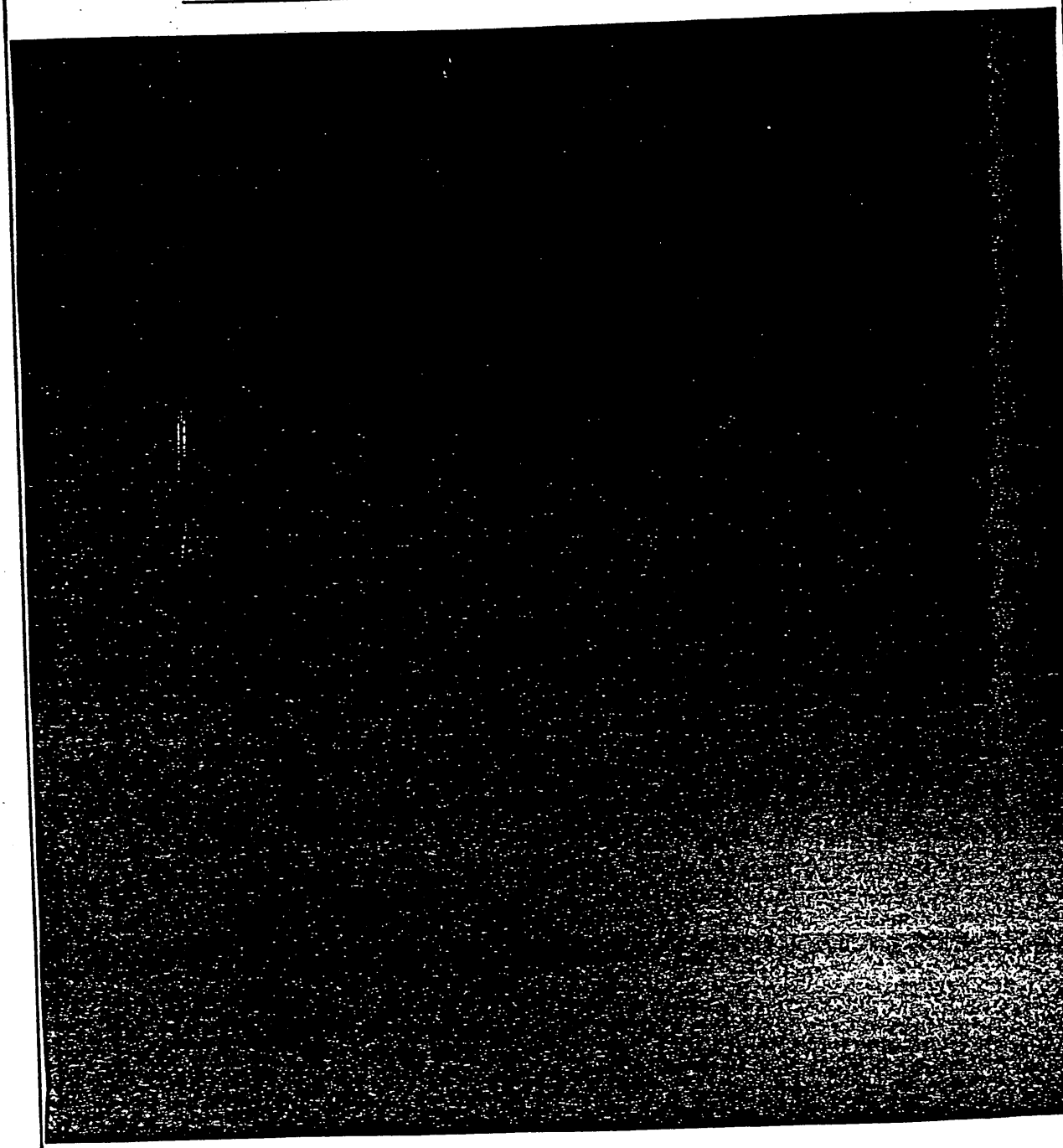

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TABLE 3

STRATEGIC FORCES EXECUTION DECISION PROCESS (U)

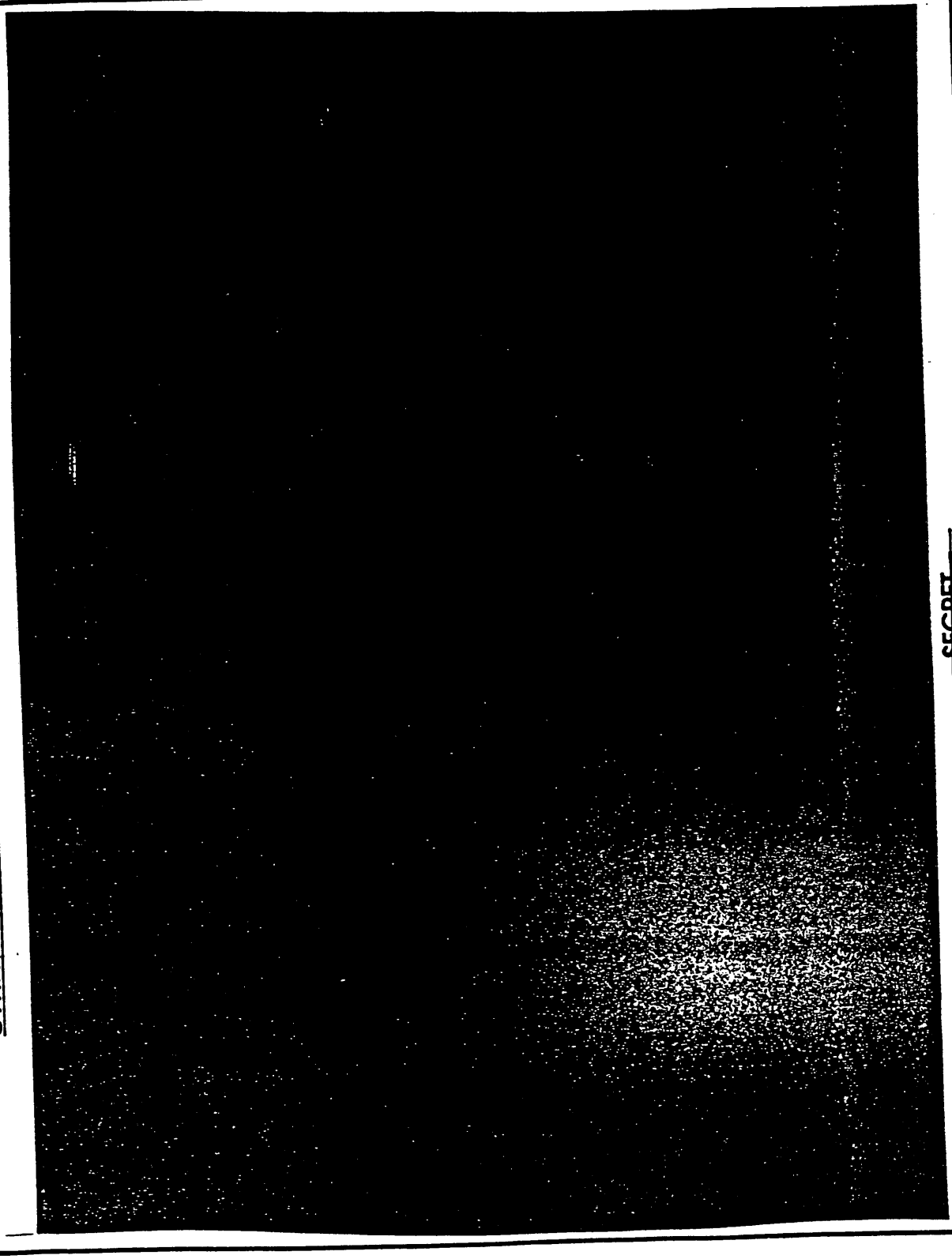

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FIGURE 2

~~(S)~~

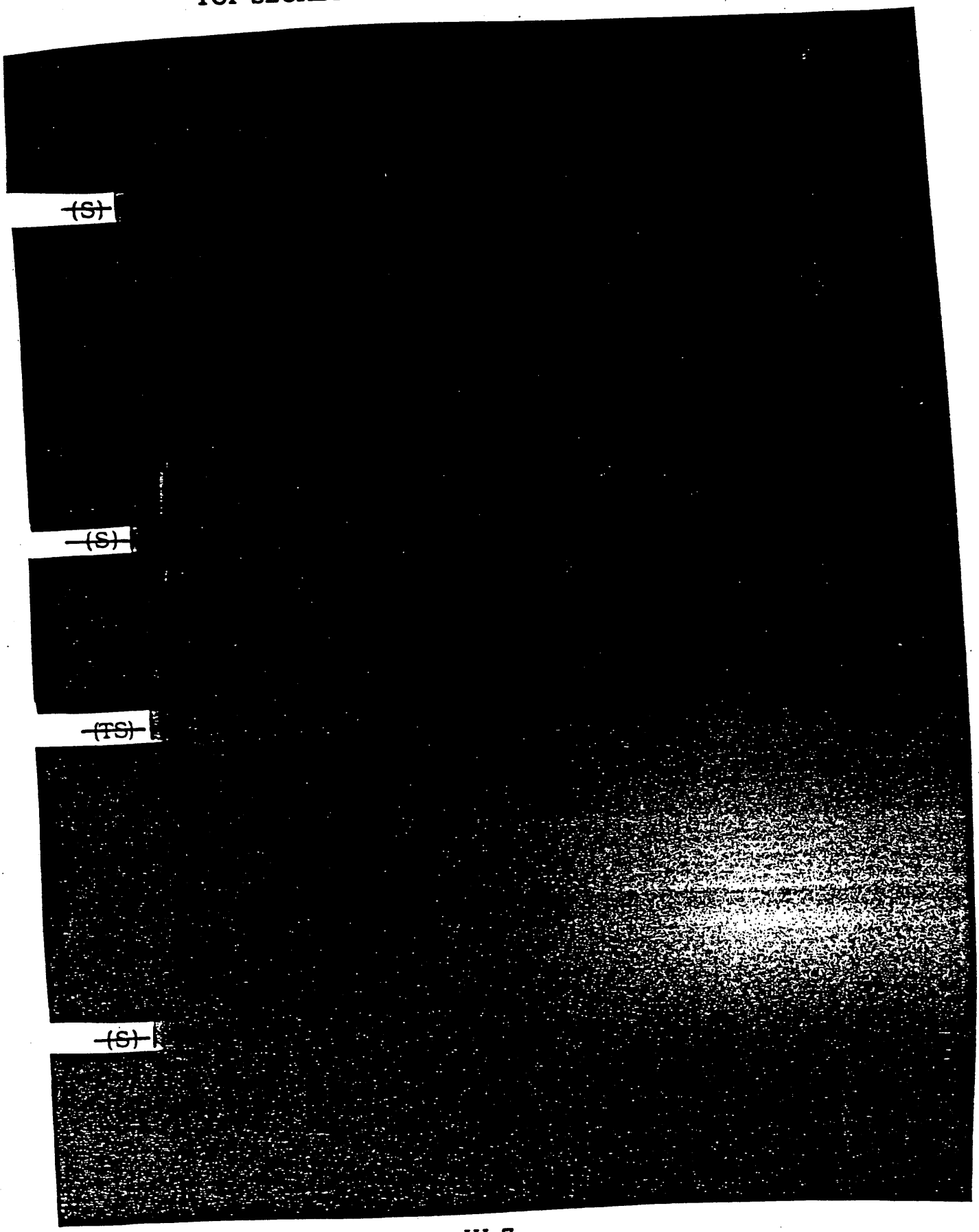
~~(S)~~

~~(S)~~

(U) EXECUTION FAILSAFE MEASURES

(U) In addition to the nuclear command and control system features that assure authorized use, an elaborate system of failsafe measures to assure against unauthorized execution has also been implemented.

~~(TS)~~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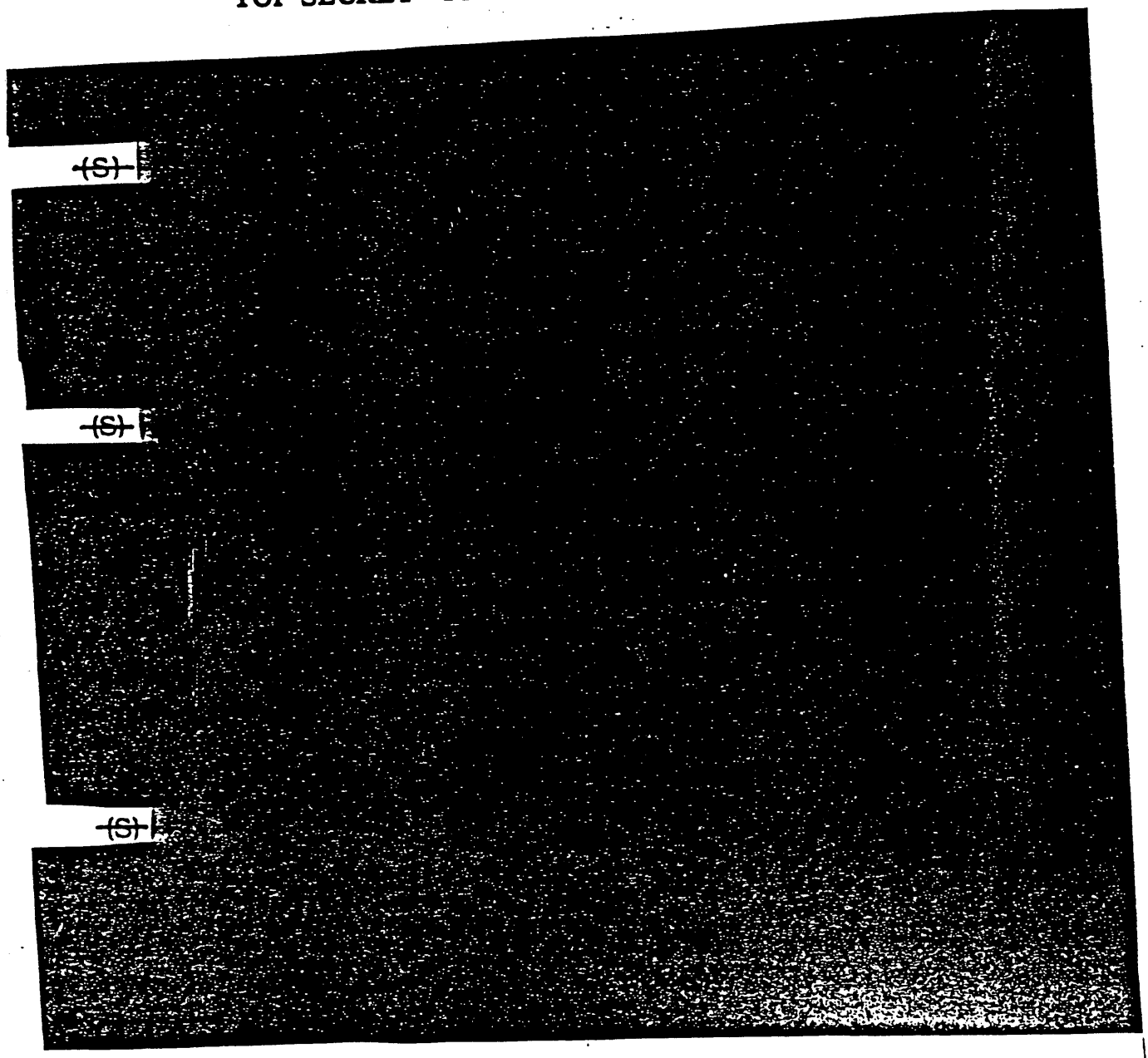

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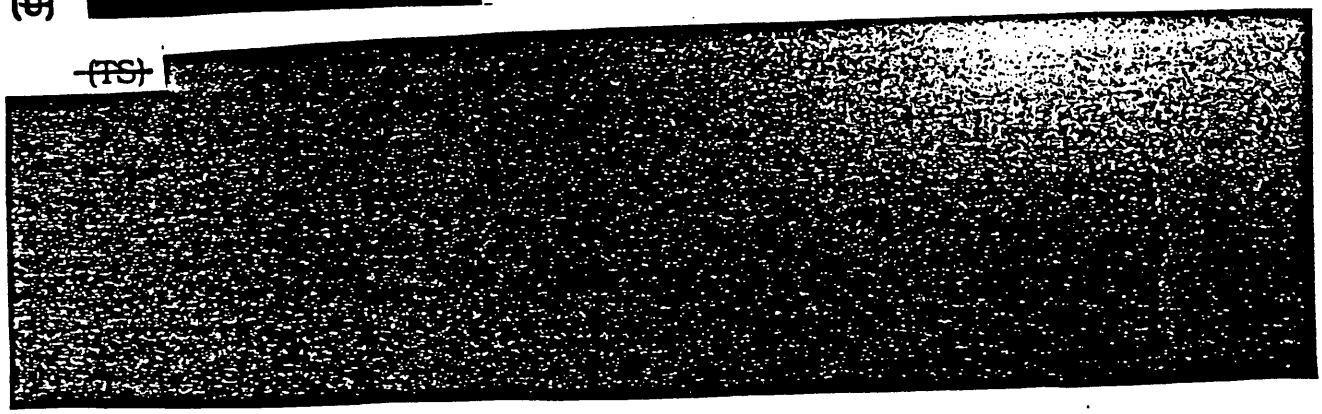

NON-STRATEGIC NUCLEAR FORCES EXECUTION DECISION PROCESS (U)

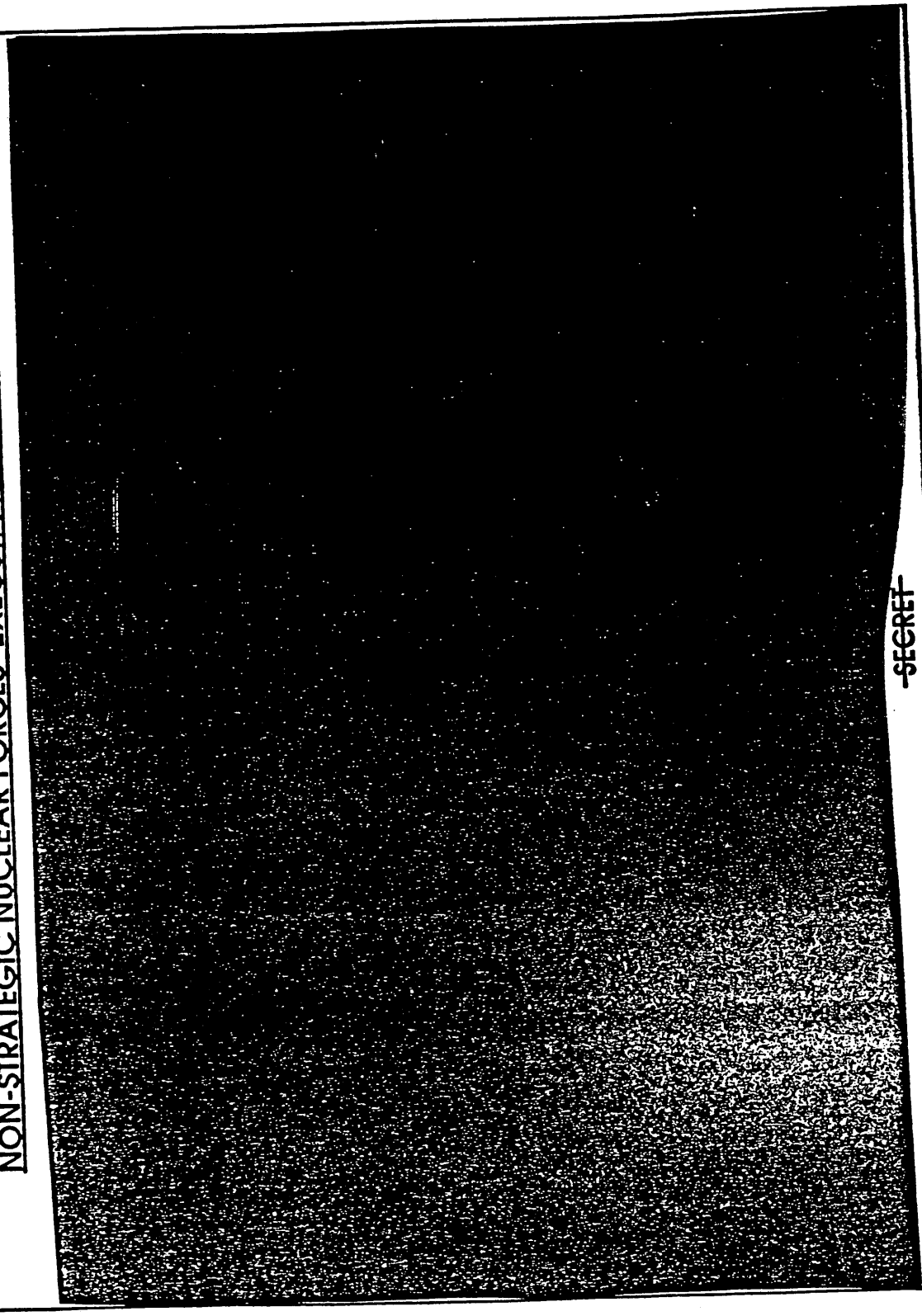

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FIGURE 3

~~(TS)~~ [redacted]

(U) POSITIVE MEASURES TO ASSURE AGAINST UNAUTHORIZED USE

(U) The preceding section described the procedures and cryptographic features employed to insure both authorized use and termination of the use of U.S. nuclear weapons. The following section describes NCCS positive measures that assure against unauthorized use. Assurance against unauthorized use is provided by a layered system of failsafe measures that have evolved over almost 50 years and have been completely successful in preventing inadvertent or unauthorized use of any U.S. nuclear weapon. This layered system is summarized in Figure 4 and described in more detail below. As stated earlier, many of the positive measures that assure against unauthorized use are interlocking and synergistic with those measures that assure authorized use.

(U) NUCLEAR COMMAND AND CONTROL SYSTEM PERSONNEL

(U) The first layer of protection against unauthorized use rests with the loyalty, training, dedication and quality of the personnel involved. They are the underpinnings that ensure that the rigorous procedures used in controlling the execution process as well as those used to provide for the safety, security, and control of nuclear weapon systems at the force level are effectively carried out. The NCCS incorporates a series of quality assurance measures that develop, maintain, and continually assess the personnel assigned to duties with nuclear weapons and nuclear command and control.

(U) PERSONNEL RELIABILITY PROGRAM

(U) The Personnel Reliability Program (PRP) ensures that only personnel of proper character are assigned to duty with nuclear weapons. Duty with nuclear weapons does not always entail having access to weapons or weapons systems, as is the case with crew members or maintenance personnel. It also includes those individuals who are responsible for supporting the systems, such as those who are involved in the execution decision process, controlling the code documents and sealed authenticators, or in providing security for the nuclear weapon or critical equipment.

(U) A member of the Personnel Reliability Program undergoes stringent initial screening, including a thorough background investigation, a medical evaluation, and an intensive training program before being certified and cleared by the unit commander to perform nuclear weapons-related

POSITIVE MEASURES TO ASSURE AGAINST UNAUTHORIZED USE (U)
THE ADVERSARY: HUMANS OR ACCIDENTS
PERSONNEL
SECURITY
NUCLEAR WEAPON SYSTEM DESIGN FEATURES
PROCEDURES
RECAPTURE & RECOVERY
PREVENT UNAUTHORIZED USE
POSITIVE CONTROL MATERIALS & CODE MANAGEMENT
OPERATIONAL SAFETY RULES
ACCIDENT PROTECTION FEATURES
EMERGENCY ACTION PROCEDURES
USE CONTROL DEVICES
ENVIRONMENTAL SENSING DEVICES
INFORMATION
PHYSICAL
PERSONNEL RELIABILITY PROGRAM
TWO PERSON POLICY
EXERCISES & TRAINING
UNCLASSIFIED

FIGURE 4

duties. Once assigned to nuclear weapon-related duties, an individual's performance on the job and behavior, both on and off the job, are continuously reviewed. If any reason emerges to doubt a person's character or reliability, that person is immediately removed from duties involving nuclear weapons or nuclear command and control. If the unit commander determines the problem is serious, the individual is promptly reassigned to non-nuclear related duties. This action is administrative rather than punitive and can be accomplished quickly.

(U) A key aspect of the Personnel Reliability Program is that it requires the active participation of all of the individuals in it. Both commanders and co-workers are required to report any changes in behavior or medical or emotional problems that might affect the performance of individuals with whom they are assigned. Individuals are required to voluntarily remove themselves from the program for such problems as well. For example, voluntary removal often occurs when a person is taking certain prescribed medications that affect alertness. Voluntary as well as other temporary decertifications from the program allow an individual to return to nuclear-related duties when any problems have been resolved. This voluntary decertification and recertification process has been very beneficial in that it encourages responsible actions by personnel with temporary personal or medical problems, because they know that voluntary decertification will have no negative impact on future assignments or career progression.

(U) TWO PERSON POLICY

(U) Personnel certified for nuclear weapon-related duties are trained and indoctrinated into the Two Person Policy. This policy dictates that no individual shall have sole access to a nuclear weapon, critical component, or critical nuclear command and control systems or materials. During any operation when access is required, a minimum of two authorized persons must be present, each of whom is capable of detecting incorrect or unauthorized procedures with respect to the task being performed and familiar with applicable safety and security requirements, which include specific procedures to terminate such actions. These two individuals must be physically positioned where they can detect any incorrect or unauthorized actions undertaken by the other. The policy is enforced by the persons who constitute the team and associated security personnel during the entire time they are performing their task or operation until the time they leave the area requiring the Two Person Policy. Execution of this policy provides a failsafe measure against both deliberate and inadvertent acts that might have a negative effect on a weapon or other critical component of the nuclear command and control system.

~~(U)~~ [redacted]

~~(S)~~ [redacted]

[redacted]

(U) NUCLEAR COMMAND AND CONTROL SYSTEM SECURITY

(U) Failsafe measures have been implemented to protect the physical aspects of all of the elements of the nuclear command and control system, including nuclear weapons, and to protect the information that is critical to assuring use when authorized and assuring against unauthorized use. As is the case with many failsafe measures, the protections provided by the physical and information security programs are often overlapping and synergistic.

~~(DoD UCNI)~~ [redacted]

(U) PHYSICAL SECURITY

(U) All nuclear weapons are protected by extensive physical security at all times. The types of physical security systems employed vary with the weapons systems and their alert, storage, maintenance, or transportation status.

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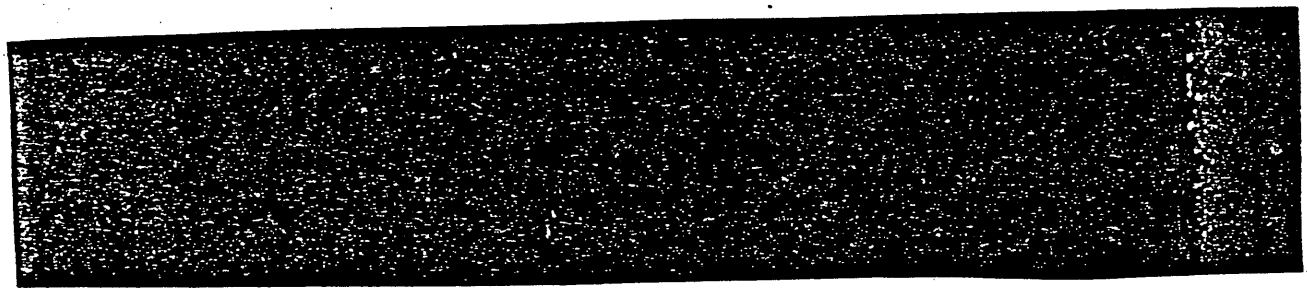

(U) [redacted]

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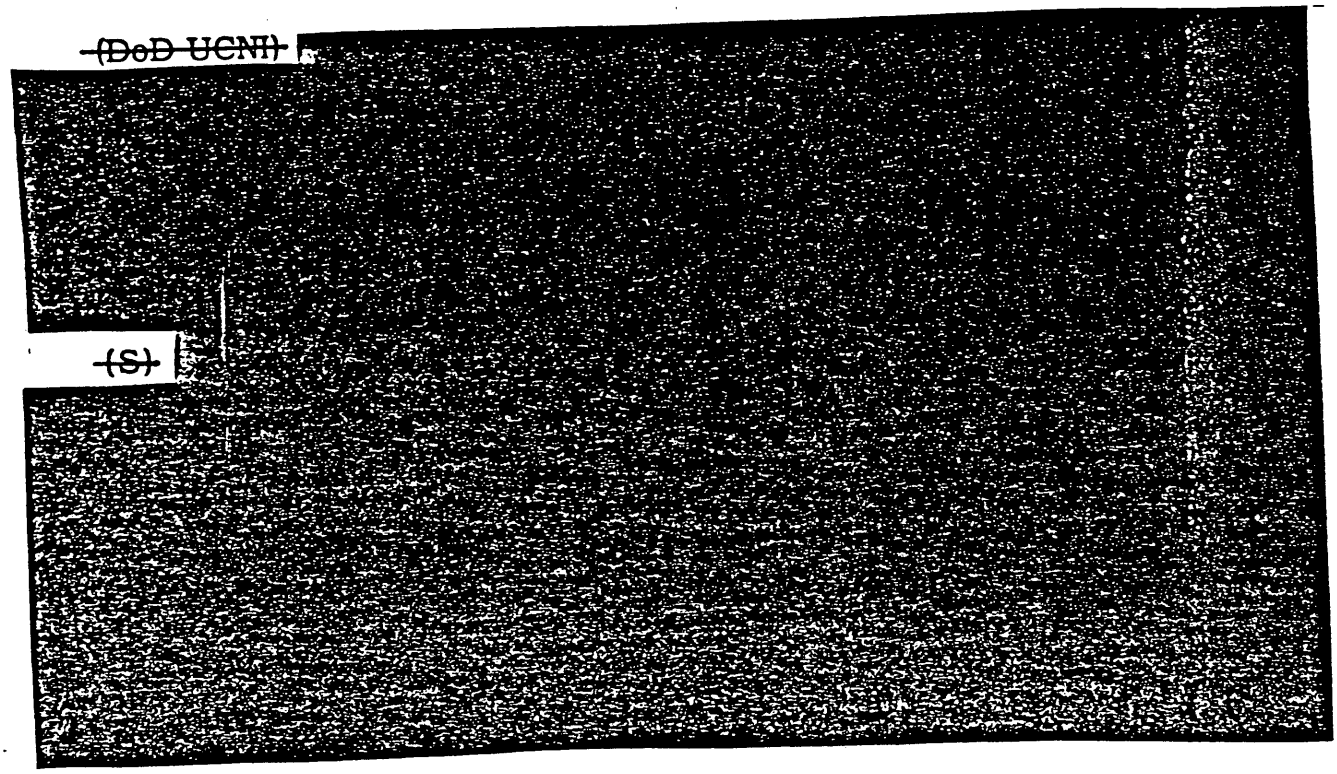

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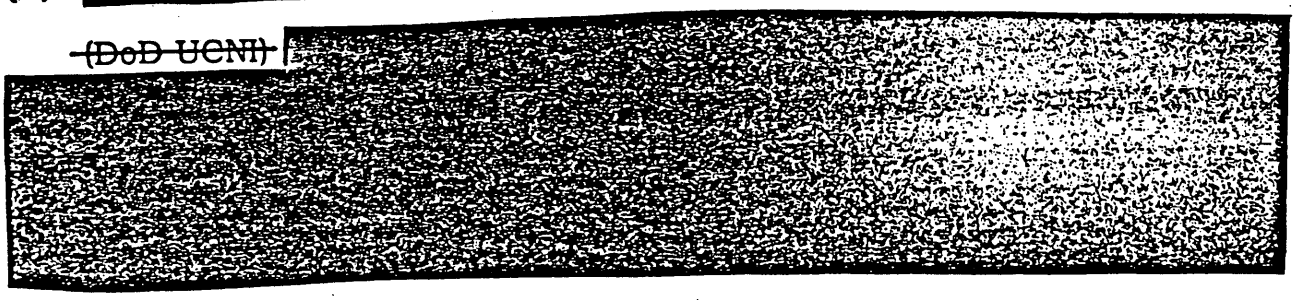

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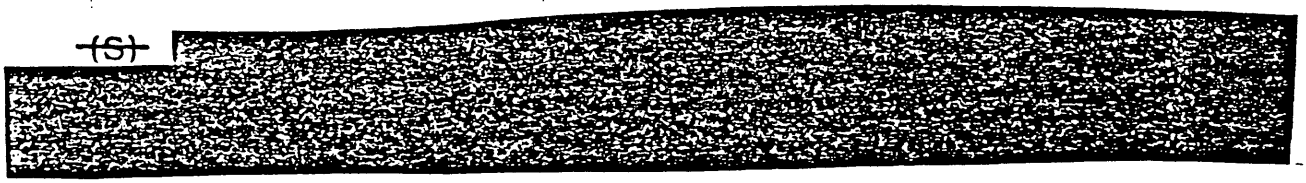

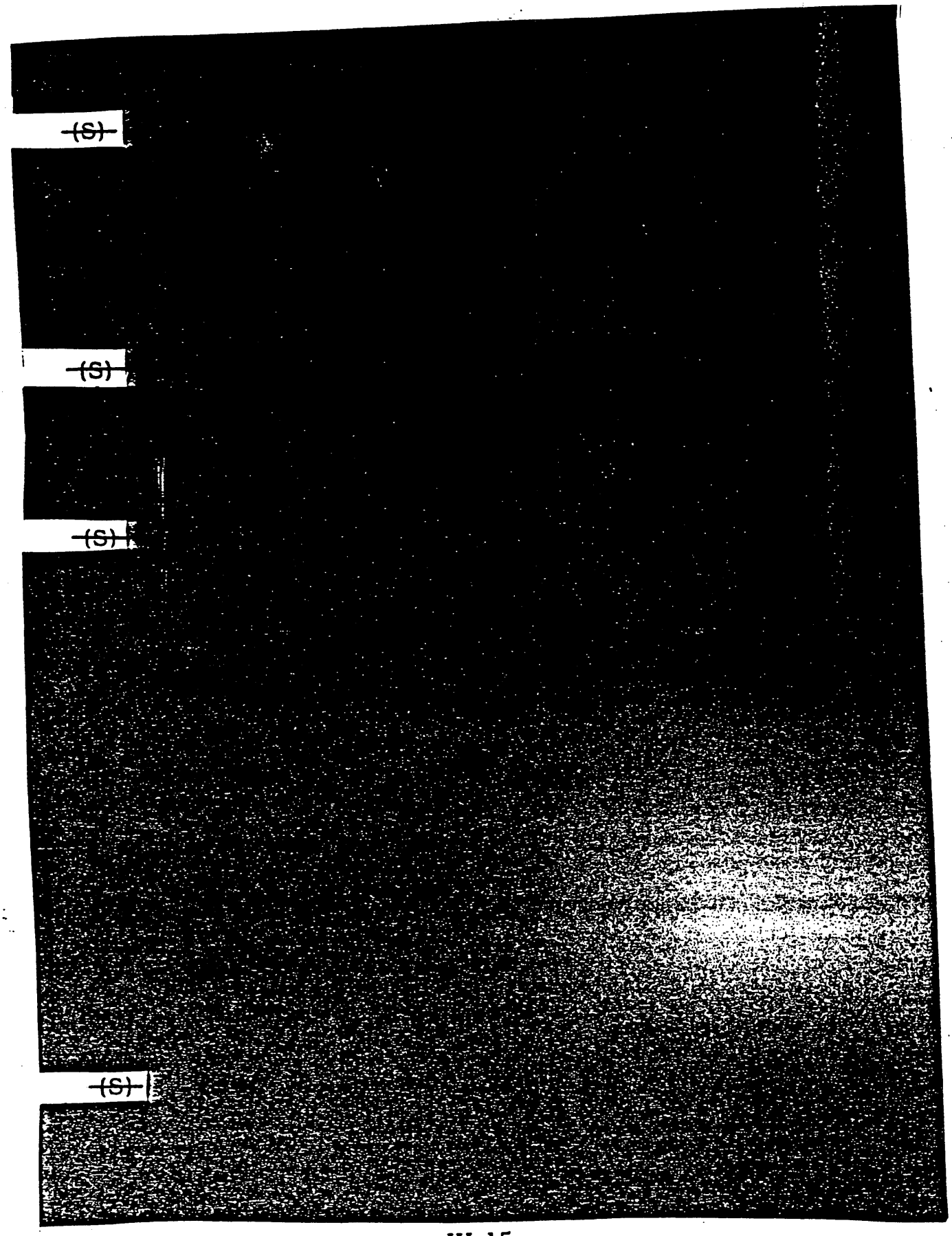
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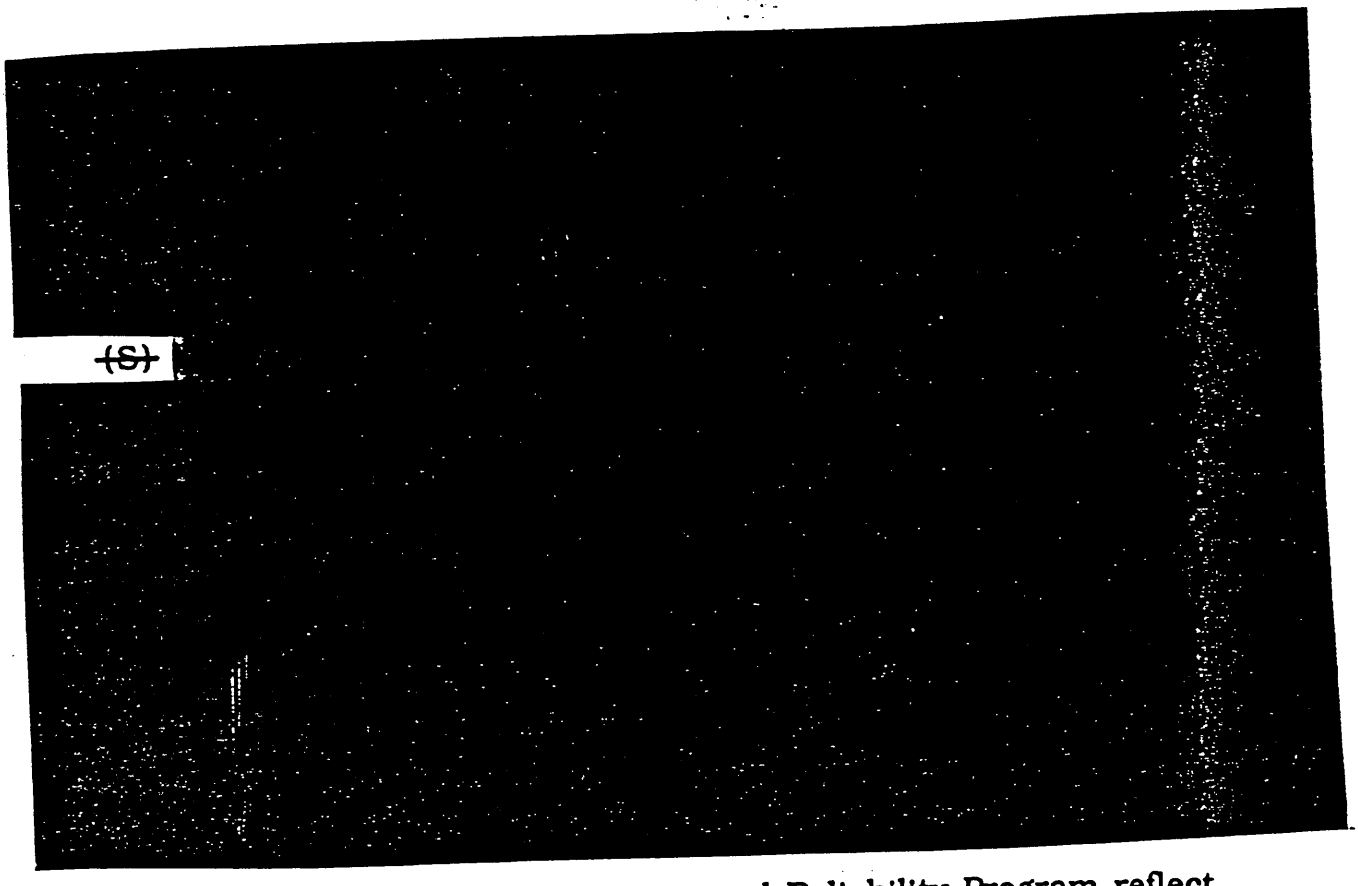

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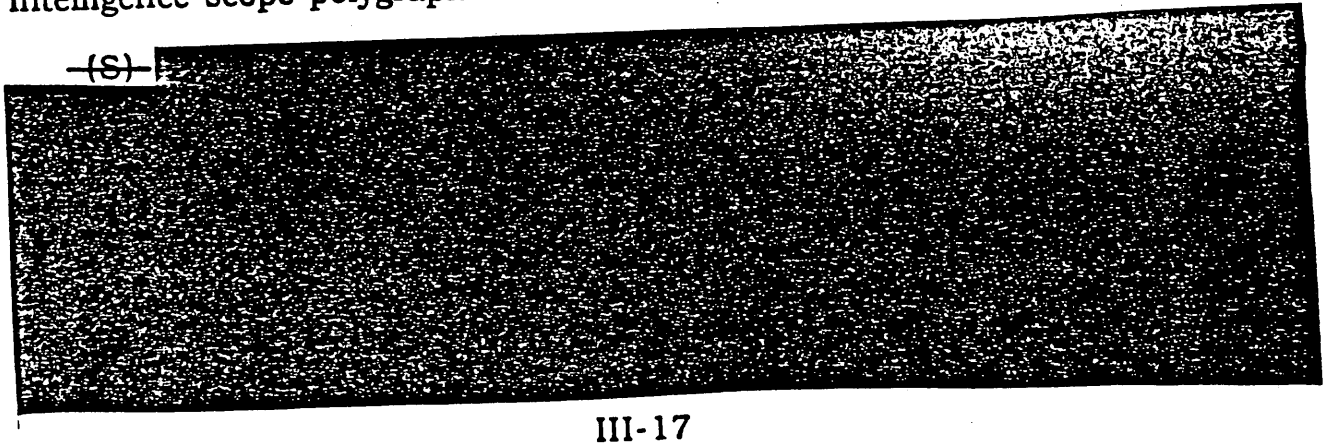
(U) Pending changes in the Personnel Reliability Program reflect recognition of the importance of the personnel who have access to NCCS coding and authentication processes and communications medium necessary to transmit release, transfer, execution, or termination orders; personnel involved in the preparation and production of those coding and authentication documents and equipment; personnel involved in the preparation and production of nuclear weapons targeting tapes and materials; and those maintenance and security personnel who could have adverse impact on system performance for nodes and equipment that represent near-single-point-failure elements for the NCCS. These individuals have been classified as serving in "specially designated" nuclear command and control positions and, in addition to the normal stringent requirements of the program, will be subjected to periodic counter-intelligence scope polygraph examinations.

~~(S)~~



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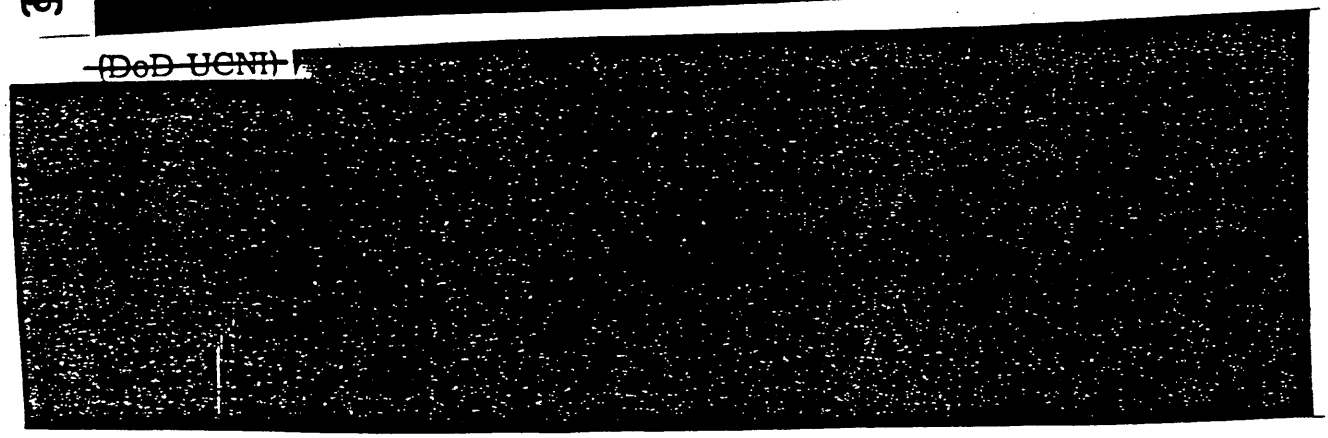

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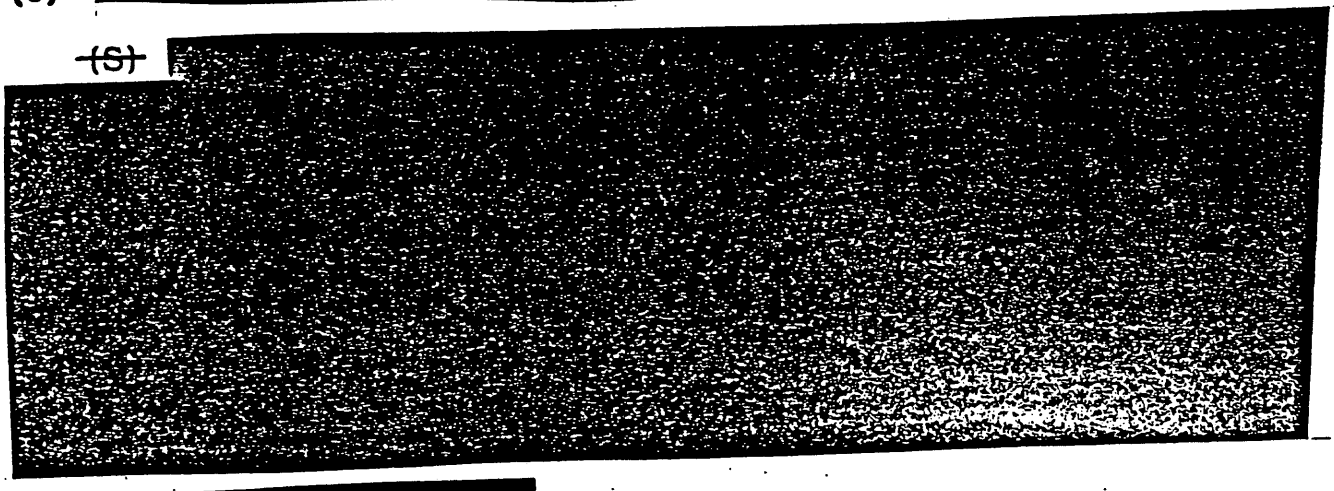

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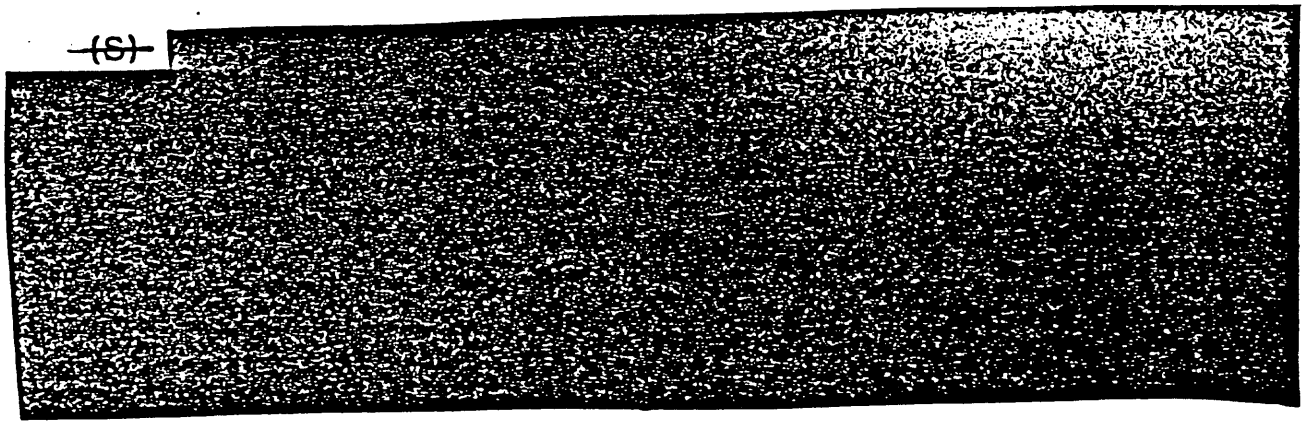

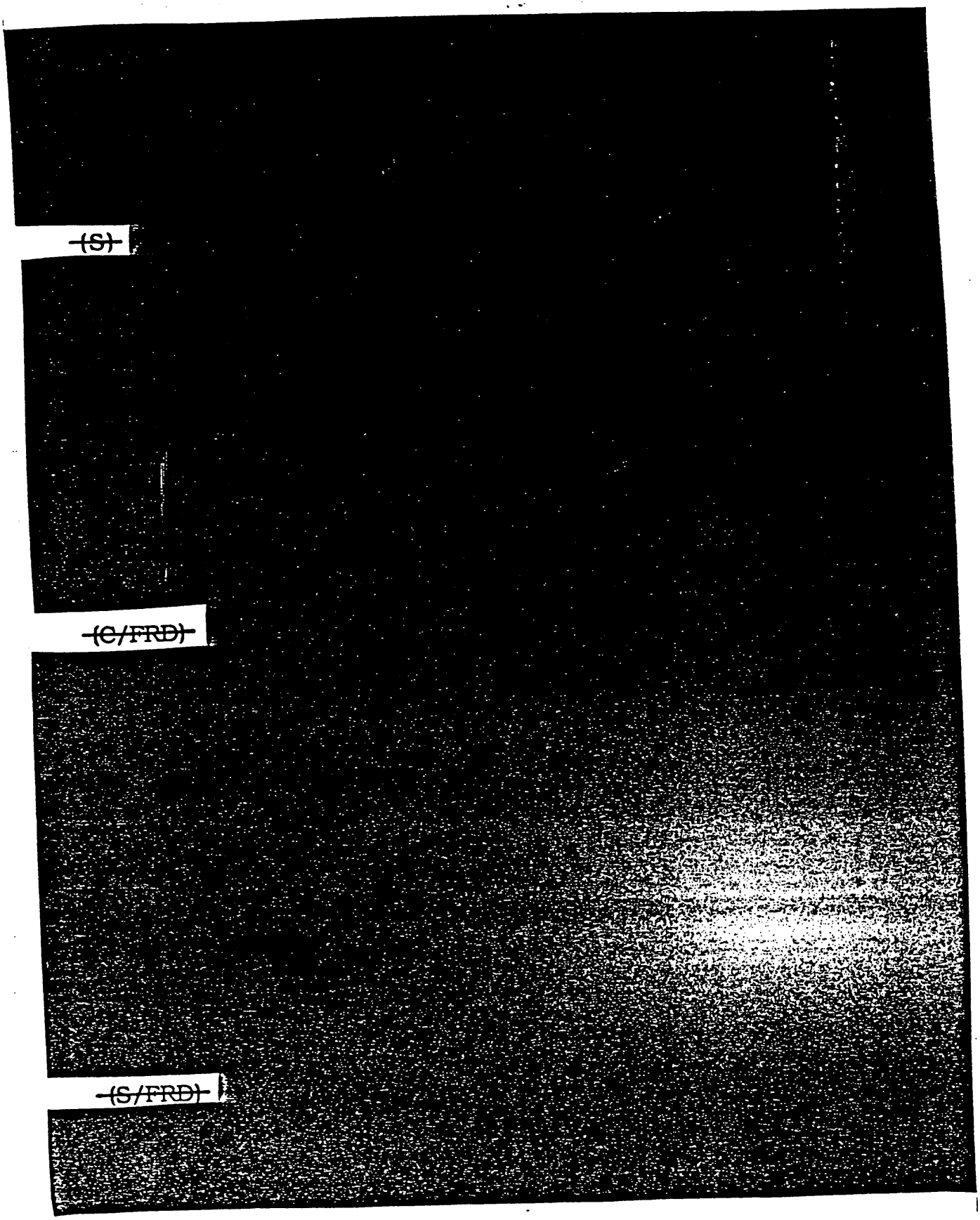

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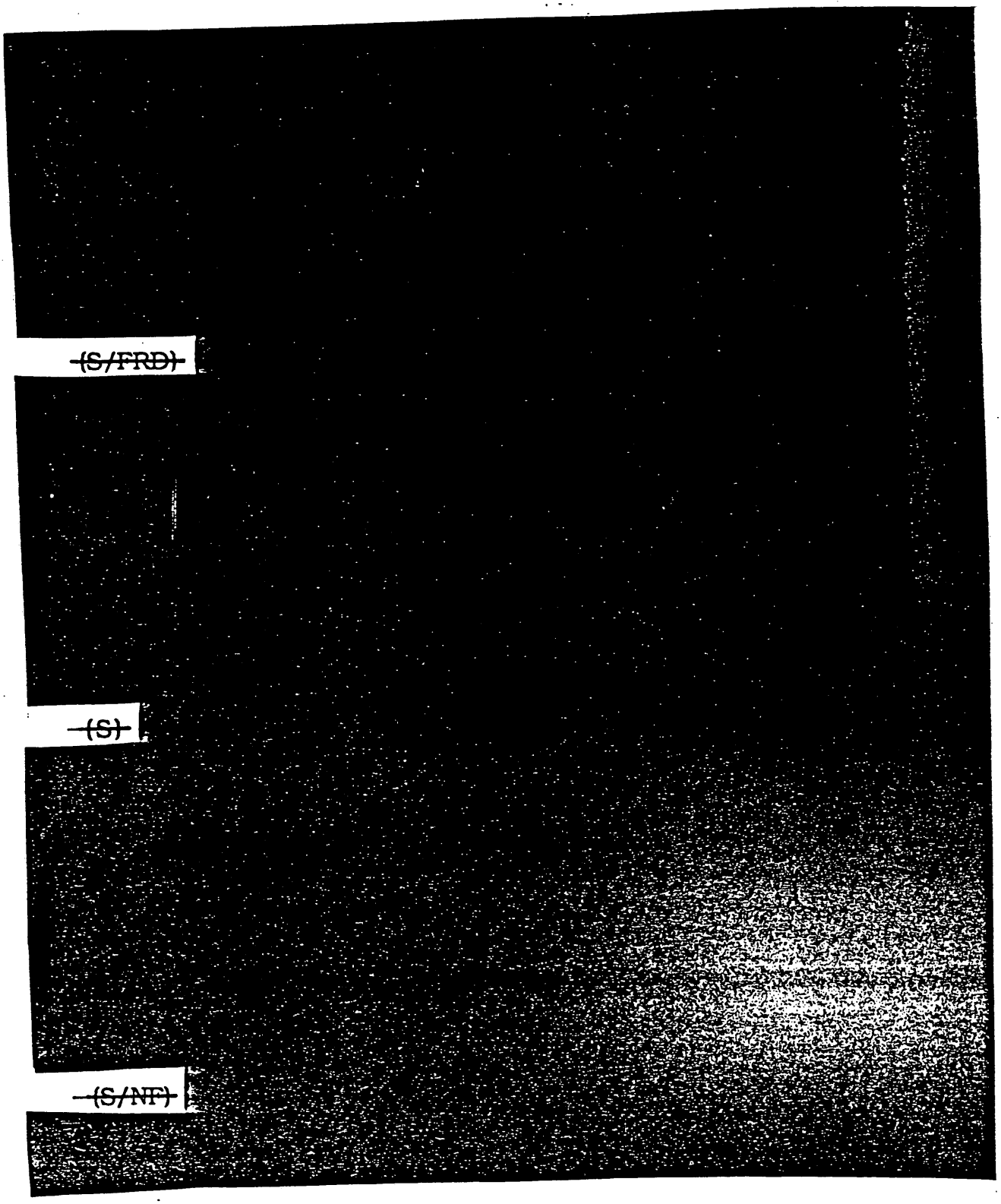
STOCKPILE SAFETY AND USE CONTROL DESIGN FEATURES

~~SECRET FRD NOFORN~~

TABLE 4



~~(S/FRD)~~

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(U) ACCIDENT PROTECTION FEATURES

(U) The U.S. nuclear weapons program has never experienced an accidental nuclear detonation. However, a number of weapon or weapon-

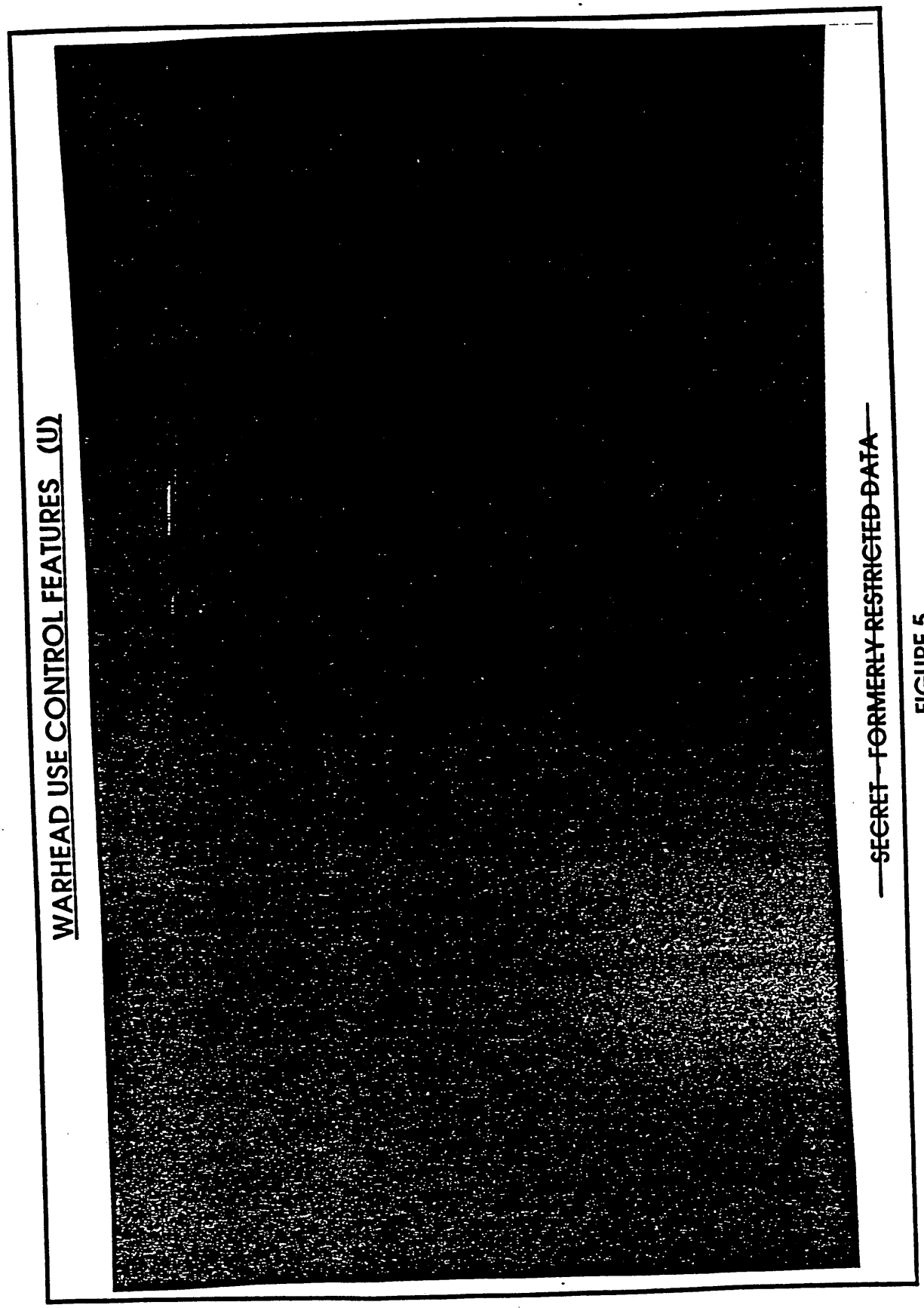
WARHEAD USE CONTROL FEATURES (U)
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FIGURE 5

CHANGES IN U.S. NUCLEAR STOCKPILE

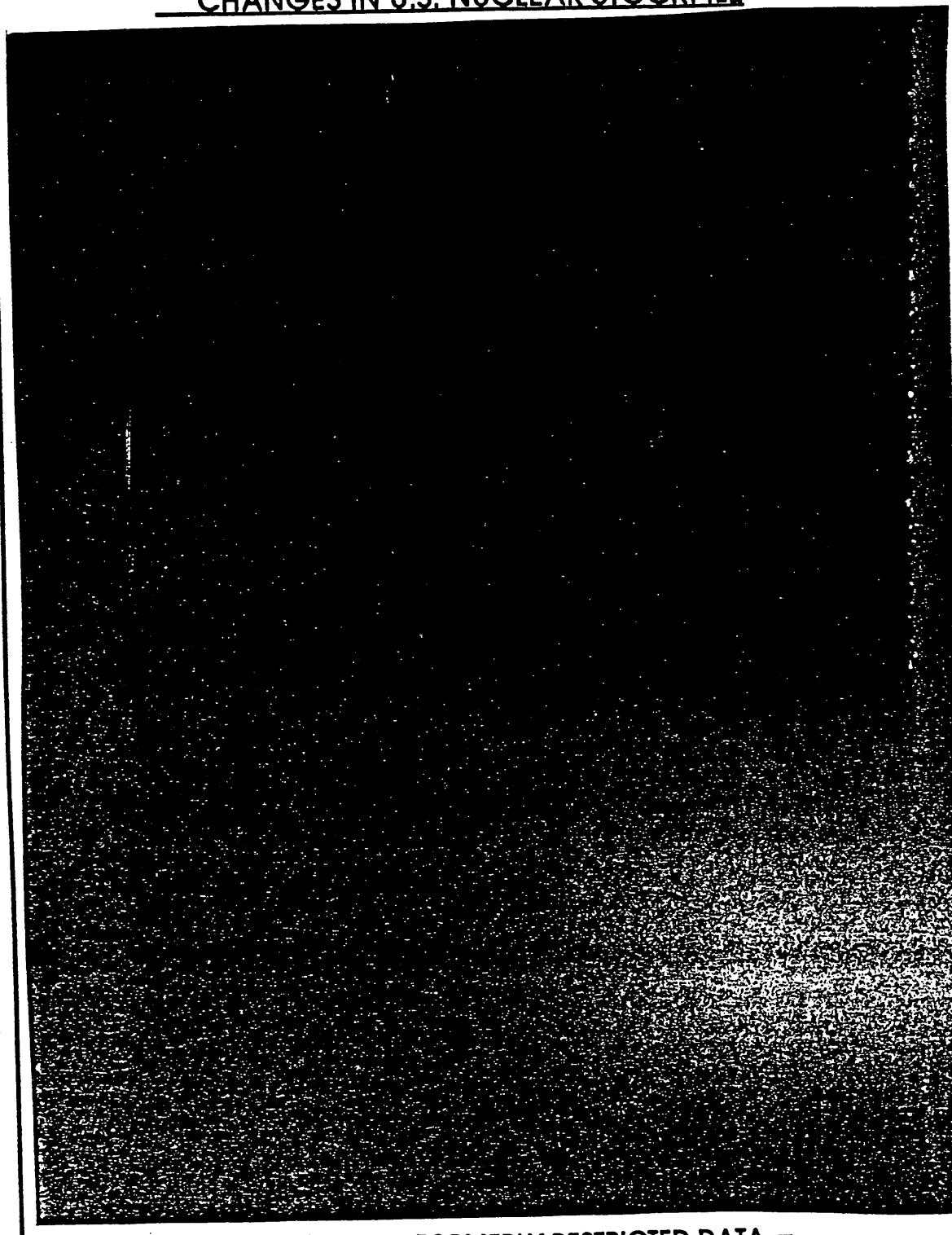

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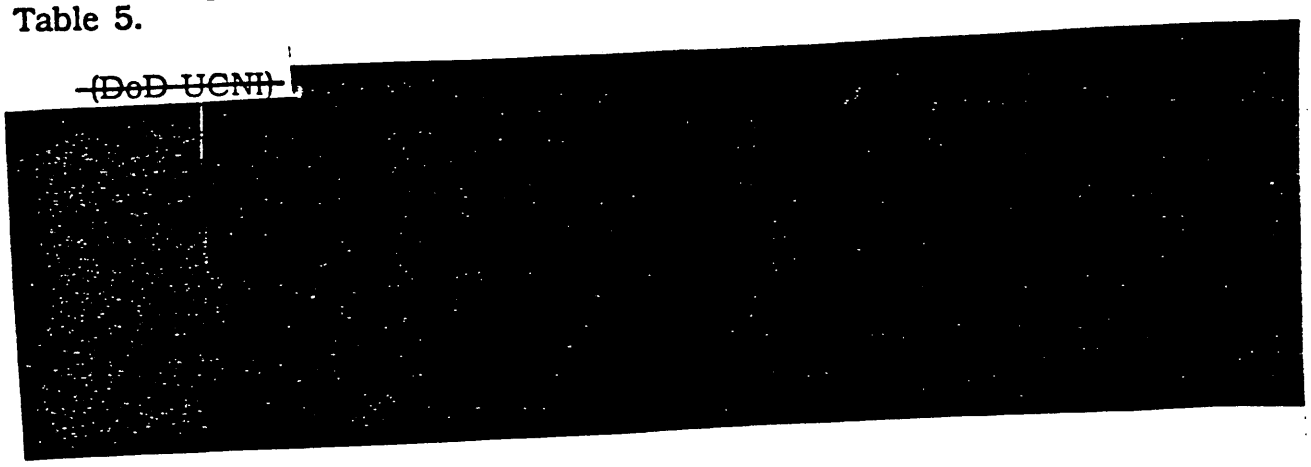
TABLE 5

related accidents/incidents have occurred. Each accident and incident has been investigated in detail to determine both causes and real or potential consequences. The findings of these investigations and analyses have resulted in both design and operational changes in the weapon program. There have been no United States nuclear weapons accidents since September of 1980, when one accident occurred. With that exception, there have been no accidents since 1968.

(U) Design features that prevent nuclear detonation of weapons subject to abnormal environments that might be experienced in an accident have been incorporated into the stockpile. These features include one or more of the following: one point safe warhead designs, enhanced nuclear detonation safety systems, insensitive high explosives, and fire resistant pits. The characteristics of these safety features are summarized in Table 4 and the relative percentage of the stockpile that contains them is illustrated in Table 5.

~~(DoD UCNI)~~



(U) NUCLEAR COMMAND AND CONTROL PROCEDURES

(U) In addition to the failsafe capabilities provided by the personnel and security programs and the design features incorporated into nuclear weapons and weapon systems, there are detailed and rigorous procedures prescribed for all operations involving nuclear weapons, weapons systems, and the NCCS. The Emergency Action Procedures carried out by command center and subordinate force personnel have already been described in the discussion of the execution release process. There are equally rigorous Operational Safety Rules, prepared for each nuclear weapon system and approved by the Secretary of Defense, which must be followed in the conduct of any operation involving nuclear weapons. In addition to these, there are other procedures dealing with the production, distribution, handling, and management of the positive control materials used in the NCCS.

(U) NUCLEAR WEAPON OPERATIONAL SAFETY RULES

(U) The Operational Safety Rules govern all aspects of operations involving nuclear weapons. The rules for a given nuclear weapon system will

dictate the procedures to be used in its movement, storage, and maintenance; provide for its security; and control its employment. They will specify both the equipment to be used in these operations and the procedures for certifying that equipment for use. These rules vary among weapons and weapon systems but in all cases protect them from accidents and provide protection against their unauthorized or inadvertent use. Some of the safety procedures used in the employment of nuclear weapons are described below.

~~(S)~~

~~(S)~~

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[redacted]

(U) At present, there are no nuclear-armed strategic bombers or non-strategic dual capable aircraft on alert, nor are any sea-launched, nuclear-armed cruise missiles or nuclear bombs deployed at sea.

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~~(S)~~ [redacted]

~~(S)~~ [redacted]

~~(U)~~ [redacted]

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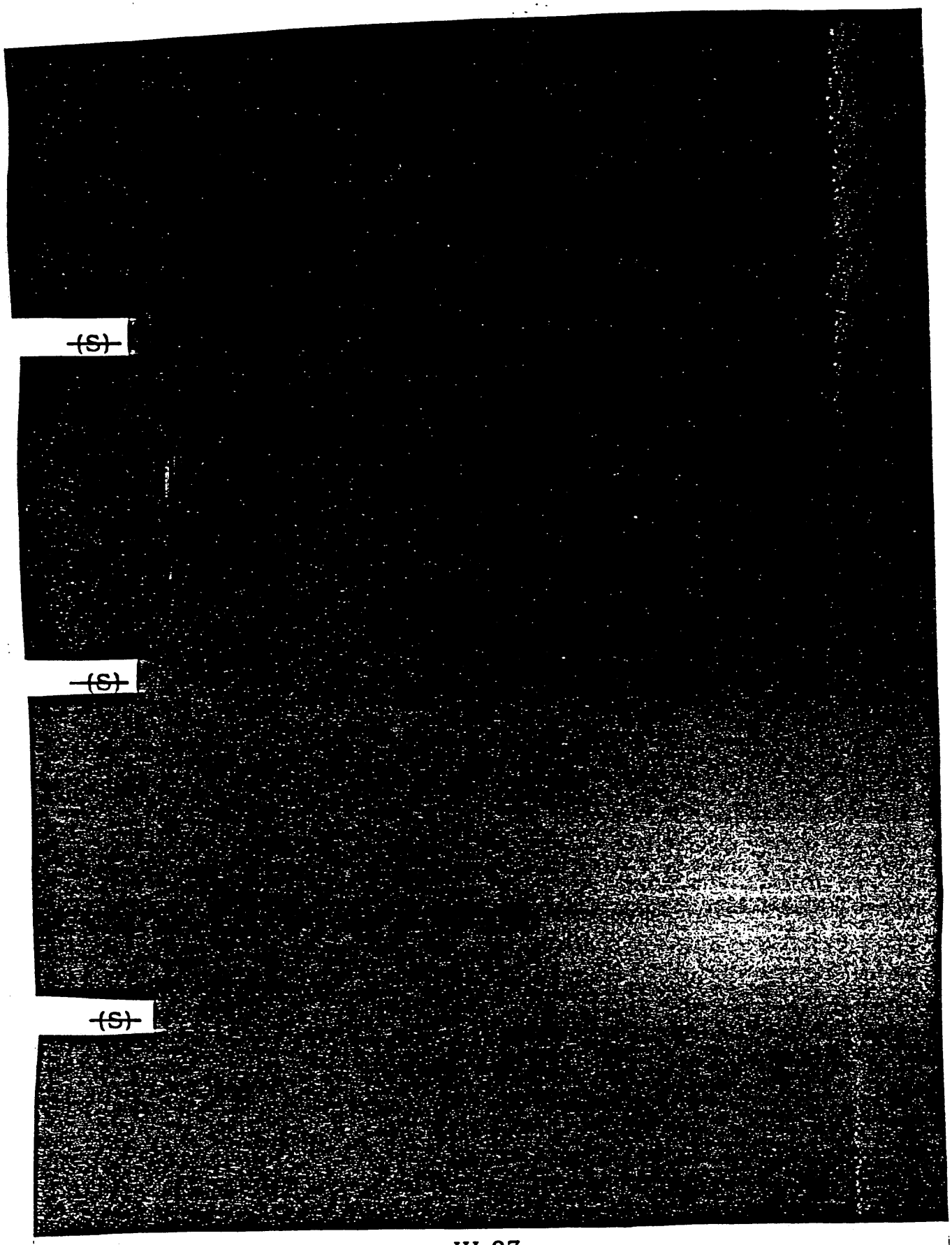
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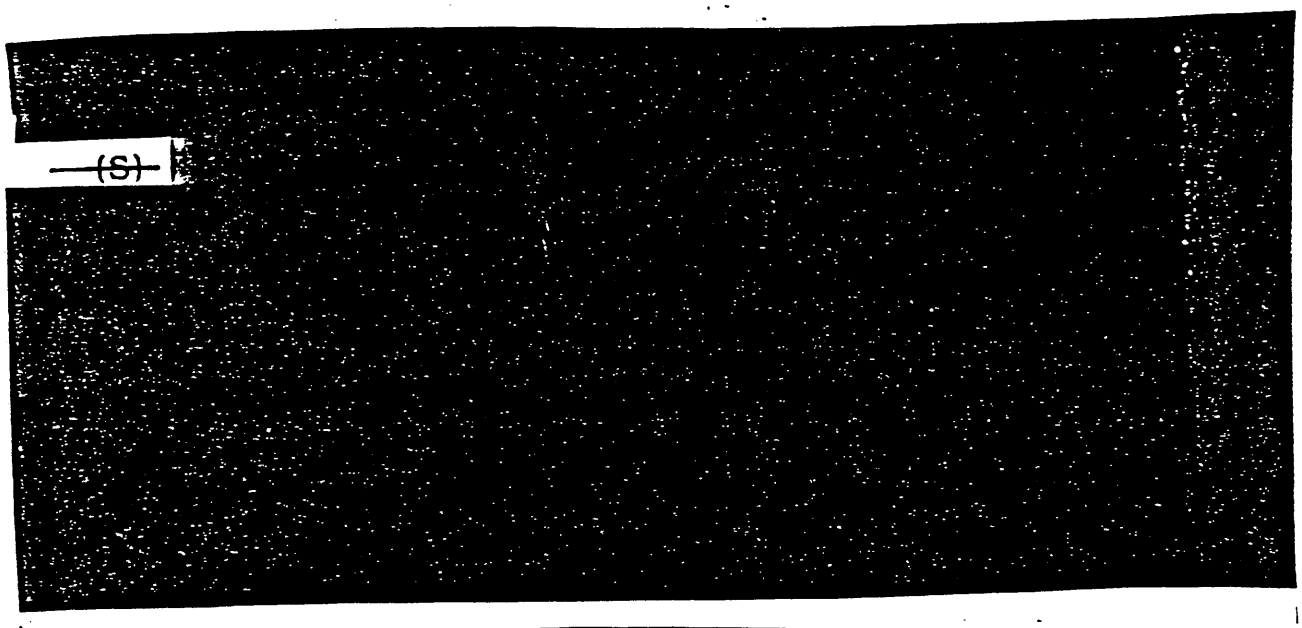

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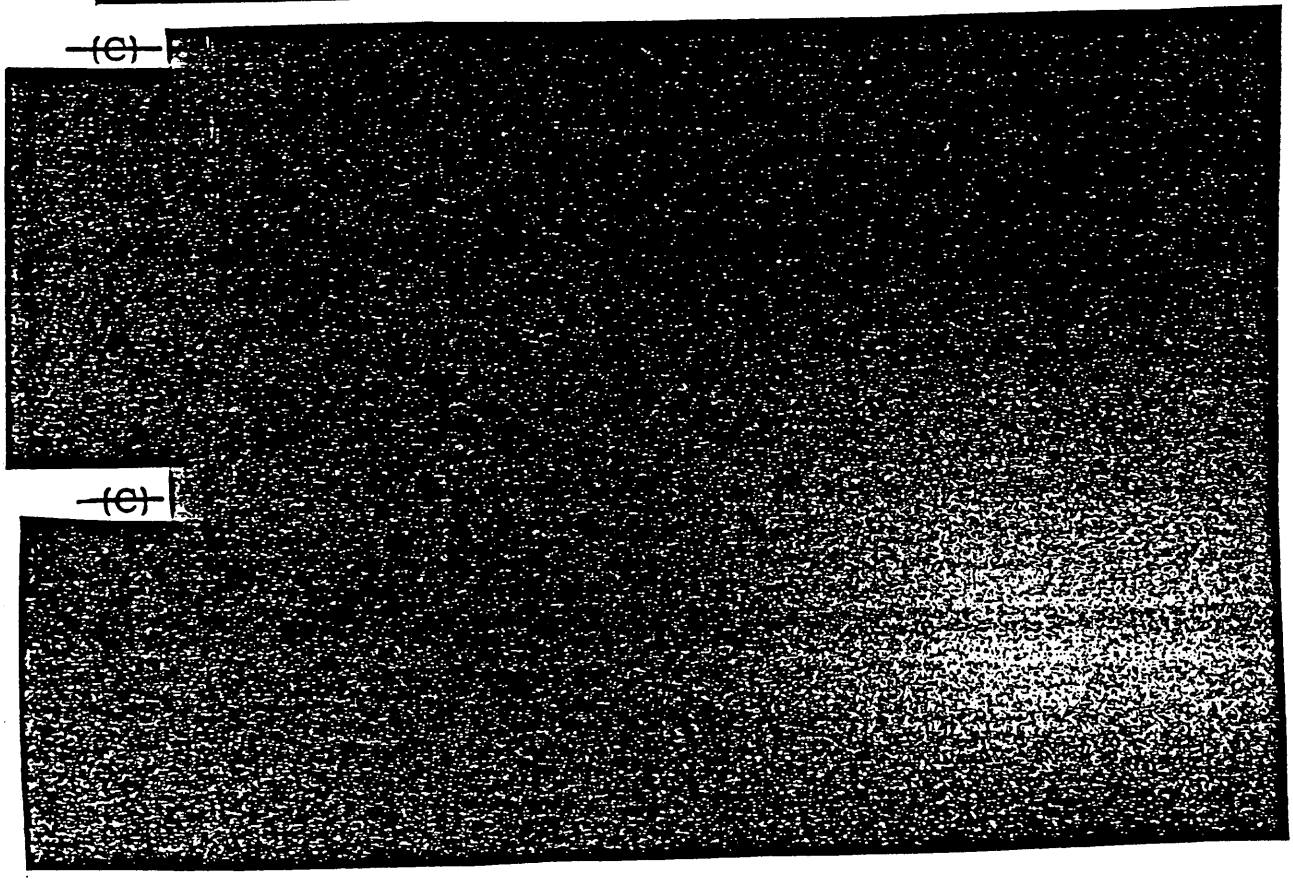

~~(C)~~

~~(C)~~

~~(U)~~ A seminal document supporting the assure against side of the balance is DoD Directive 3150.2: "Safety Studies and Reviews of Nuclear Weapon Systems". This Directive establishes the Nuclear Weapon System Safety Standards which define safety very broadly and, in fact, encompass all

EXISTING SAFETY, SURETY, AND CONTROL POLICY AND OFFICES OF PRIMARY RESPONSIBILITY (U)

~~UNCLASSIFIED~~

TABLE 6

failsafe measures that assure against unauthorized use. These standards are presented in Table 7.

NUCLEAR WEAPON SYSTEM SAFETY STANDARDS (U)

1. There shall be positive measures to prevent nuclear weapons involved in accidents, or jettisoned weapons, from producing a nuclear yield.

2. There shall be positive measures to prevent DELIBERATE prearming, arming, launching, firing, or releasing of nuclear weapons except upon execution of emergency war orders or when directed by competent authority.

3. There shall be positive measures to prevent INADVERTENT prearming, arming, launching, firing, or releasing of nuclear weapons in all credible normal and abnormal environments.

4. There shall be positive measures to ensure adequate security of nuclear weapons, pursuant to DoD Directive 5210.41 (Security Policy for Protecting Nuclear Weapons).

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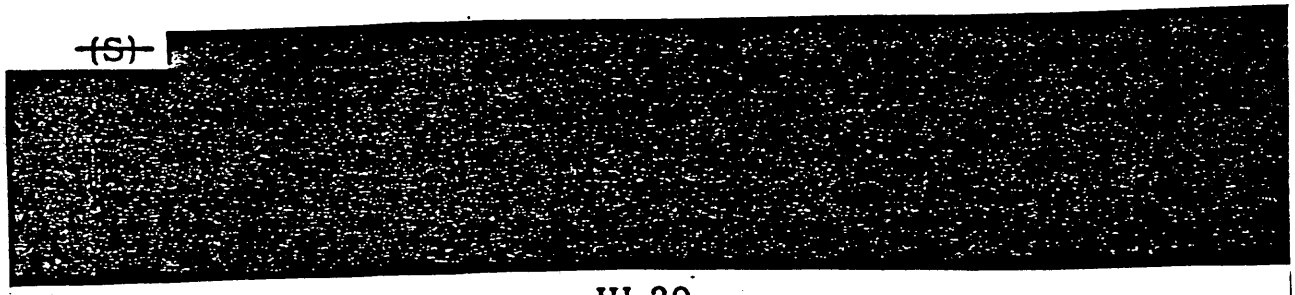
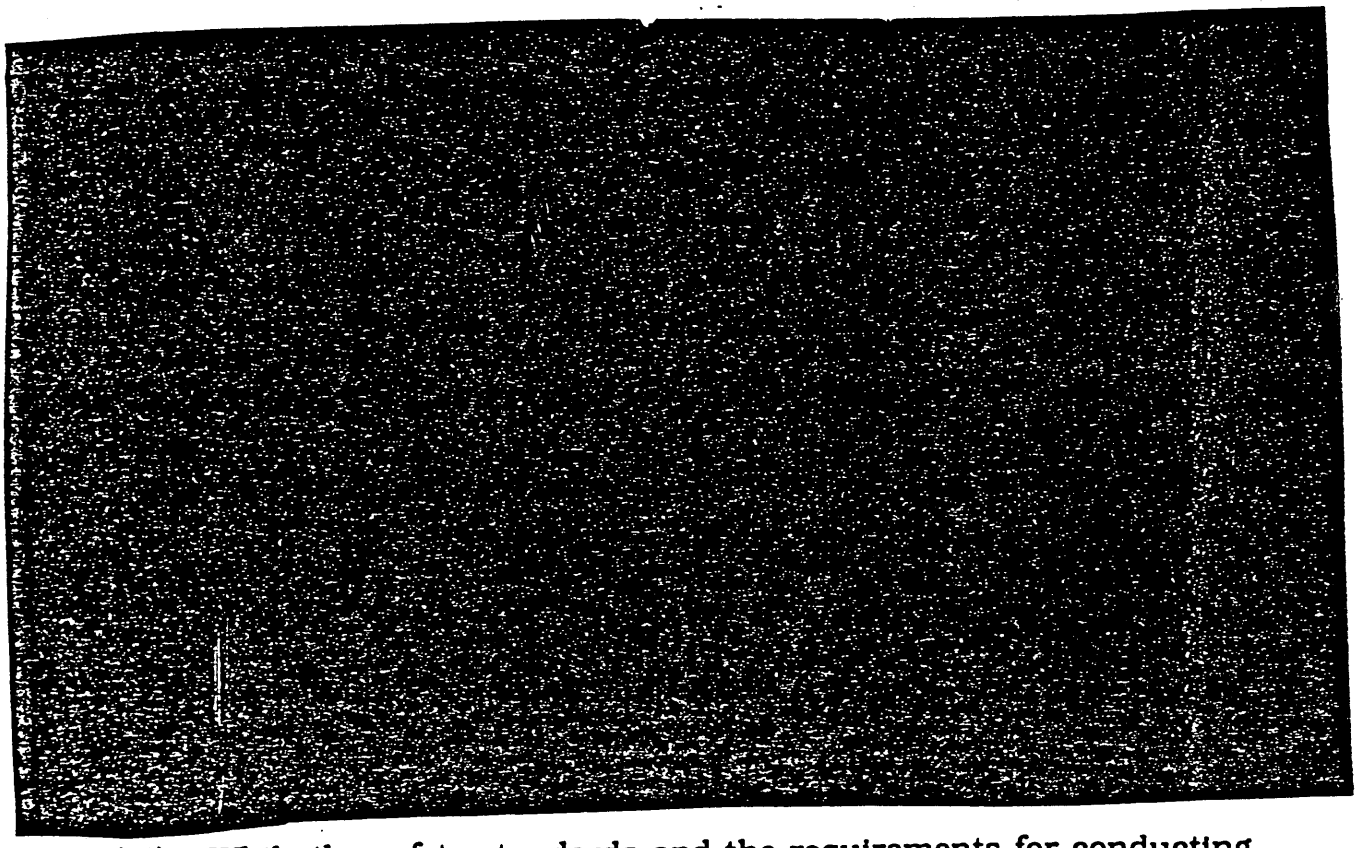
TABLE 7

(U) Consistent with the requirements of DoD Directive 3150.2, each military Service conducts nuclear weapons safety studies and recommends specific Operational Safety Rules for each nuclear weapon system. These studies are undertaken during weapon development, prior to deployment, and periodically during the system's operational life. A special safety study is undertaken each time the system is to be modified or a significant change in operational procedures is to take place. These studies examine all aspects of the weapon system for the purpose of identifying necessary changes in design, deployment, or weapon system Operational Safety Rules. The studies are conducted jointly by the Services, the Defense Nuclear Agency, and the Department of Energy, with technical support provided by Service Laboratories and the Department of Energy's National Laboratories. The safety of a weapon system's design, deployment, and operational safety is assessed against the Nuclear Weapons System Safety Standards.

~~(S)~~ 



(U) While the safety standards and the requirements for conducting safety studies are established by DoD directive, the actual implementation of the directive is delegated to the Services. The individual Nuclear Weapon Safety Study Groups are led by the owning Service which determines what aspects of the system are to be examined in any given study. This practice allows the content of the studies and their supporting inadvertent or unauthorized launch analyses and security assessments to differ between the Services.

(U) The NCCS has been completely successful in preventing unauthorized or inadvertent use, accidental nuclear detonation, or theft of any U.S. nuclear weapon. The Operational Safety Rules, reviewed and approved by the Secretary of Defense for each nuclear weapon system, establish de facto policy for the failsafe measures that assure against such events.

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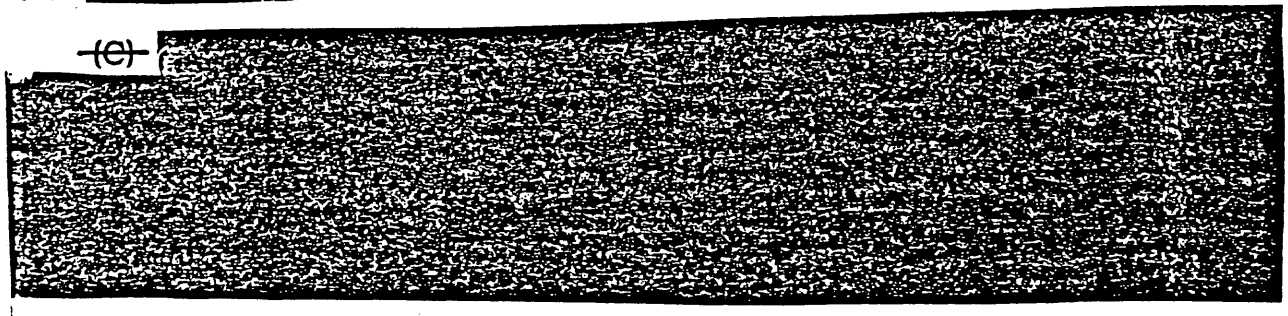


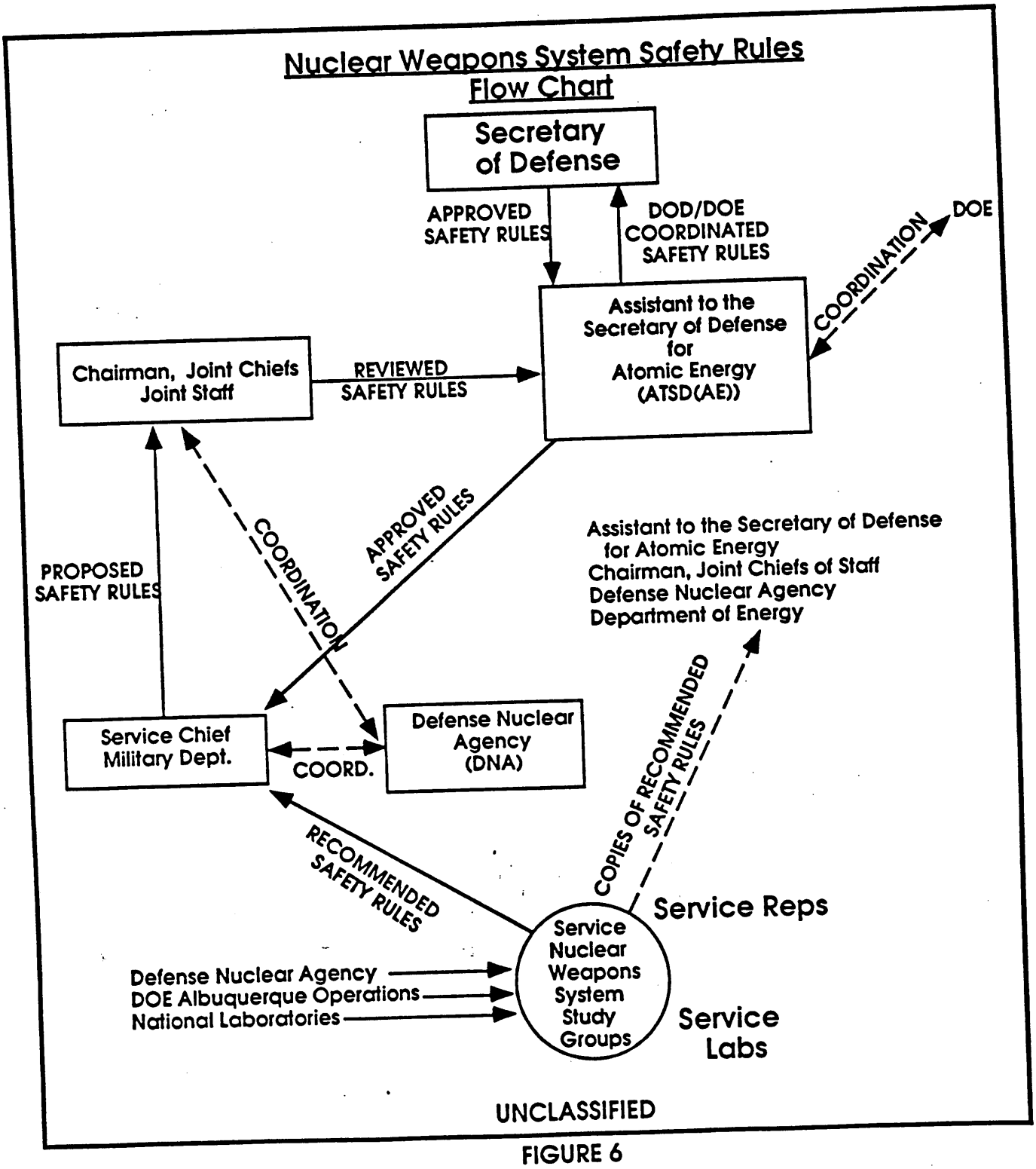

Nuclear Weapons System Safety Rules
Flow Chart
Secretary of Defense
APPROVED SAFETY RULES
DOD/DOE COORDINATED SAFETY RULES
DOE
COORDINATION
Assistant to the Secretary of Defense for Atomic Energy (ATSD(AE))
Chairman, Joint Chiefs Joint Staff
REVIEWED SAFETY RULES
PROPOSED SAFETY RULES
COORDINATION
APPROVED SAFETY RULES
Assistant to the Secretary of Defense for Atomic Energy
Chairman, Joint Chiefs of Staff
Defense Nuclear Agency
Department of Energy
Service Chief Military Dept.
COORD.
Defense Nuclear Agency (DNA)
COPIES OF RECOMMENDED SAFETY RULES
RECOMMENDED SAFETY RULES
Service Reps
Defense Nuclear Agency
DOE Albuquerque Operations
National Laboratories
Service Nuclear Weapons System Study Groups
Service Labs
UNCLASSIFIED

FIGURE 6

(U) Department of Defense (DoD) oversight of the NCCS is administered in three functional areas: safety, security, and control. Each DoD component assigned responsibilities within the NCCS has an inherent duty to oversee the implementation of those assigned responsibilities. The agencies and organizations responsible for both implementation and oversight of existing policies for safety, security and control of United States nuclear weapons are identified in Table 6. In addition, some DoD components are tasked to conduct independent oversight of NCCS activities for which they have no command or implementation responsibilities.

(U) The Secretary of Defense has overall responsibility for the NCCS within the DoD. He is responsible for approving both promulgation of and changes to all Departmental NCCS policy and for ensuring that it is implemented by his deputies. He also reviews and approves all nuclear weapon system Operational Safety Rules with the concomitant requirements for ensuring safety, security, and control. In addition, in his role as NCCS Executive Agent, he is responsible to the President for ensuring appropriate planning, integration, and oversight of the overall NCCS.

(U) The inter-relationships between the Department components with assigned oversight responsibilities, their operational and administrative lines of command, and their lines of coordination and support in independent oversight functions are illustrated in Figure 7. The oversight process for the three functional areas is discussed below.

(U) SAFETY OVERSIGHT

(U) The Secretary of Defense has overall responsibility for nuclear weapons safety which he exercises both through his deputies' designated responsibilities in specific areas and through his review and approval of all Operational Safety Rules. He is supported in this effort by the Under Secretary of Defense for Acquisition, who has primary responsibility for safety within the Office of the Secretary of Defense, and the Assistant to the Secretary of Defense for Atomic Energy, who has primary responsibility for nuclear weapons system safety. He is further supported by a safety oversight system that involves numerous Department of Defense and Department of Energy operational and technical design organizations and serves to integrate their activities through a formalized process that identifies safety issues and raises them to the highest levels within the Department for resolution. This process includes both the nuclear weapon safety studies and the extensive analyses of weapon-related accidents and incidents discussed above. It also includes the participation of joint Project Officers'

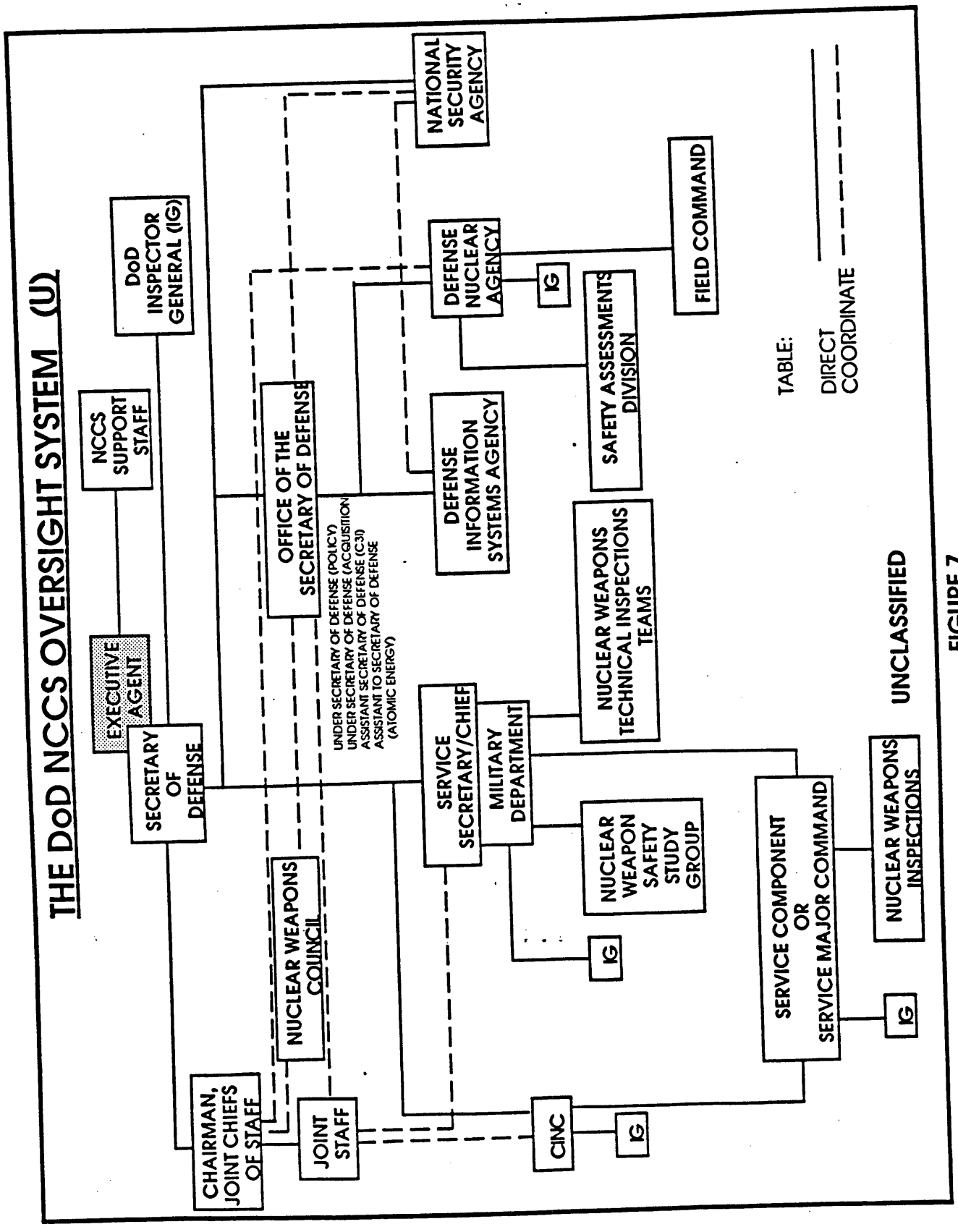

THE DoD NCCS OVERSIGHT SYSTEM (U)
NATIONAL SECURITY AGENCY
DoD INSPECTOR GENERAL (IG)
NCCS SUPPORT STAFF
EXECUTIVE AGENT
SECRETARY OF DEFENSE
OFFICE OF THE SECRETARY OF DEFENSE
UNDER SECRETARY OF DEFENSE (POLICY)
UNDER SECRETARY OF DEFENSE (ACQUISITION)
ASSISTANT SECRETARY OF DEFENSE (C3I)
ASSISTANT TO SECRETARY OF DEFENSE (ATOMIC ENERGY)
DEFENSE NUCLEAR AGENCY
IG
FIELD COMMAND
DEFENSE INFORMATION SYSTEMS AGENCY
SAFETY ASSESSMENTS DIVISION
NUCLEAR WEAPONS TECHNICAL INSPECTIONS TEAMS
SERVICE SECRETARY/CHIEF
MILITARY DEPARTMENT
NUCLEAR WEAPON SAFETY STUDY GROUP
IG
NUCLEAR WEAPONS COUNCIL
CHAIRMAN, JOINT CHIEFS OF STAFF
JOINT STAFF
CINC
IG
SERVICE COMPONENT OR SERVICE MAJOR COMMAND
IG
NUCLEAR WEAPONS INSPECTIONS
TABLE:
DIRECT COORDINATE
UNCLASSIFIED

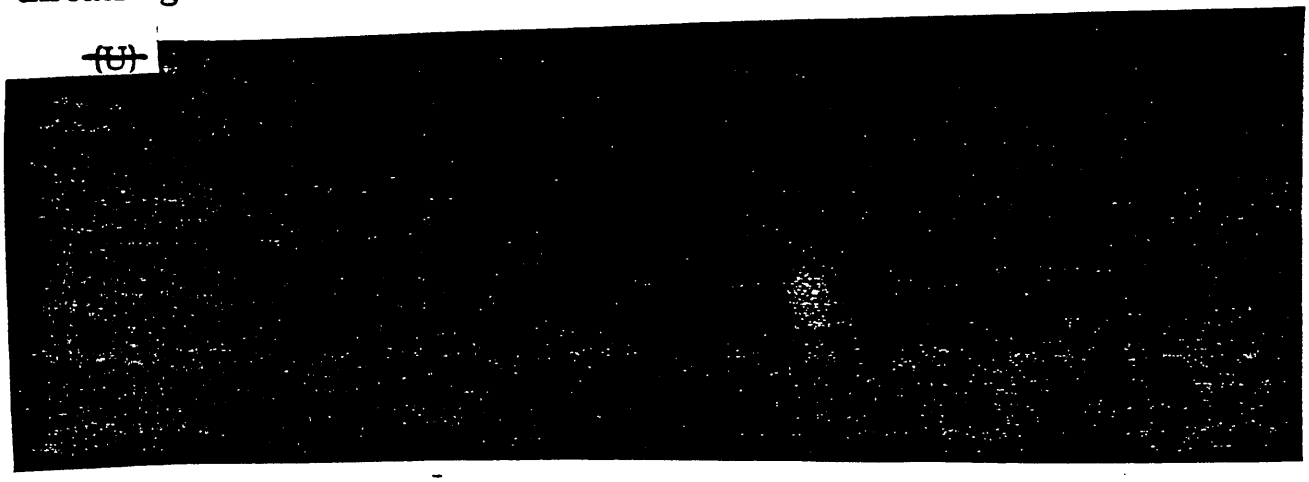
FIGURE 7

Groups and Design Review and Acceptance Groups which both guide and direct weapon development and changes throughout their life cycle, and the Nuclear Weapons Council and its subordinate committees, which have legislated responsibilities for nuclear weapons safety. Additional oversight has been provided through independent safety reviews by outside organizations (e.g., the Clark Blue Ribbon Task Group, the Department of Energy's Moe Committee, and the House Armed Services Committee's Drell Panel). Each of these has provided findings which have led the Secretaries of Defense and Energy both to improve the nuclear weapons safety process and to study further safety improvements to the nuclear weapons stockpile.

(U) SECURITY OVERSIGHT

(U) Nuclear command and control system security oversight is predominantly focused on the physical and personnel security of nuclear weapons and weapon systems. Other aspects of security oversight (including communications, computer, information, and operational security) are basically managed as an element of broader non-NCCS specific oversight processes. The Assistant Secretary of Defense for Command, Control, Communications, and Intelligence is responsible for developing DoD security and personnel policies for the NCCS as well as for assessing threats against it.

~~(U)~~



(U) CONTROL OVERSIGHT

~~(U)~~

(U) The Assistant Secretary of Defense for Command, Control, Communications, and Intelligence is responsible for developing command and control policy, coordinating policy guidance between agencies, and developing methods for evaluating NCCS performance. The Chairman, Joint Chiefs of Staff, is responsible for developing the procedures that implement

those policies, and for conducting exercises and assistance visits to command centers to assess their effectiveness in implementing Departmental command and control policies.

~~(C)~~ [redacted]

(U) OVERSIGHT INSPECTIONS

(U) Common to all oversight areas is that each relies on inspections and assessments to support the oversight function. The inspection program is essentially split between assessments of those safety, security, and control measures that assure against unauthorized use and those that assure authorized use.

(U) Assessments of the measures that assure against unauthorized use are centrally administered, through the Nuclear Weapons Technical Inspection Program, by the Defense Nuclear Agency. The governing document for these inspections is a joint Defense Nuclear Agency, Army, Navy, and Air Force publication which establishes a standardized inspection program. It delineates policy, assigns responsibilities, and prescribes standard procedures for conducting inspections of all nuclear-capable units. These procedures include frequency of inspections (not less than every eighteen months) and minimum requirements nuclear-capable units must meet in order to become or remain nuclear-certified. In addition to the periodic inspections, which are conducted by the Service or major command, each nuclear-certified unit is also inspected at least once every five years by Field Command, Defense Nuclear Agency. This second inspection regime was developed to ensure that uniform inspection standards are maintained between all Services and major commands.

(U) Inspections of units for those measures that assure authorized use, such as the Emergency Action Procedures that control force execution, are not centrally managed. These inspections are administered at various levels within the Department of Defense and, in many instances, encompass component-unique procedures.

Assistant to the Secretary of Defense for Atomic Energy (U)

(U) The Assistant to the Secretary of Defense for Atomic Energy is the principal assistant to the Secretary for atomic energy matters and, as such, has both implementation and oversight responsibilities for nuclear weapons safety, survivability, and use control. He is responsible for developing atomic energy policies for the Secretary and issuing guidance on his behalf. He also evaluates DoD programs for carrying out approved policies and develops

systems and standards for administration and management of atomic energy programs and reviews. He is a focal point for the primary interdepartmental body responsible for nuclear weapons, the Nuclear Weapons Council, in that he serves as its Staff Director and Executive Secretary and chairs the Standing Committee that supports its independent oversight of nuclear weapons safety, security, and control.

Service and CINC Oversight Responsibilities (U)

(U) The Military Departments and the nuclear CINCs are also charged with implementing Departmental policies for safety, security, and control and for ensuring proper implementation within their respective areas. Included in their responsibilities are: training, exercising, and maintaining critical NCCS elements to provide capability to respond to Nuclear Control Orders; implementing safety standards and rules; protecting nuclear weapons from damage, misuse, or theft; assisting in the location of lost, stolen, or missing nuclear weapons; and ensuring that standards and requirements, as appropriate, are included in the inspections they conduct and the direction of their subordinate commands. The Military Departments have additional responsibilities in their conduct of Nuclear Weapon Safety Studies and development of recommended Operational Safety Rules.

(U) INDEPENDENT OVERSIGHT

(U) In addition to the line oversight responsibilities of the DoD components described above, several other agencies are charged with conducting independent oversight of the NCCS. These include the Defense Nuclear Agency, the joint Department of Defense-Department of Energy Nuclear Weapons Council and its subordinate Standing Committee and Weapons Safety Committee, and the U.S. Nuclear Command and Control System Support Staff. The independent oversight responsibilities of these agencies are summarized in Table 8.

(U) The interdepartmental nature of the Nuclear Weapons Council contributes to the very complex oversight process for the development and acquisition of nuclear weapons. This process draws on expertise and technical support from many organizations in both Departments (Figure 8).

(U) The NCCS Support Staff, as established by National Security Decision Directive is staffed and supported by both the DoD and the DOE and can draw additional expertise from other NCCS agencies when required. Its oversight responsibilities span the entire NCCS.

(U) These agencies provide the findings of their investigations and recommendations for system enhancements to the highest levels of the NCCS. A summary of their annual reports, the failsafe measures discussed, and the report recipients is shown in Table 9.

INDEPENDENT NCCS OVERSIGHT AGENCIES (U)

Defense Nuclear Agency

- o Develops and assesses nuclear weapon accident and incident procedures
- o Provides oversight for DoD nuclear weapons quality assurance program
- o Conducts Nuclear Weapons Technical Inspections for the Chairman, Joint Chiefs of Staff
- o Provides for administration and technical support for the Nuclear Weapons System Safety Red Teams and the Joint Advisory Committee for Nuclear Weapons Surety
- o Participates in joint DoD - DOE nuclear weapons systems studies and reviews, including the Nuclear Weapons System Safety Study Groups

Nuclear Weapons Council

- o Considers safety, security, and control measures in both new and existing nuclear weapon systems
- o Provides recommendations to Secretaries of Defense and Energy on the Annual Stockpile Improvement Plan
- o Provides guidance on priorities for nuclear weapons research and development and oversees the program
- o Submits the Annual Nuclear Weapons Surety Report to the Secretaries of Defense and Energy for signatures and forwarding to the President
  - Summarizes the safety, security, control, and reliability of the stockpile for the preceding year

U.S. Nuclear Command and Control System Support Staff

- o Assesses and monitors the NCCS on a continuing basis to ensure all nuclear command and control processes are integrated through all environments to:
  - Assure authorized use
  - Assure against unauthorized or inadvertent use
- o Reviews and monitors all NCCS policy guidance
- o Conducts oversight of inspections, tests, and exercises
- o Provides recommendations and an Annual Report on the status of the NCCS to the Executive Agent

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TABLE 8

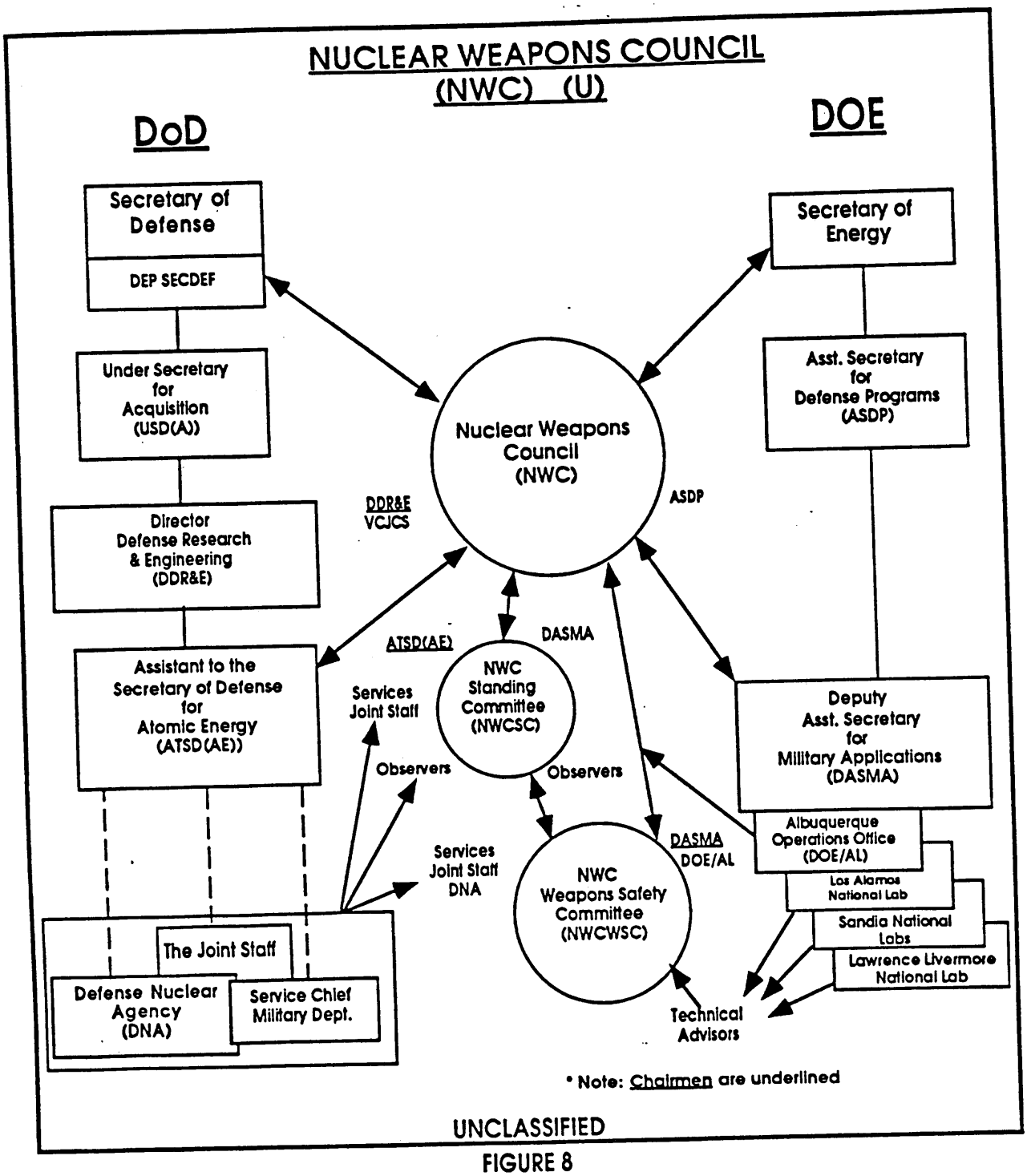
NUCLEAR WEAPONS COUNCIL
(NWC) (U)
DoD
DOE
Secretary of Defense
DEP SECDEF
Under Secretary for Acquisition (USD(A))
Director Defense Research & Engineering (DDR&E)
Assistant to the Secretary of Defense for Atomic Energy (ATSD(AE))
Secretary of Energy
Asst. Secretary for Defense Programs (ASDP)
Deputy Asst. Secretary for Military Applications (DASMA)
Albuquerque Operations Office (DOE/AL)
Los Alamos National Lab
Sandia National Labs
Lawrence Livermore National Lab
Nuclear Weapons Council (NWC)
DDR&E
VCJCS
ASDP
ATSD(AE)
DASMA
NWC Standing Committee (NWCSC)
Services Joint Staff
Observers
Observers
Services Joint Staff DNA
DASMA DOE/AL
NWC Weapons Safety Committee (NWCWSC)
The Joint Staff
Defense Nuclear Agency (DNA)
Service Chief Military Dept.
Technical Advisors
• Note: Chairmen are underlined
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FIGURE 8

NCCS REPORTS (U)

	Safety	Security	Command & Control	Inspections	Recipients
NSS Annual Report	YES	YES	YES	YES	Executive Agent (SecDef)
DoD/DOE Annual Nuclear Weapons Surety Report to the President	YES	YES	YES	YES	President
DoD/DOE Annual Nuclear Weapons Stockpile Memorandum	YES		YES (USE CONTROL)		President
DoD/DOE Nuclear Weapon Council Stockpile Improvement Program Review	YES		YES (USE CONTROL)		SecDef Sec. of Energy

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TABLE 9

(U) RISK REDUCTION

(U) Risk reduction has been broadly defined as that combination of confidence-building and predictability measures that would reduce the probability of outbreak of nuclear war as a result of accident, miscalculation, misinterpretation, terrorism, or unexpected technological breakthrough. These measures can be taken unilaterally or multilaterally, but in all cases the existence of these measures are communicated with others to ensure their effectiveness. In certain cases, they require multilateral participation.

(U) Many U.S. government actions can be considered to be risk reduction measures, depending upon the breadth of interpretation applied. Based on the above definition, all of the failsafe measures discussed earlier in this chapter contribute to risk reduction. The existence and sometimes the details of the positive measures that assure against unauthorized use of nuclear weapons have been well publicized, in large part to provide all nations with confidence in U.S. ability both to provide adequate security and protection to its nuclear weapons and to prevent catastrophic consequences resulting from an accident or terrorist incident. In addition, the degree of readiness and tight control implemented by those measures that assure authorized use have been developed to deter any adversary from either miscalculating U.S. resolve and capability to respond to an attack or from misinterpreting actions taken to change the posture of the stockpile. Furthermore, both the Departments of Defense and Energy conduct research and development programs across a broad range of nuclear weapon and nuclear command and control issues.

(U) TRADITIONAL RISK REDUCTION MEASURES

(U) Historically, risk reduction measures have been defined much more narrowly than what is implied above. Until very recently, they have focused almost exclusively on direct communications between the United States and the former Soviet Union, as a means of avoiding misinterpretation of actions and intentions of either side or to avoid potentially dangerous confrontations between their forces. A summary of existing direct communication and prior notification agreements is presented in Table 10.

(U) To a certain extent, arms control negotiations and treaties have also served as risk reduction measures by reducing the growth of and, more recently, the size and destructive power of each superpower's nuclear arsenal. While these measures remain important and have certainly contributed to the prevention of nuclear war between the United States and the former Soviet Union, the changes in the international security environment discussed in Chapter Two indicate a need for expansion beyond this traditional narrow focus.

COMMUNICATIONS AND PRIOR NOTIFICATION AGREEMENTS WITH THE SOVIET UNION (U)

1963	Direct Communications Link ("Hotline Agreement"), as modified (1971, 1984)
1971	Accident Measures Agreement, as modified (1976, 1977, 1985)
1972	Incidents At Sea Agreement
1973	Prevention of Nuclear War Agreement
1987	Nuclear Risk Reduction Centers
1988	Ballistic Missile Launch Notification Agreement
1989	Dangerous Military Activities Agreement
1989	Strategic Exercise Notification Agreement

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TABLE 10

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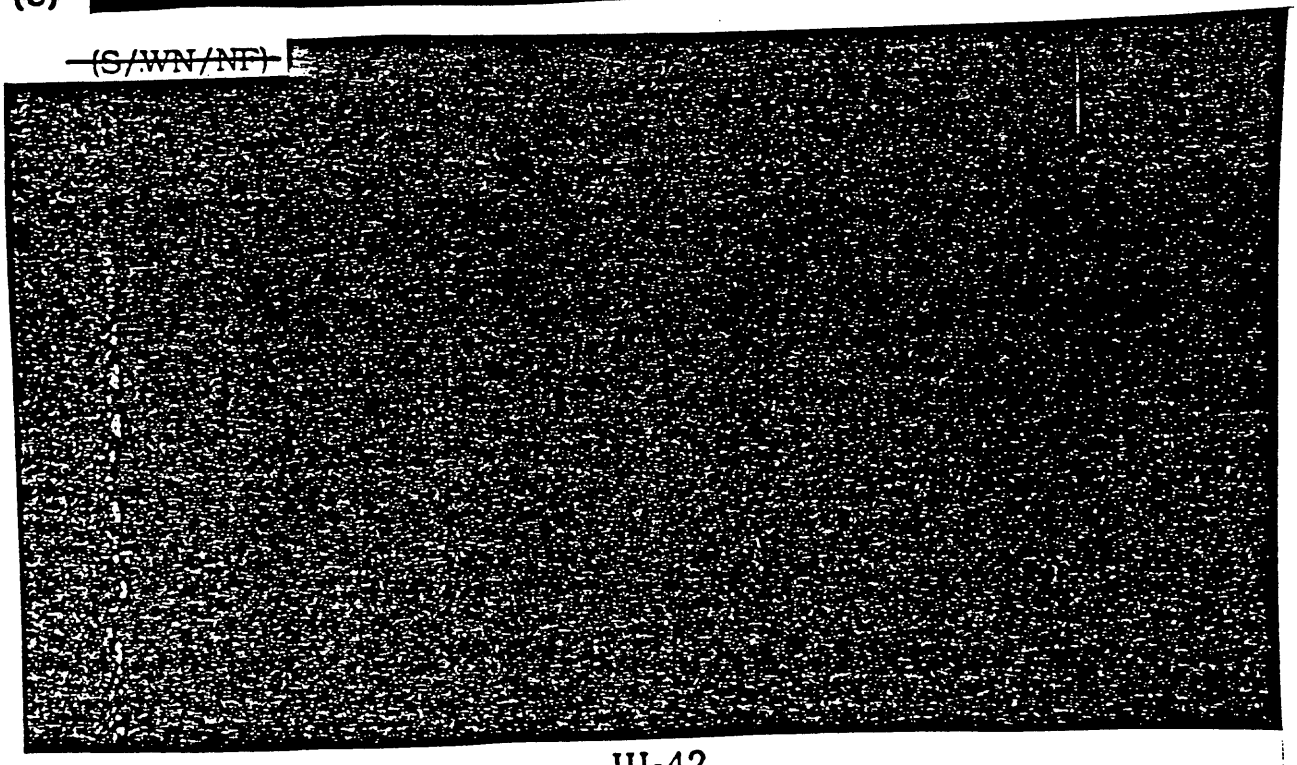

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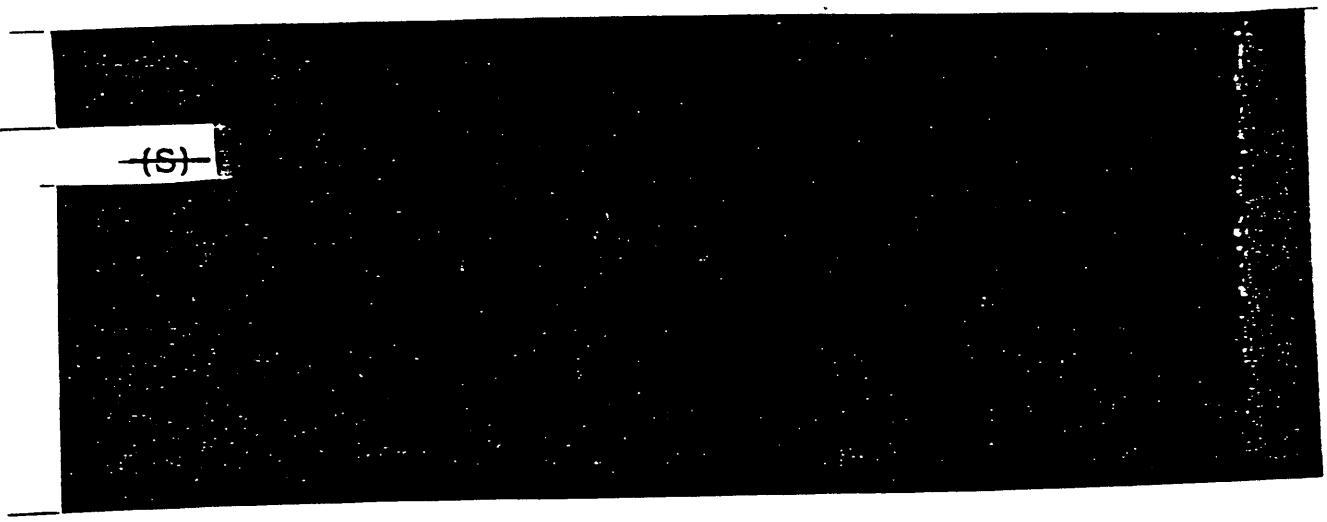

CHAPTER FOUR
FAILSAFE (U)

(U) BACKGROUND

(U) The effective safety, security and control of U.S. nuclear weapons is the most important goal of the U.S. Nuclear Command and Control System. As such, the positive measures which ensure that nuclear weapons safety, security, and control are effective and that they contribute to the appropriate "assure-assure against" balance receive regular and intense scrutiny and high resource priority from all NCCS components. This scrutiny is particularly important in the current environment.

(U) The Advisory Committee also recognizes that nuclear weapons will continue to play an important role in this country's deterrence strategy. Therefore, the ability to assure the responsive and flexible use of nuclear weapons, when authorized by the President, should be maintained while the United States pursues failsafe enhancements.

(U) This chapter focuses on specific failsafe[1] issues investigated by the Advisory Committee. These issues were selected by the Advisory Committee to support a comprehensive, yet focused, assessment of all aspects of failsafe. In its investigation, the Advisory Committee thoroughly considered all elements (i.e., equipment, facilities, communications, procedures, and personnel) of the DoD portion of the NCCS. Based upon this review, the Advisory Committee identified specific issues which were considered to merit further detailed investigation. The three major issues addressed in this chapter are:

- (U) Issue 1: What NCCS vulnerabilities exist and what improvements should be implemented to strengthen DoD positive measures to prevent accidental, inadvertent, or unauthorized use while assuring authorized use of nuclear weapons?

[1] (U) Failsafe: That combination of safety, security, and control procedures and equipment intended to prevent mistaken authorized use, unauthorized use, inadvertent use, or loss of nuclear weapons or to interrupt, terminate or mitigate the results of such action should one occur. These are unilateral actions that need not/should not be communicated to others to be effective.

- (U) Issue 2: Should the United States implement a system for post-launch destruct for all nuclear weapons? If so, what types of systems should be implemented? What improvements are required?

- (U) Issue 3: Are current DoD procedures, equipment, and facilities adequate to maintain the required standards of nuclear weapons safety, security, and control under the full range of stockpile conditions?

(U) Sub-issues are discussed with associated major issues in appropriate sections.

ISSUE 1: NCCS VULNERABILITIES (U)

(U) What NCCS vulnerabilities exist and what improvements should be implemented to strengthen DoD positive measures to prevent accidental, inadvertent, or unauthorized use while assuring authorized use of nuclear weapons?

- ~~(S)~~ Sub-issue 1-1
- ~~(S)~~ Sub-issue 1-2
- ~~(S)~~ Sub-issue 1-3

- (U) Sub-issue 1-4 (Coded Control Devices on all U.S. nuclear weapons): Should the United States implement coded control devices on all current and/or future nuclear weapons systems? If so, what types of devices and on which weapons systems?

- ~~(S)~~ Sub-issue 1-5
- ~~(S)~~ Sub-issue 1-6
- ~~(S)~~ Sub-issue 1-7
- ~~(S)~~ Sub-issue 1-8

(U) METHODOLOGY

(U) The NCCS Assessment Study Group was established to examine the NCCS as it currently exists and as it may evolve by the year 2011, and to propose opportunities, where possible, to improve the failsafe characteristics of the system. The Group was also tasked to ensure that none of the recommendations it made would negatively affect the ability to use nuclear weapons in an effective manner, if authorized. This issue was particularly difficult in that it dealt with an existing, large, and complex system. The size and complexity of the NCCS necessitated a formalized approach to ensure a thorough and complete examination.

(U) The first part of this approach was the development of a process flow diagram to document the procedures, equipment, and personnel that comprise nuclear command and control. Development of this diagram was a multi-step task including data collection, site visits, review and editing draft diagrams with support from the responsible organizations, and finally, synthesis of the diagrams into a complete depiction of the nuclear command and control process.

(U) When the process flow diagram was completed, the full NCCS Assessment Study Group systematically examined the documented process to identify weaknesses, potential failures, and opportunities for improvement, either through procedural or technical means. Since Study Group membership represented all appropriate NCCS technical specialties, agencies, services, and operating authorities, the expertise necessary for a thorough review was present. All data from the process flow diagram were converted into a Fault Tree Analysis computer model as an additional completeness check and alternative route for identifying areas needing improvement.

(U) Using these techniques, the Study Group determined, and the Advisory Committee concurred, that while the NCCS was sound, further investigation into eight specific areas, with a view toward making improvements, was warranted.

(U) The Study Group established individual Red Teams to conduct each investigation, with the specific charge of taking an aggressor's approach to determine if any weaknesses could be identified and potentially exploited. Cognizant operating organizations for the areas to be investigated were invited to establish Blue Teams to help provide information for the investigations and to develop opposing views to the Red Team's findings if warranted. The Red Teams developed approaches, visited the appropriate sites, and consulted with the Blue Teams. This cycle was repeated as necessary.

(U) Due to the role of coded control devices in assuring control of nuclear weapons, this area is also discussed in sub-issue 1-4.

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~~(S)~~ **SUB-ISSUE 1-1:** [redacted]

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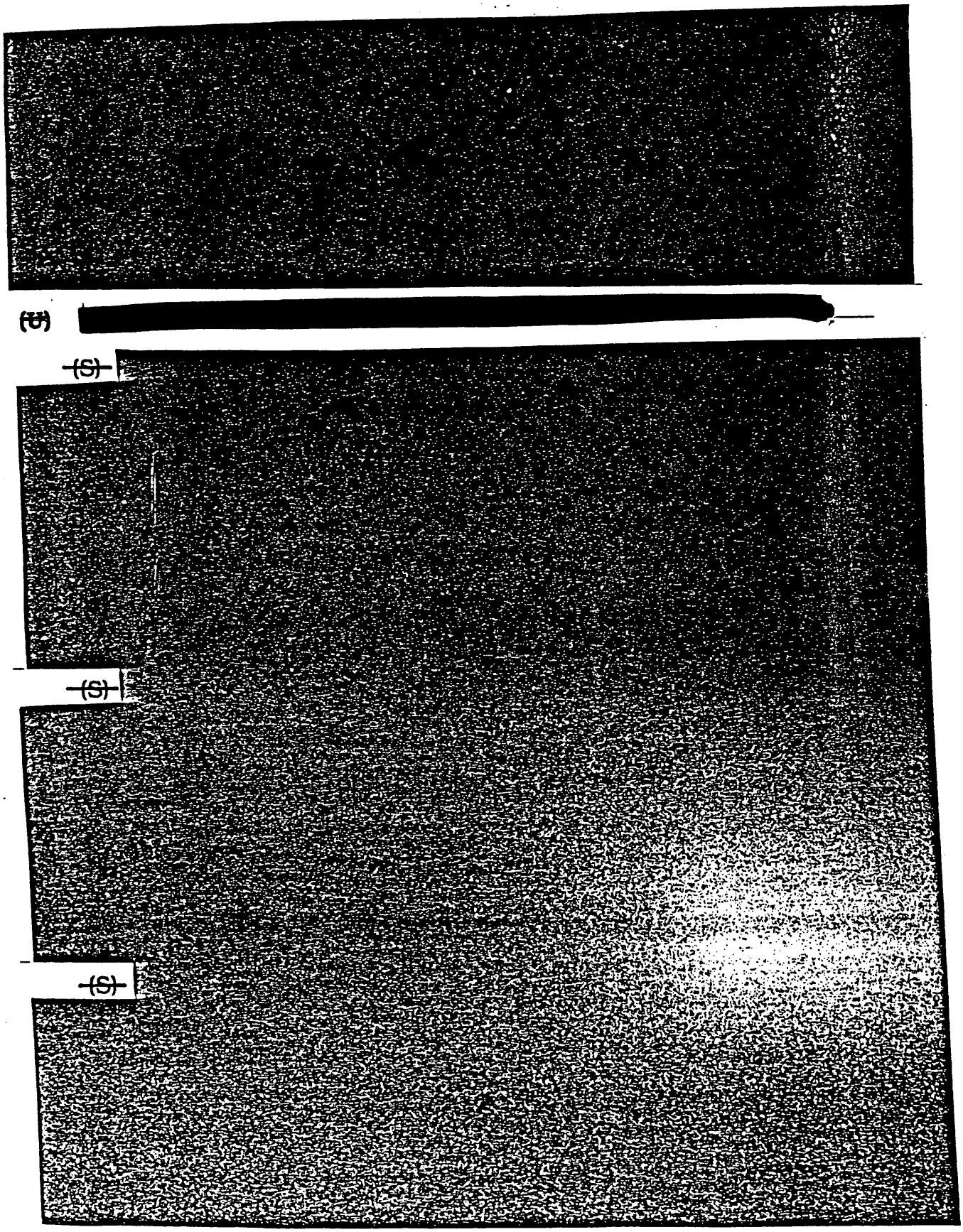

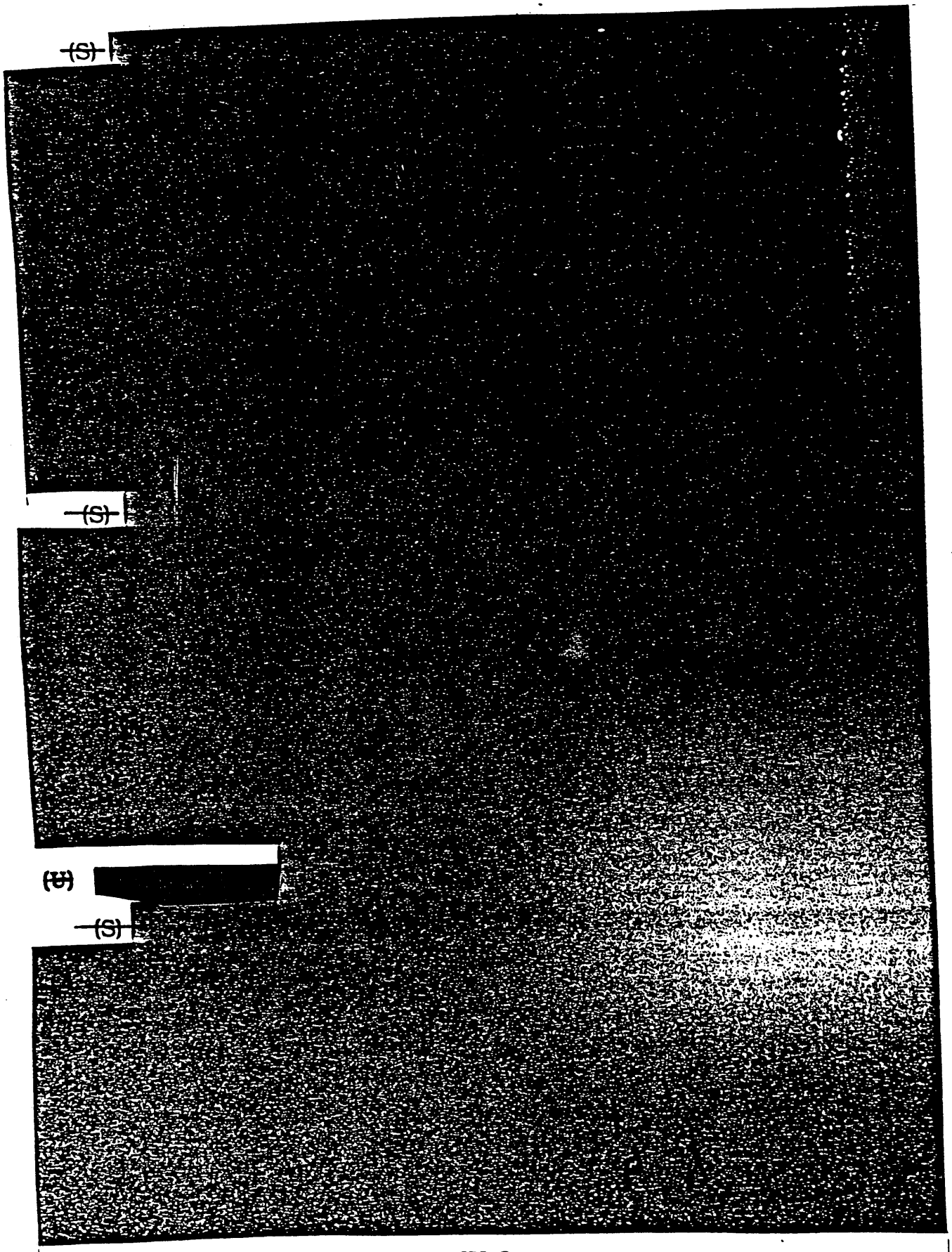
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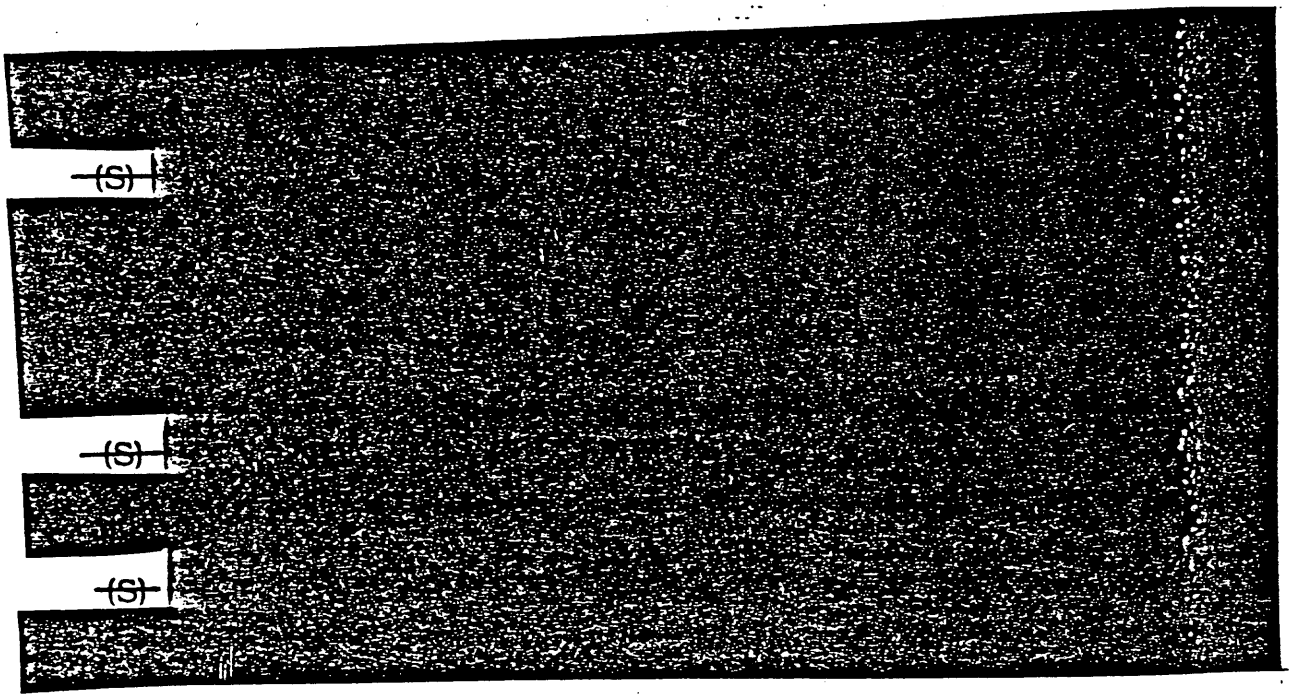

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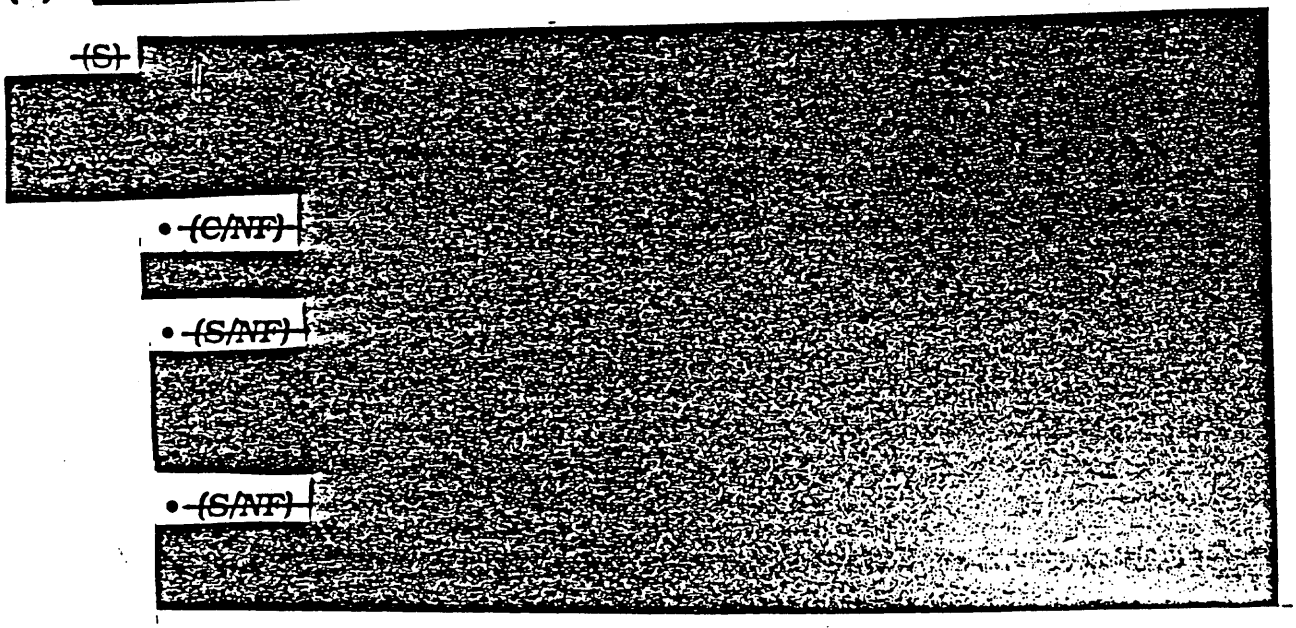

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~~(S)~~ **SUB-ISSUE 1-2:** [redacted]

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(U) BACKGROUND

(U) This issue reflects the requirement for policies and procedures to assure the capability in all situations to employ nuclear weapons as authorized by the President while assuring against their unauthorized use.

~~(TS)~~ [redacted]

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(U) METHODOLOGY

(U) This issue was investigated by a review of the publications describing this system and discussions with appropriate staff personnel. These publications are appropriately highly classified with limited distribution.

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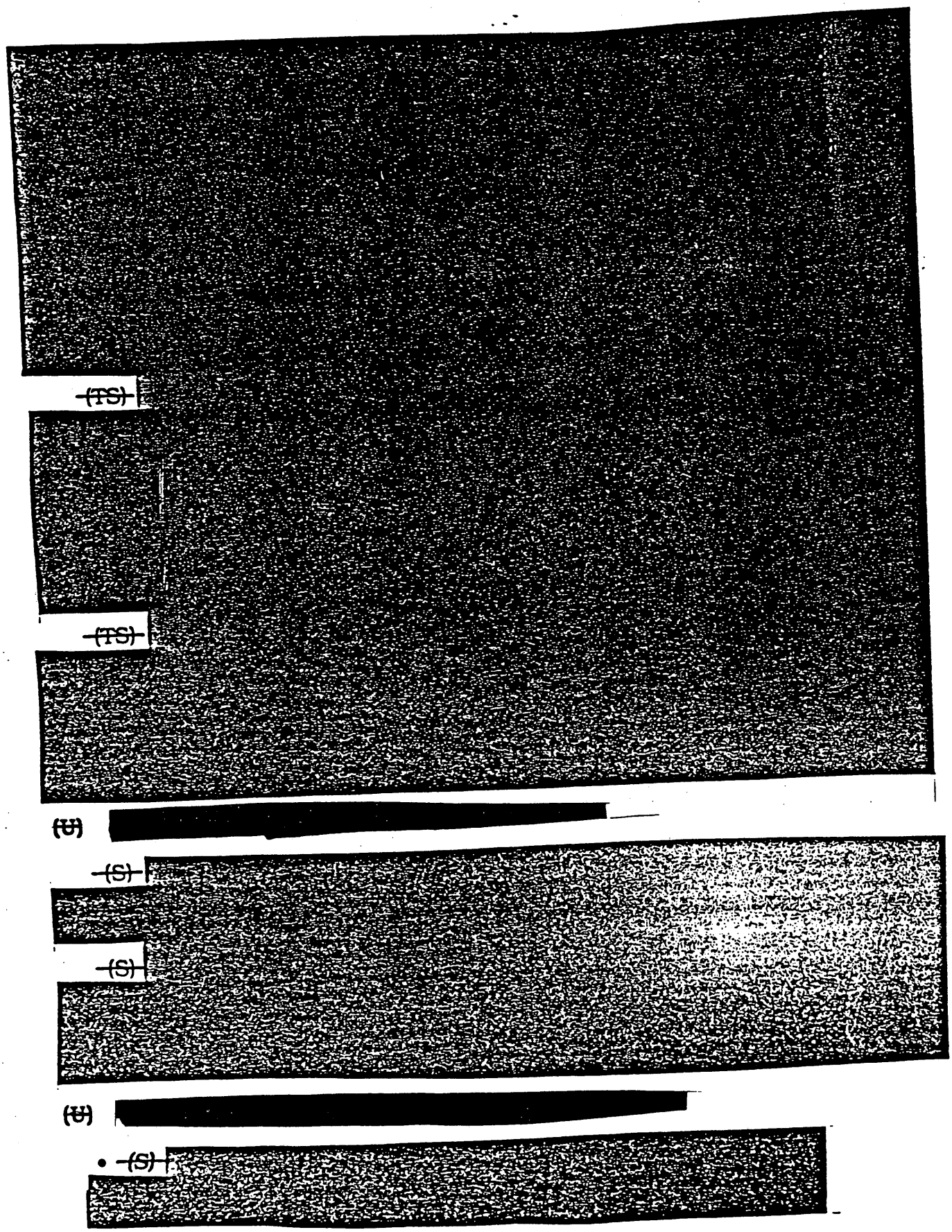

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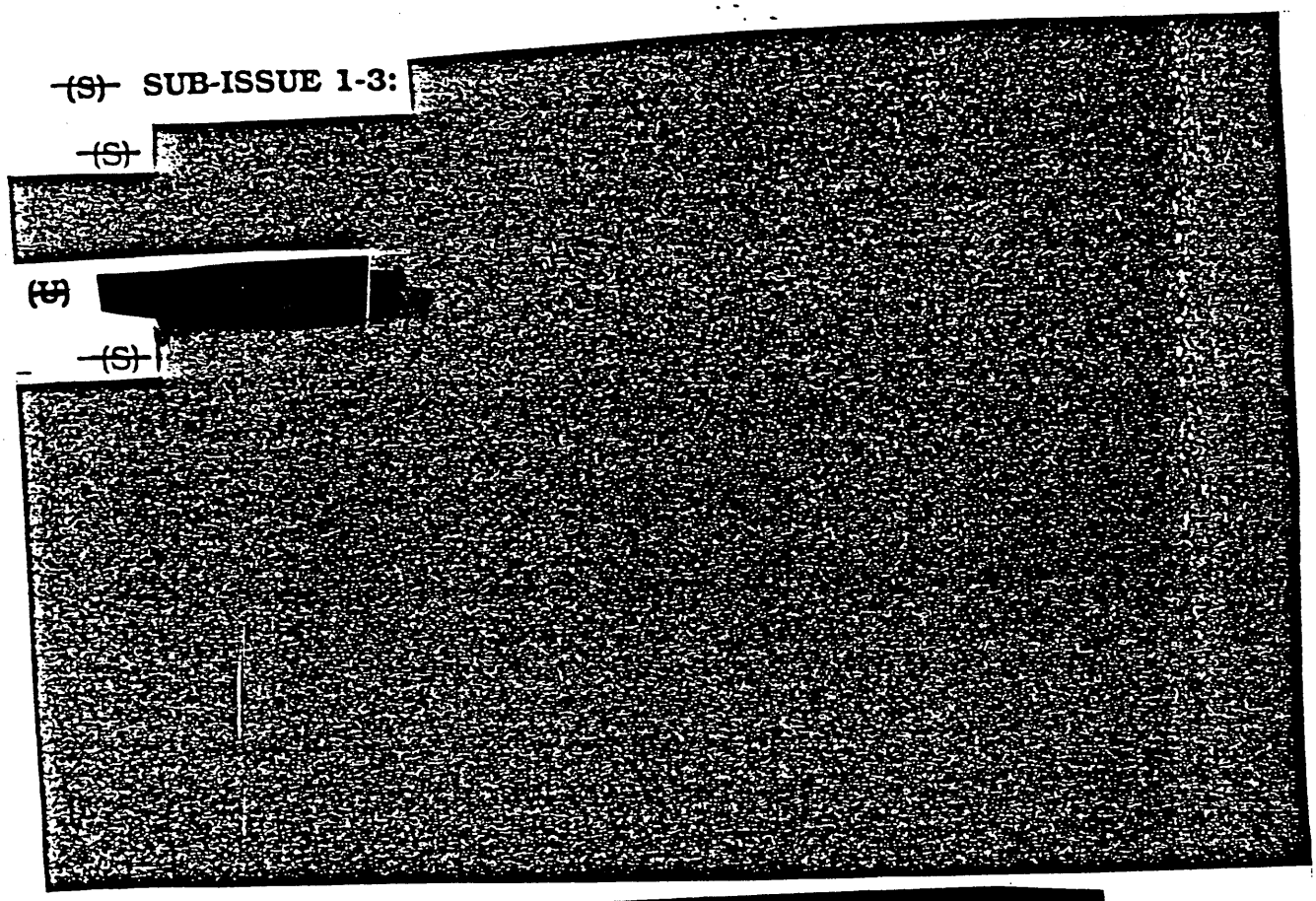

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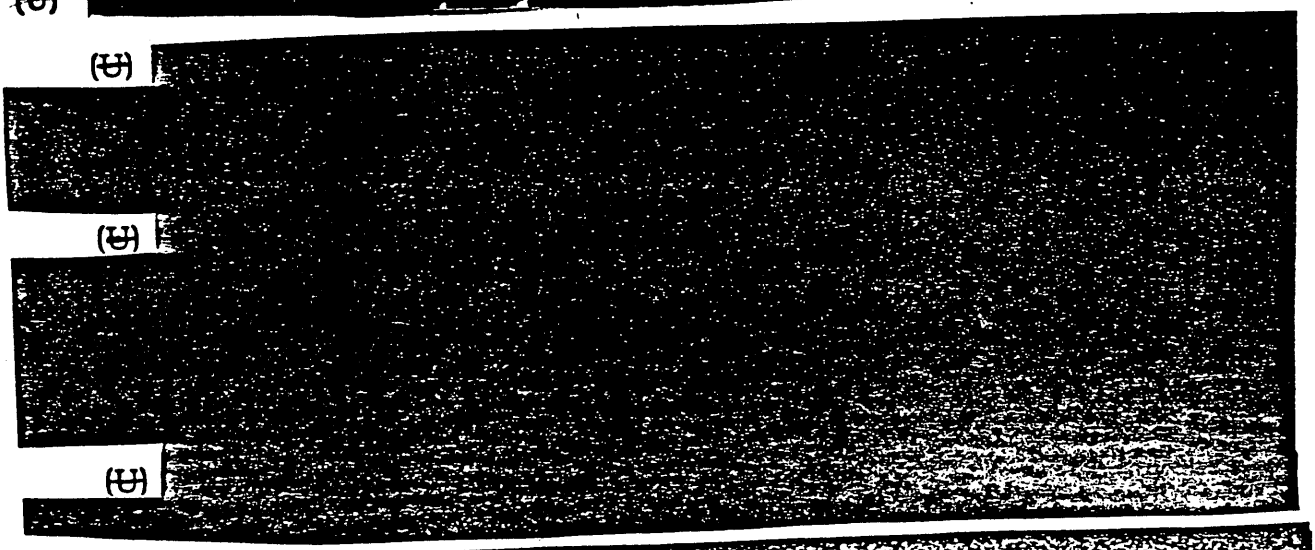

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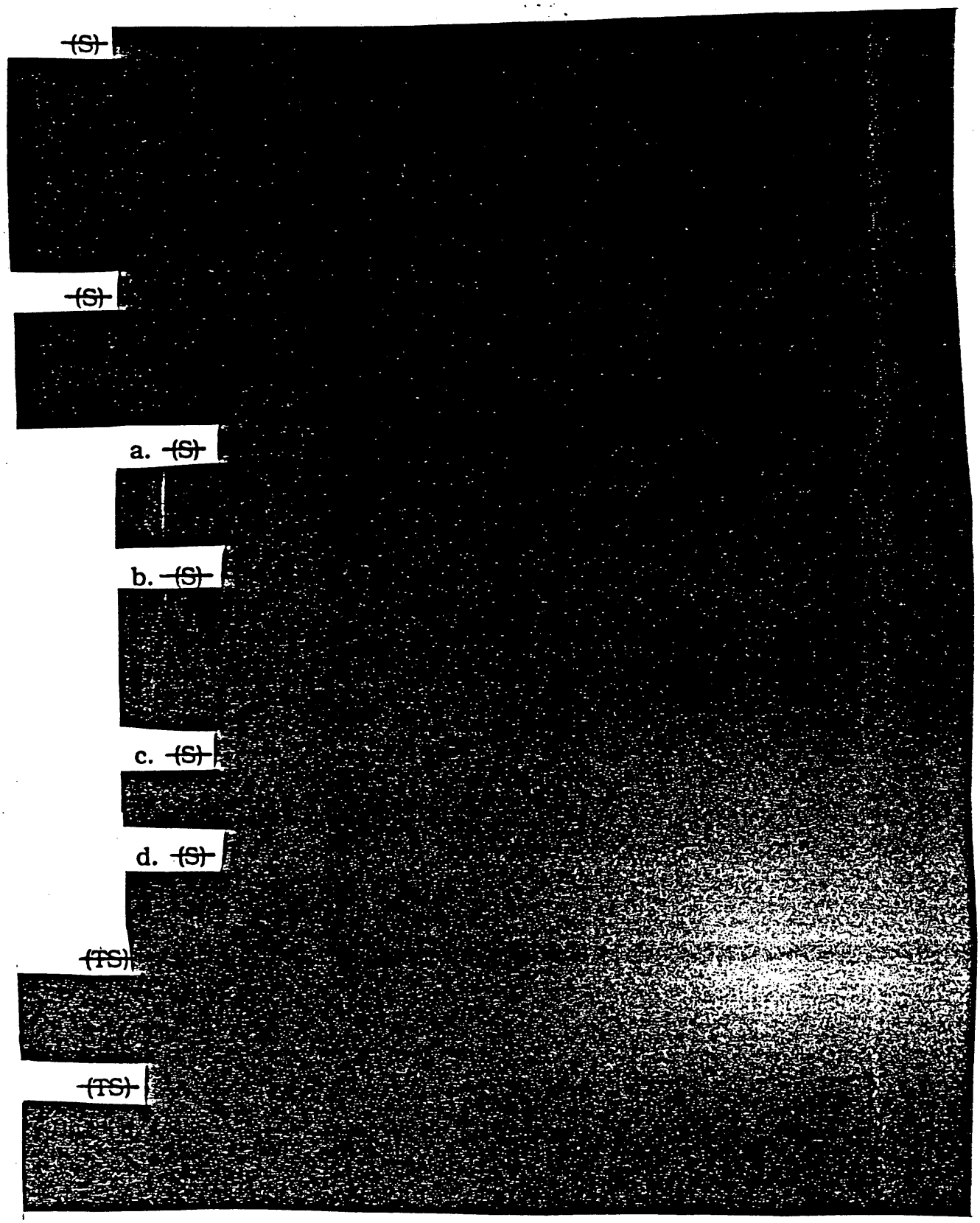
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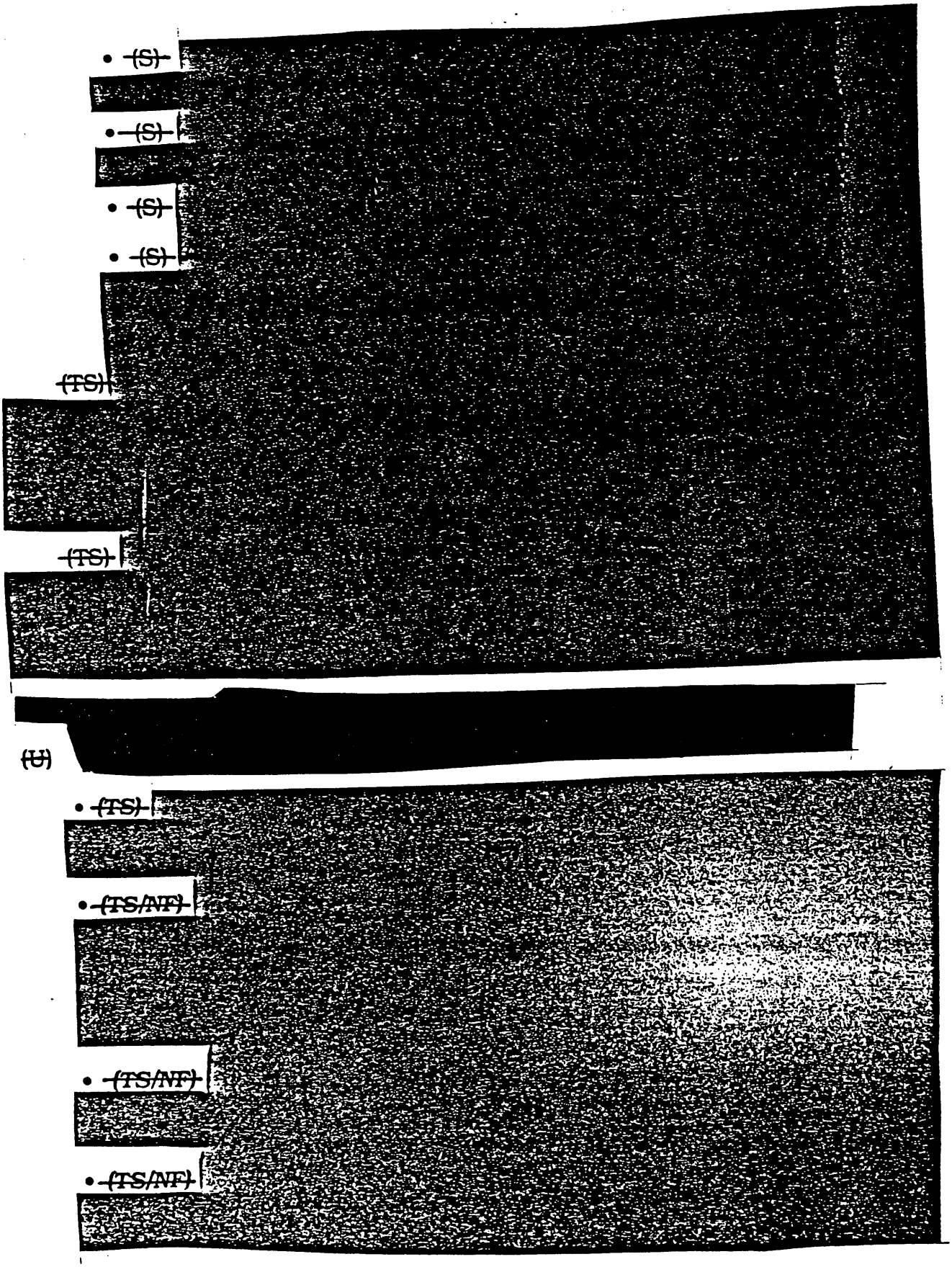
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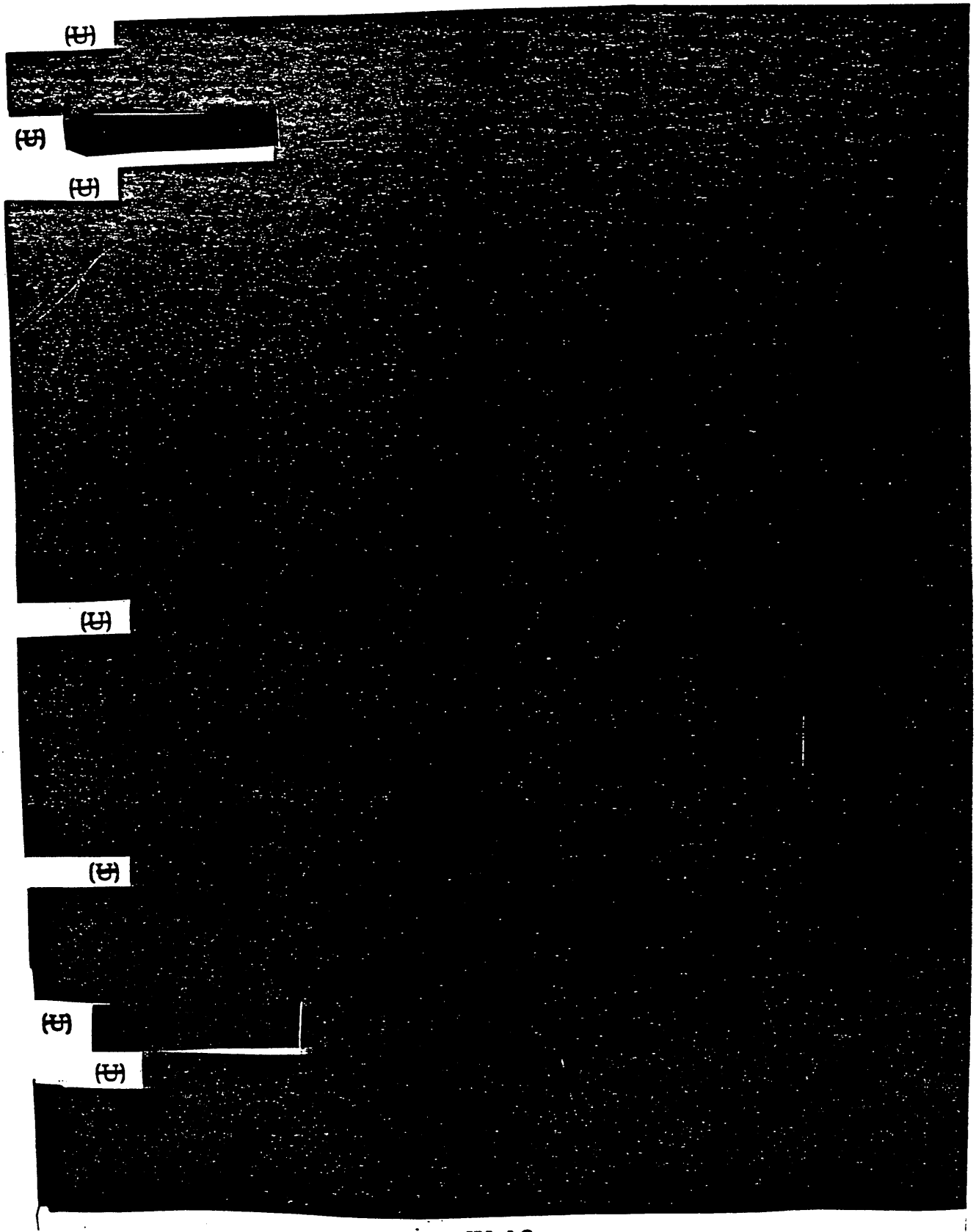

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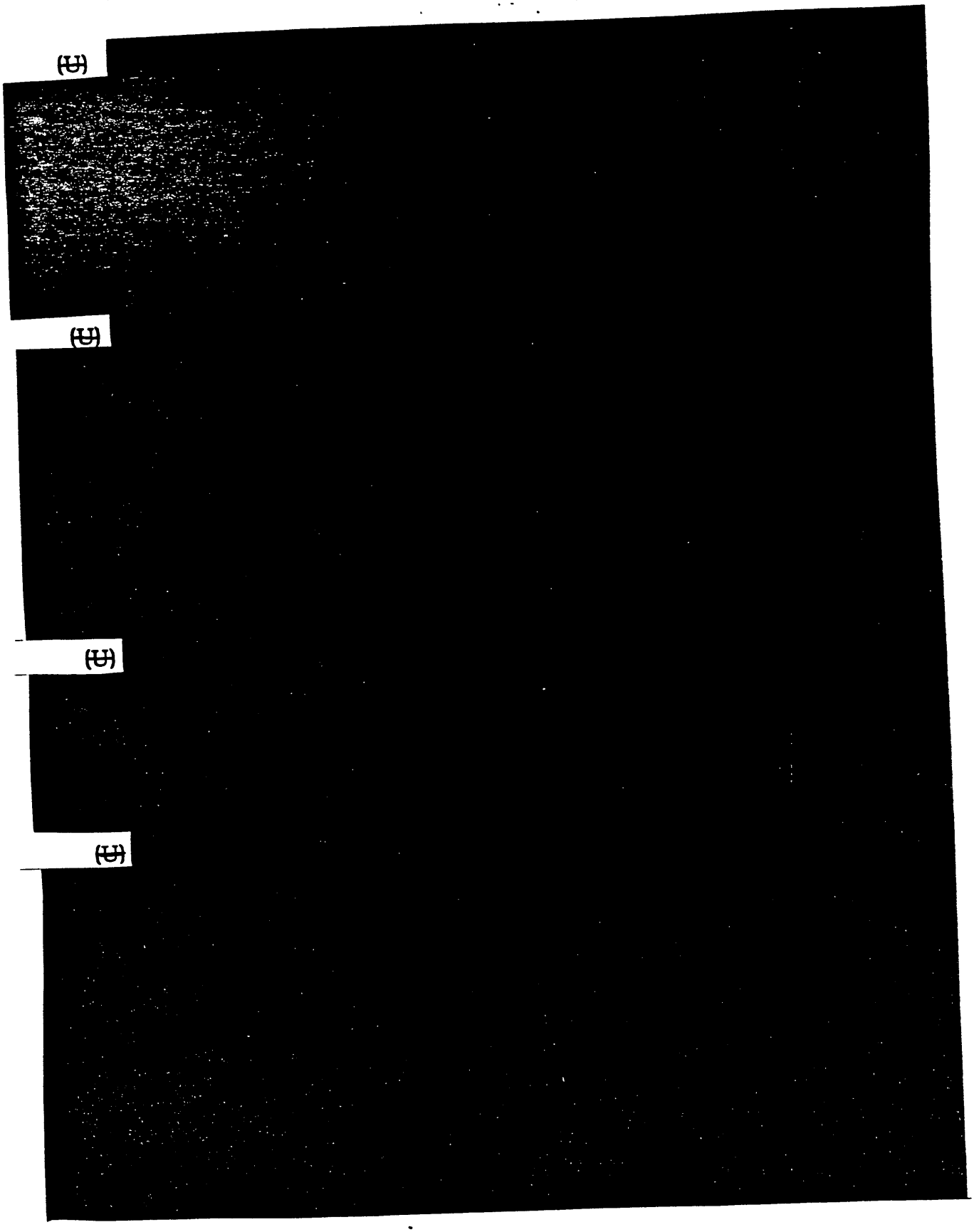

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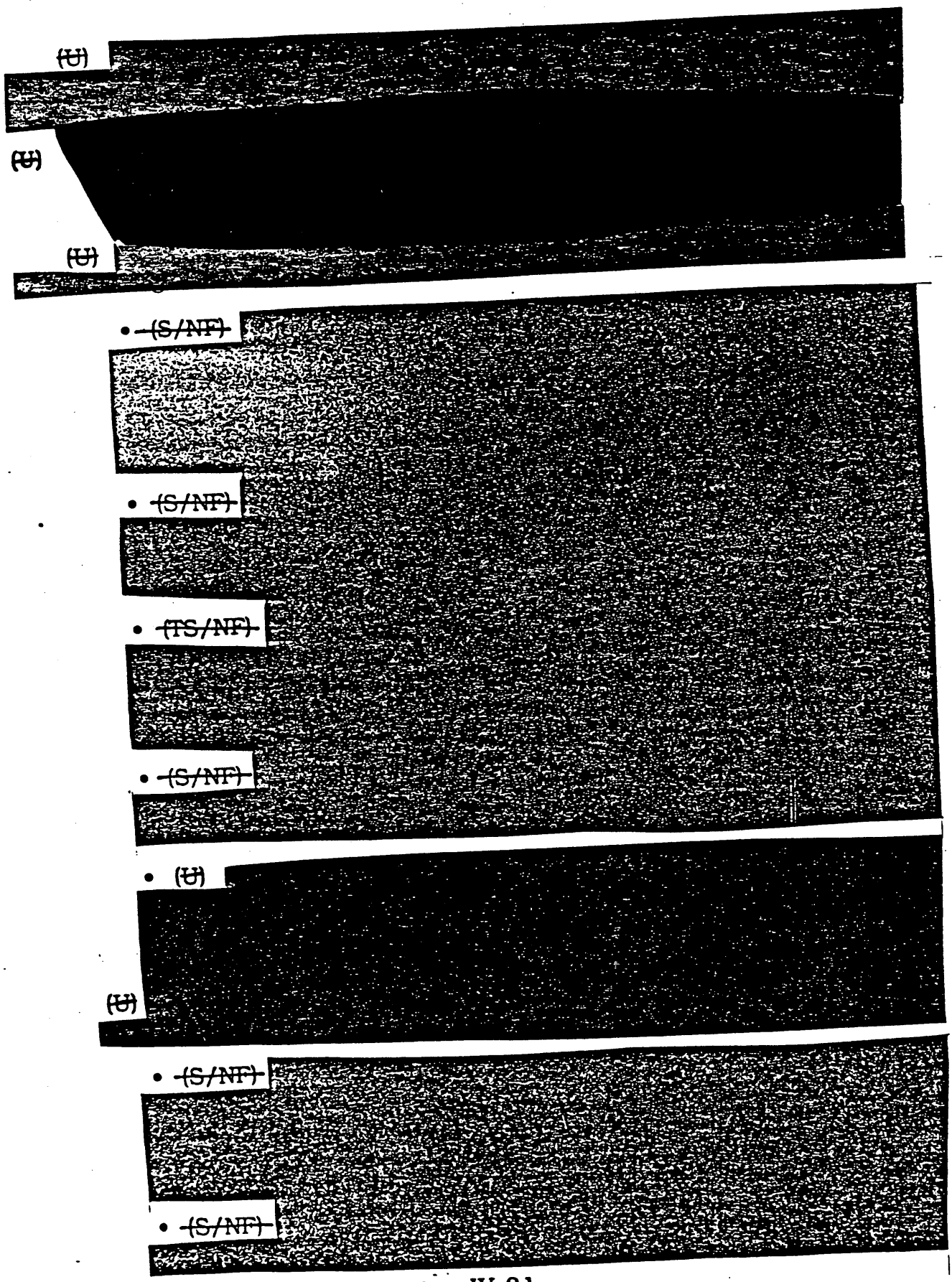
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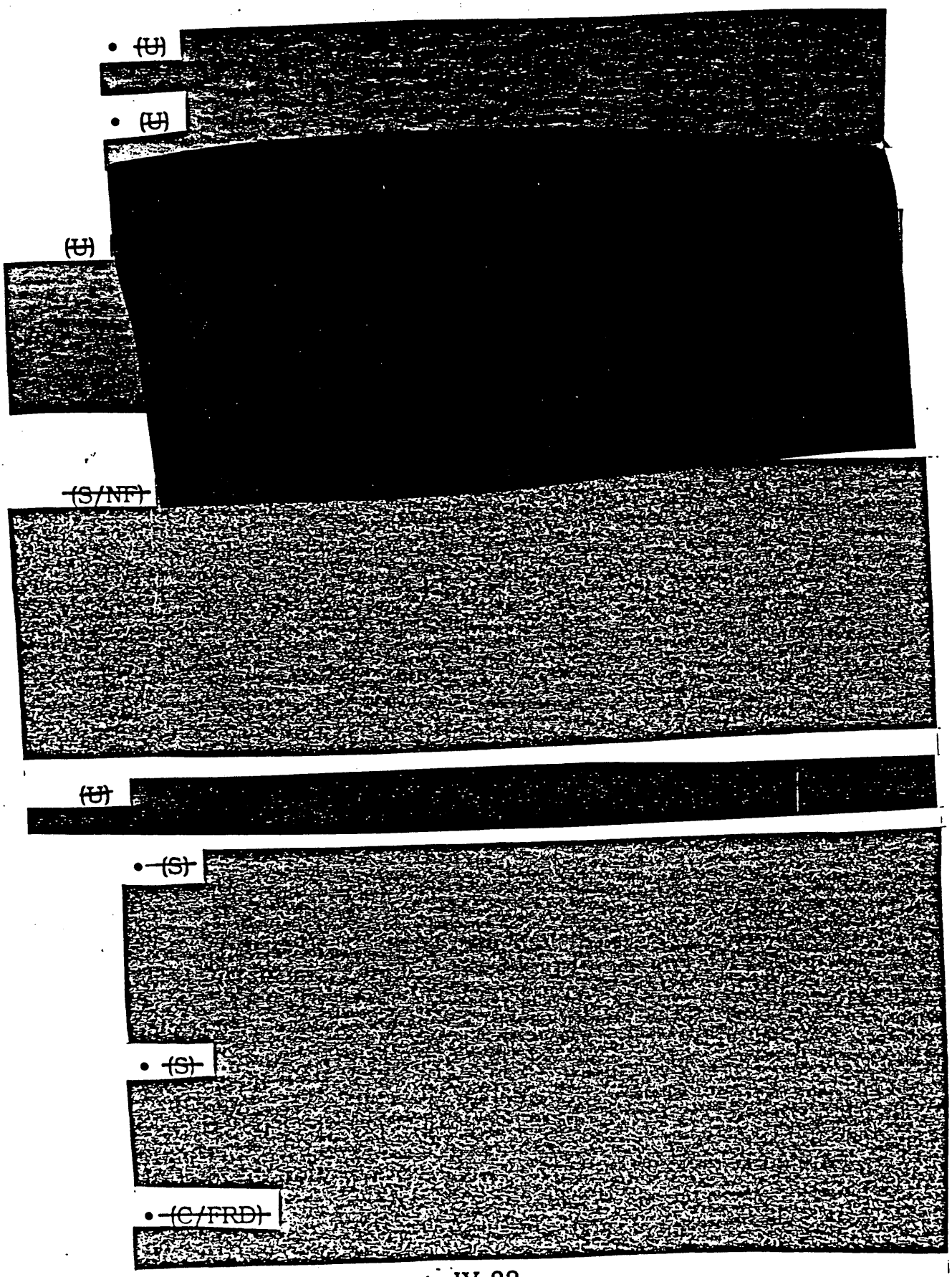
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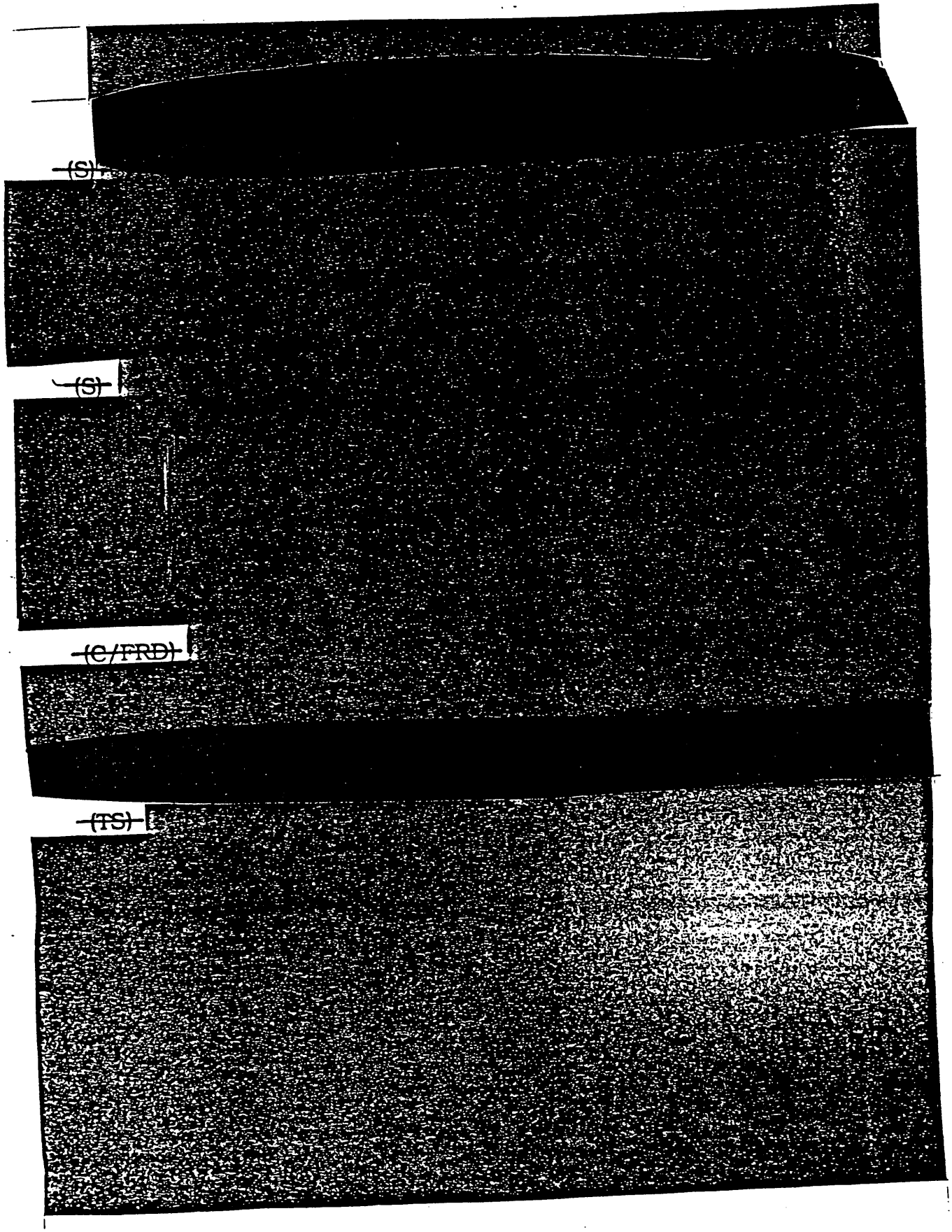
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TABLE 12

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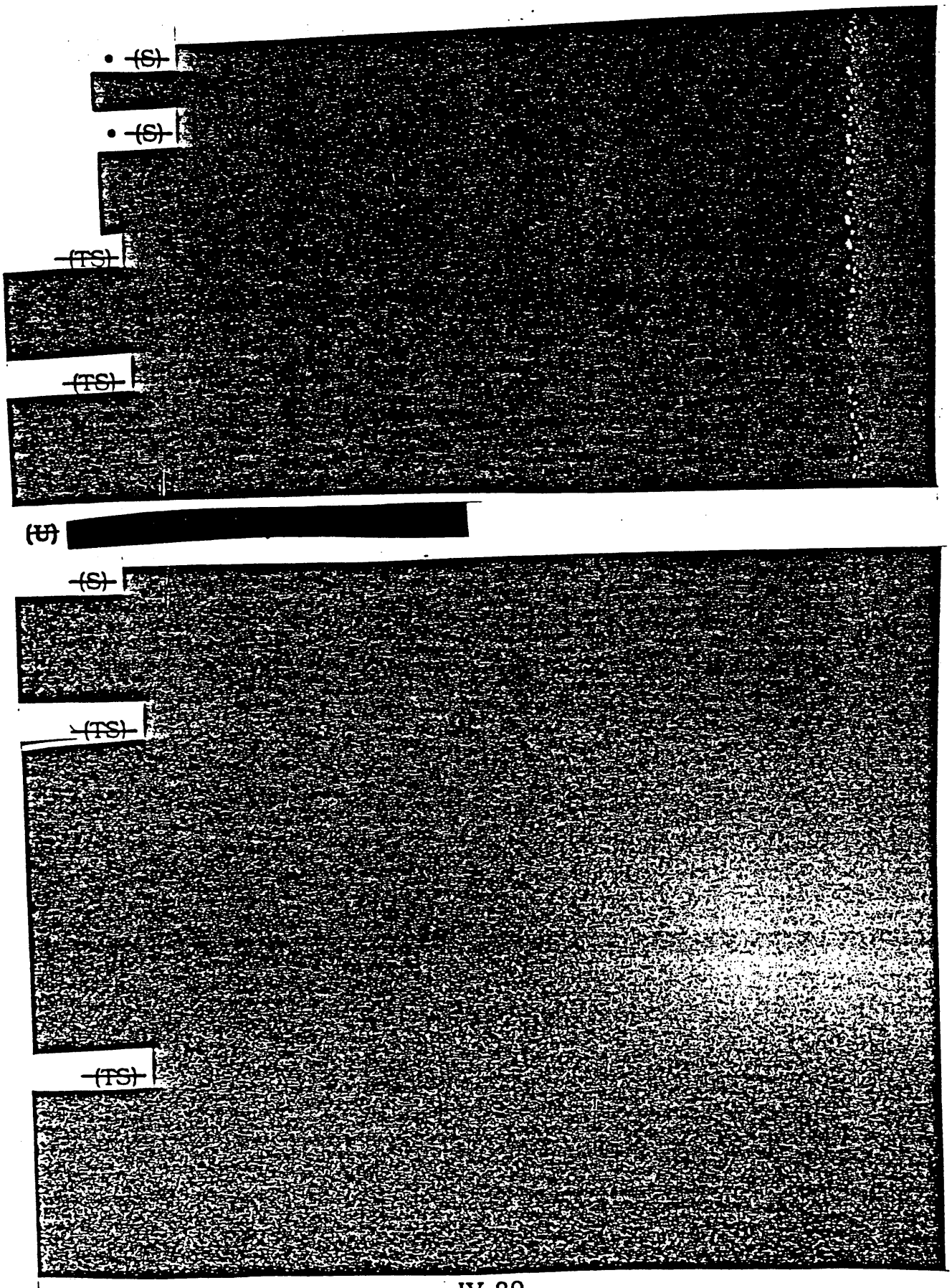
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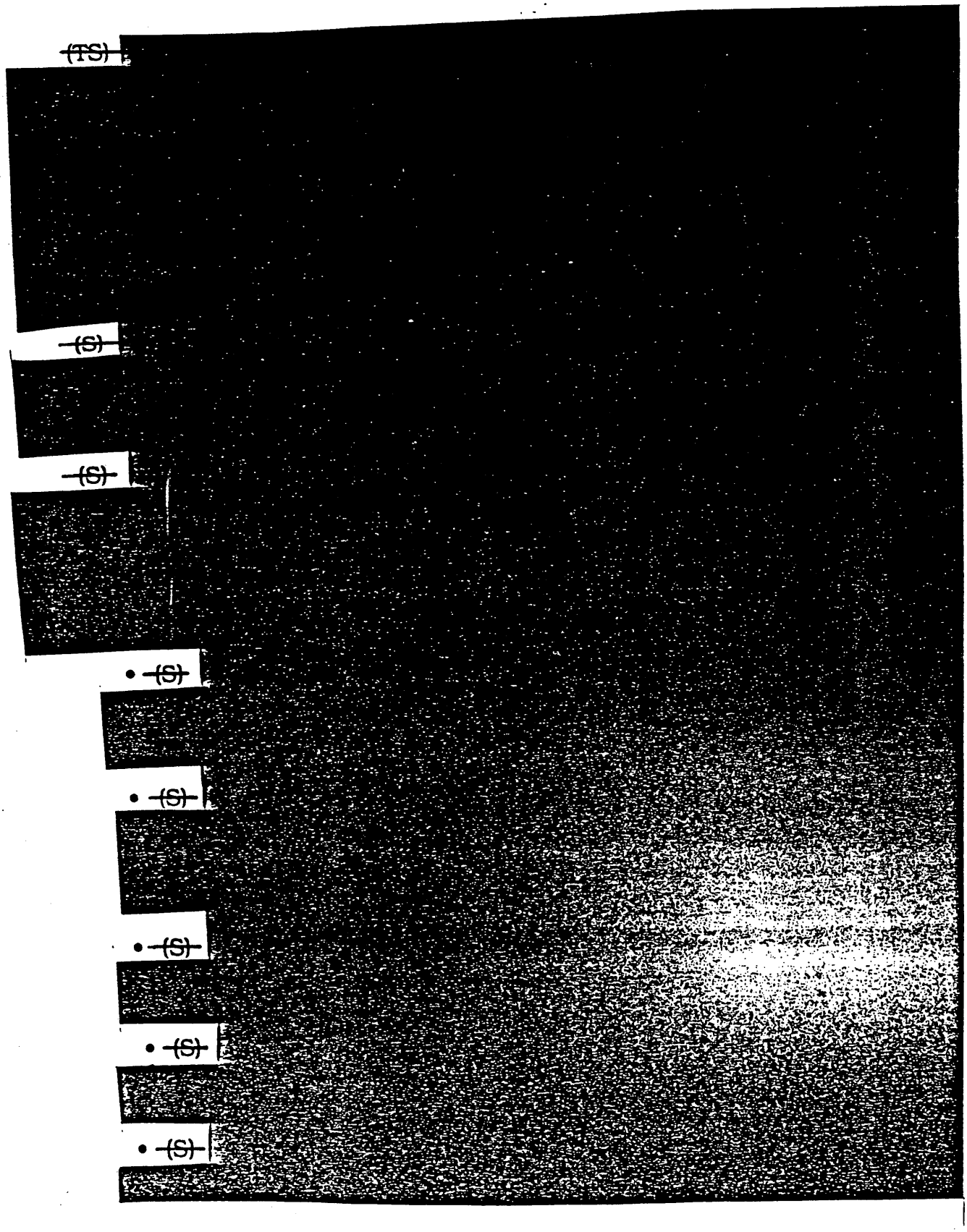
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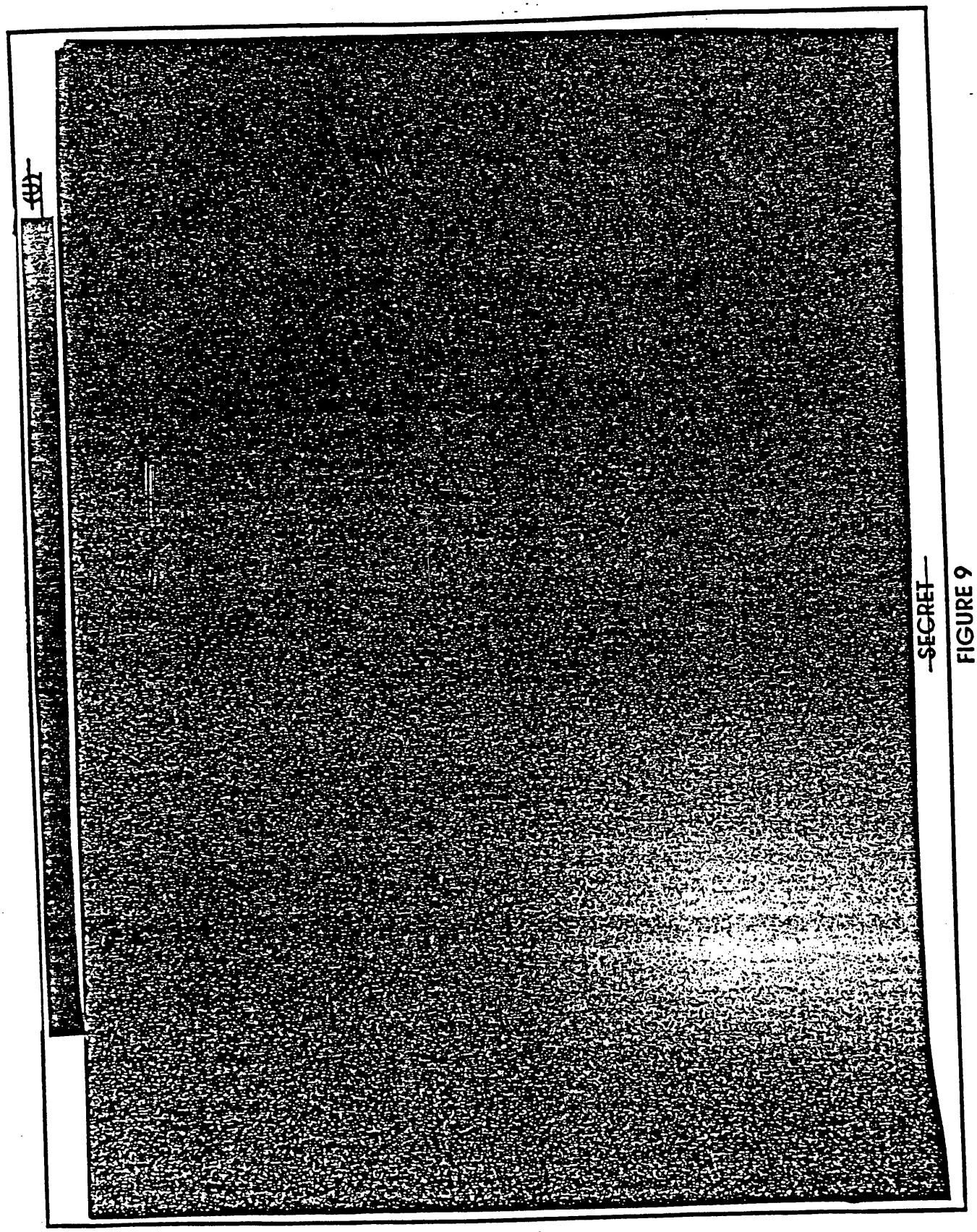

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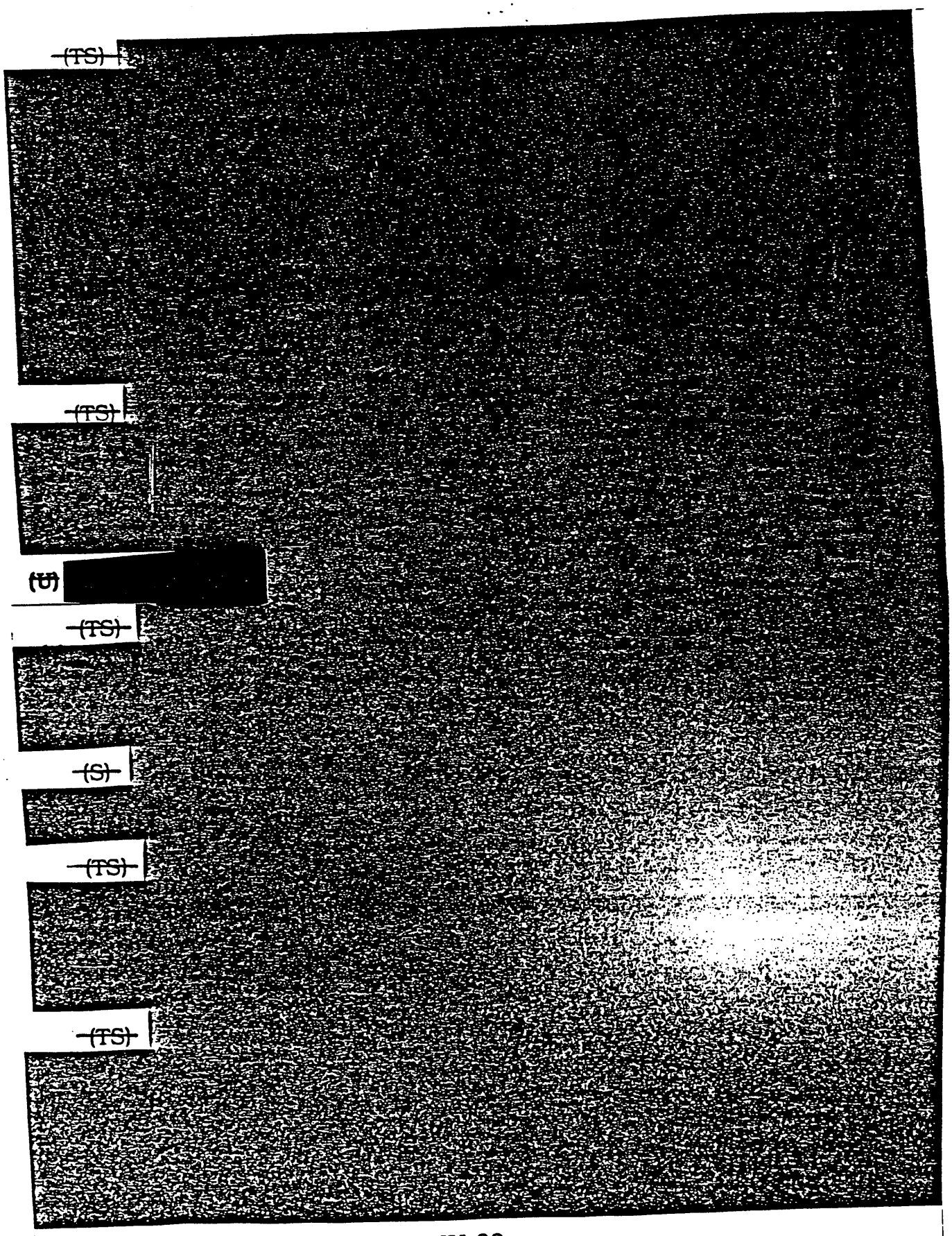
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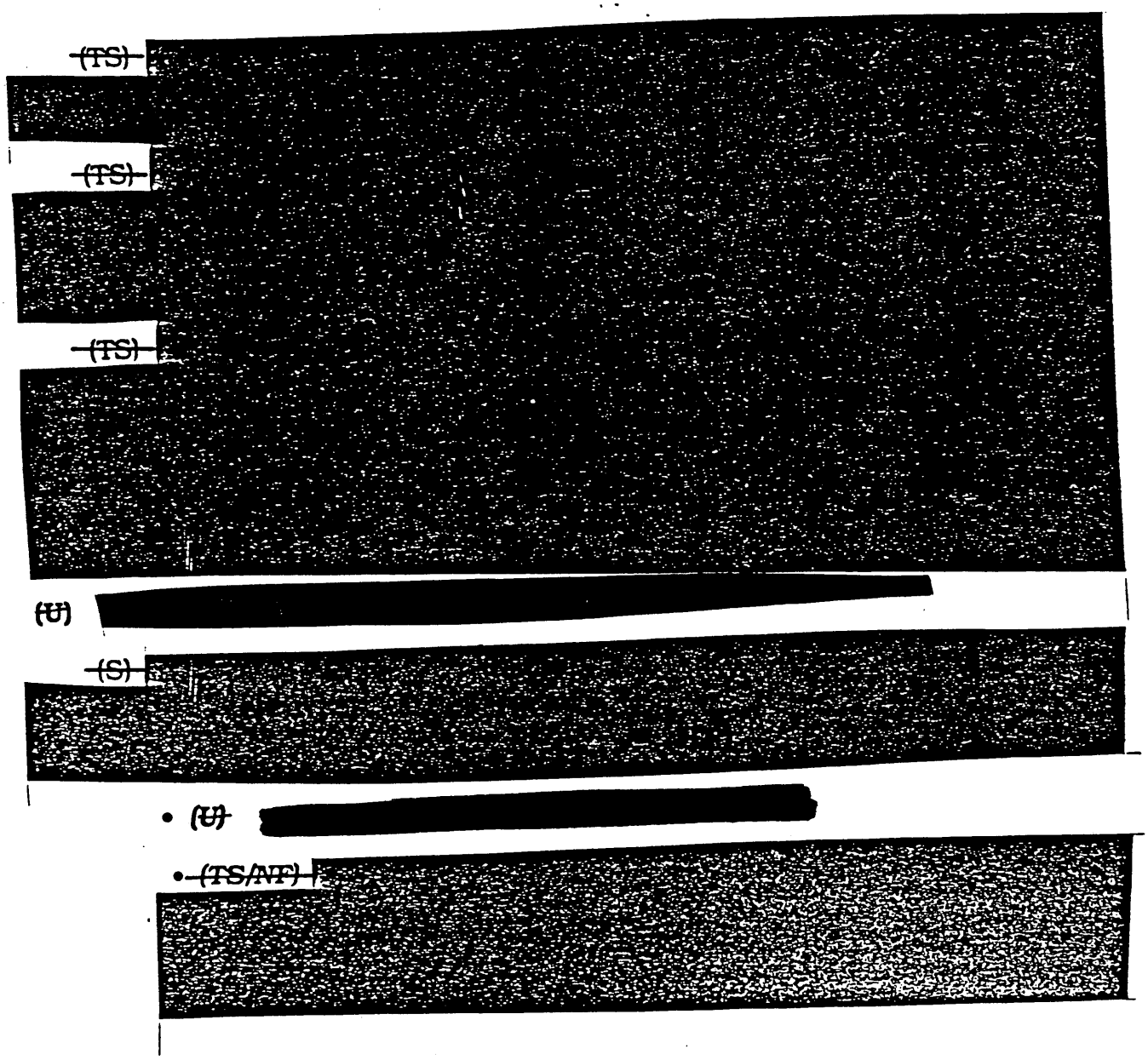
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(U) METHODOLOGY

(U) The Red Team traveled to Kings Bay Naval Submarine Base, Georgia to receive detailed mission briefings and actual crew procedural demonstrations by USS PENNSYLVANIA (SSBN 735) crewmen in a submarine simulator. Upon the completion of these demonstrations, the Red Team interviewed key members of the crew and reviewed the previously developed process flow diagrams. The Team members also toured USS TENNESSEE (SSBN 734) to familiarize themselves with an SSBN for the physical configuration and crew positions.

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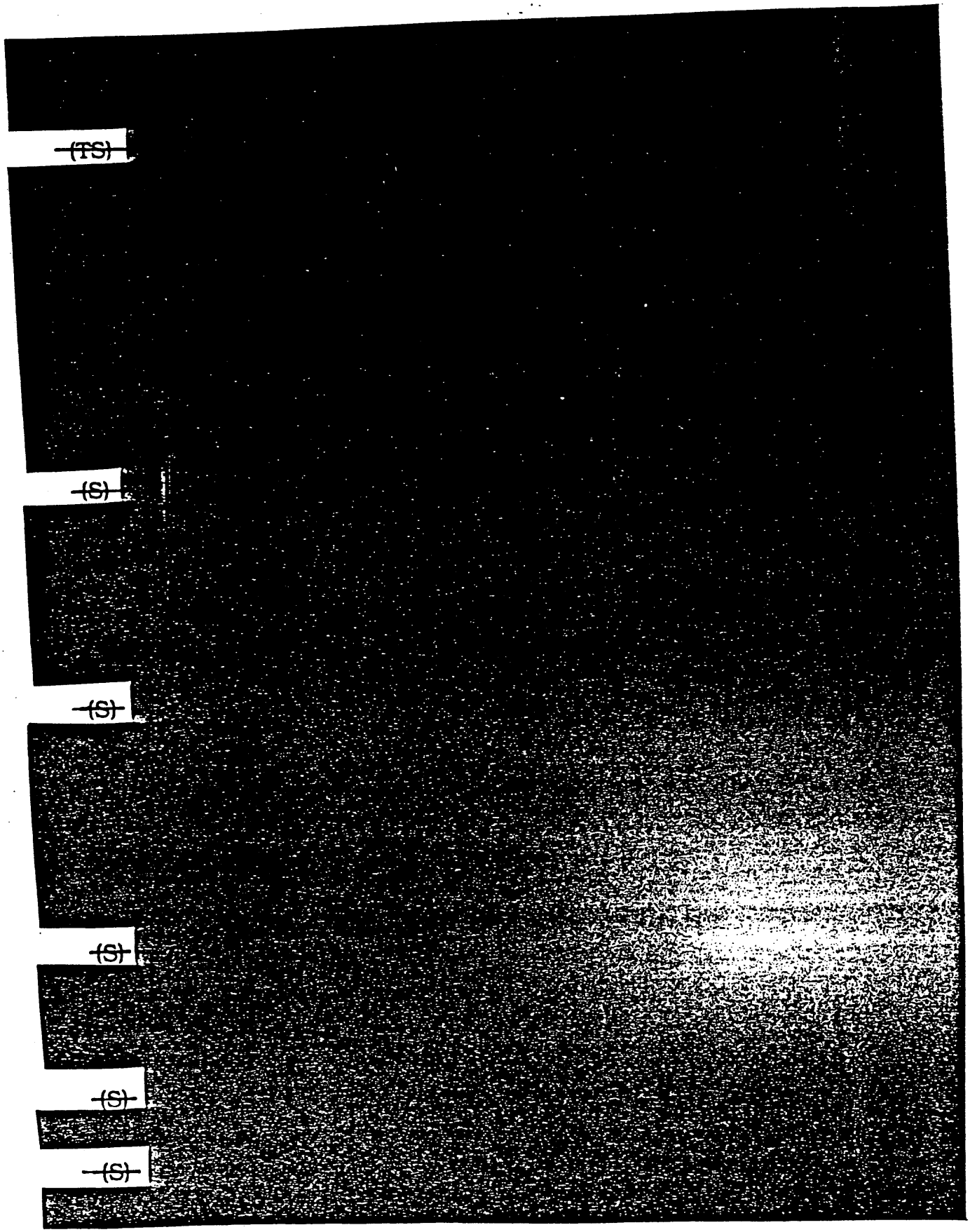
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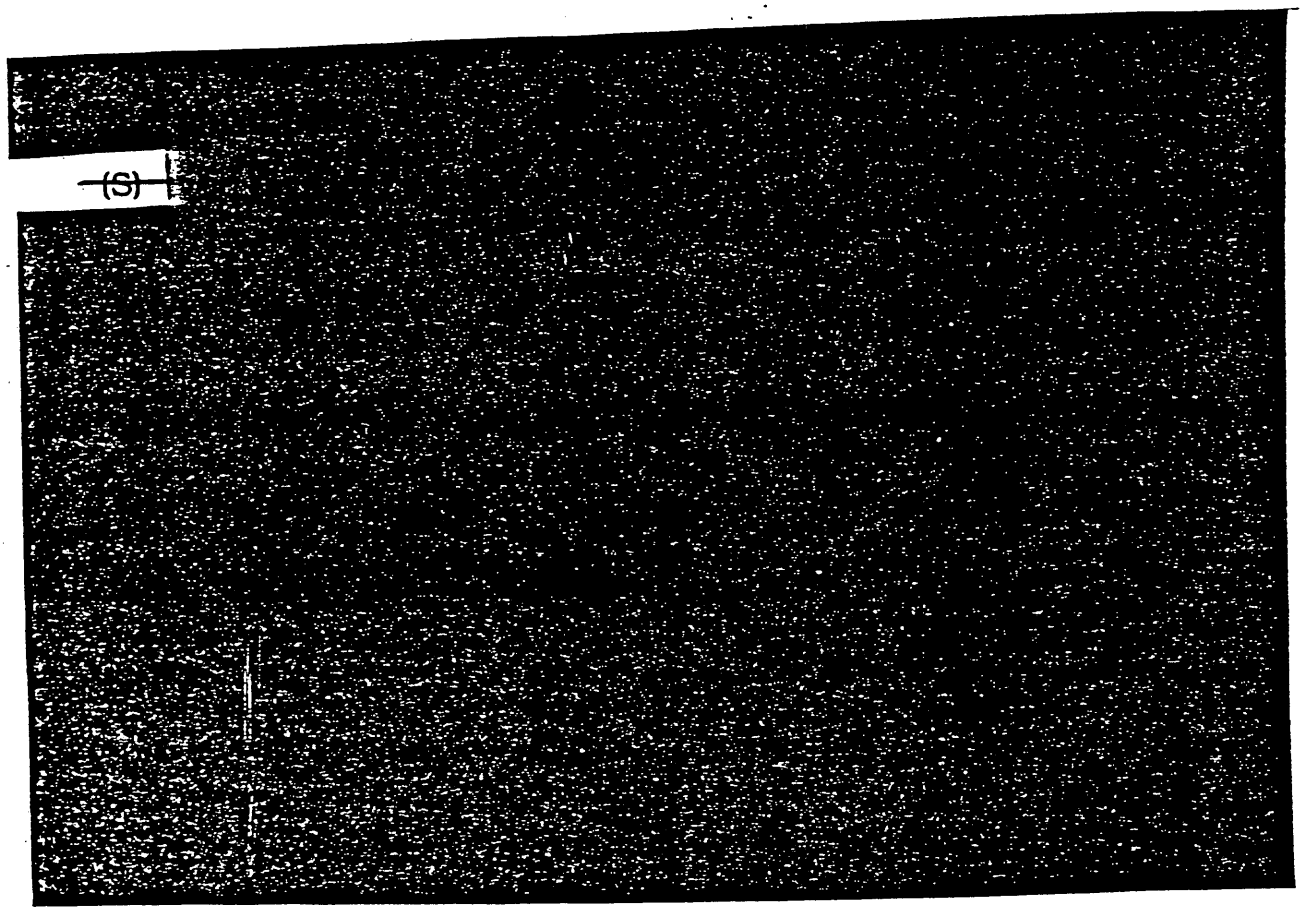

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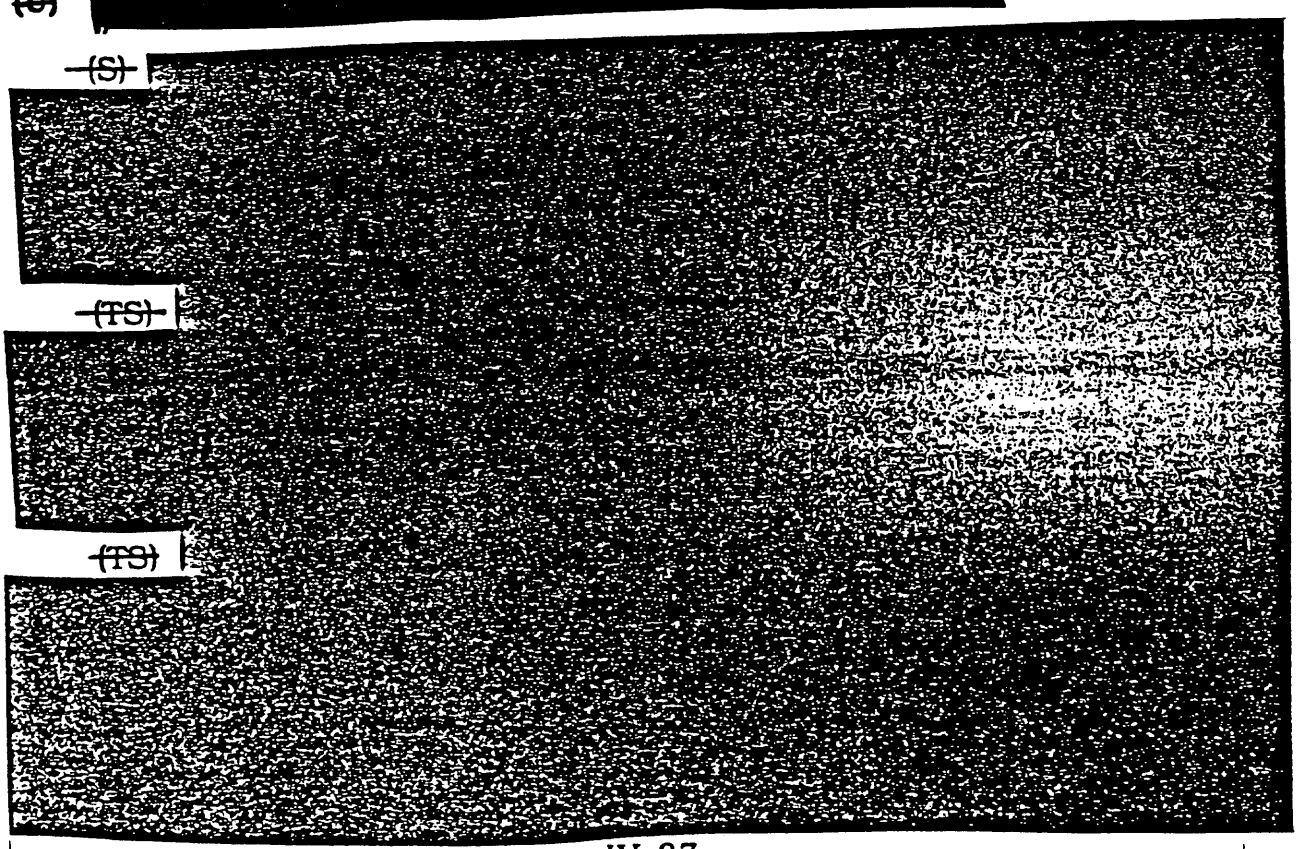

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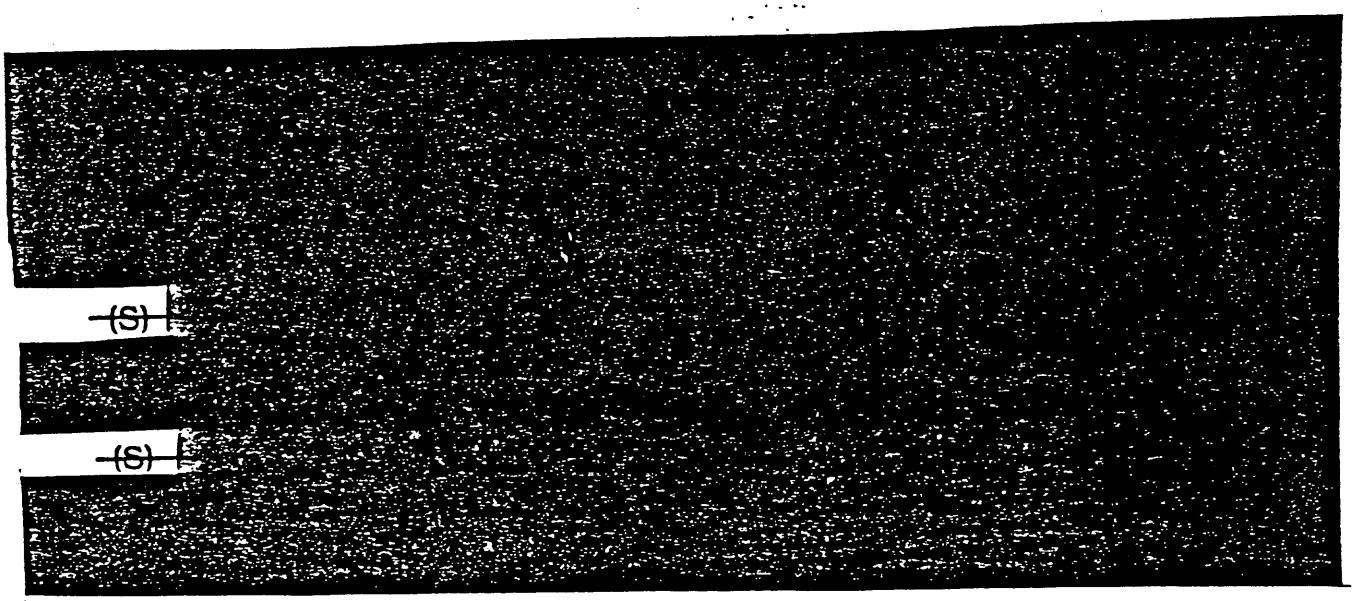

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(U) RECOMMENDATIONS

(U) The Advisory Committee recommends the Secretary of Defense:

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~~(S)~~ SUB-ISSUE 1-7: [redacted]

~~(S)~~ [redacted]

~~(U)~~ [redacted]

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(U) METHODOLOGY

(U) A Red Team composed of experts from Sandia National Laboratories and the National Security Agency was established to investigate this issue.

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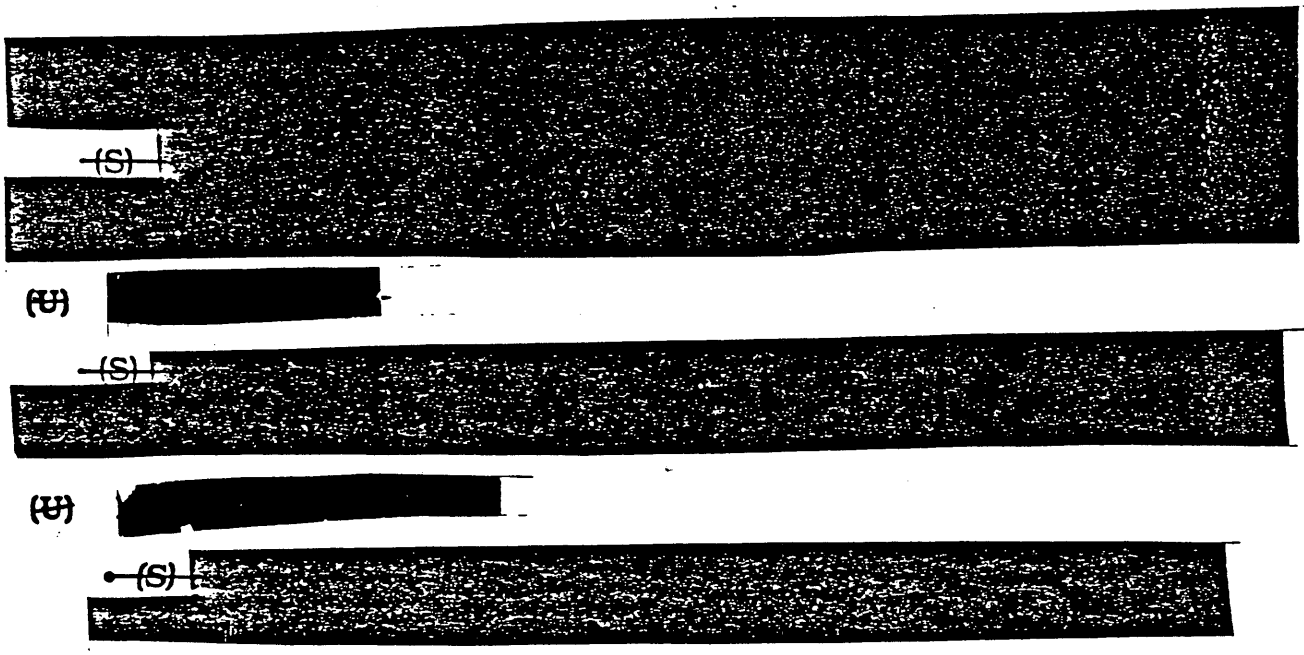

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(U) **RECOMMENDATION**

(U) The Advisory Committee recommends the Secretary of Defense:

- ~~(C/FRD)~~ [redacted]

ISSUE 2: POST-LAUNCH DESTRUCT DEVICES (U)

(U) Should the United States implement a system for post-launch destruct for all nuclear weapons? If so, what types of systems should be implemented?

(U) BACKGROUND

(U) Interest in employing post-launch destruct devices as a means of terminating an unauthorized or inadvertent launch of a U.S. ballistic missile or an authorized/intentional but ill-advised launch in which the President reconsiders the original execution order (during the approximately 30 minute flight time for ballistic missiles) has been expressed periodically in both the open literature and in the Congress. As a result of this interest, the Advisory Committee was specifically tasked by the Secretary of Defense to examine the desirability and feasibility of adding this new type of failsafe device to all ballistic and cruise missiles in the U.S. stockpile. Upon consideration of this tasking, and after further specific discussion of the potential consequences of an inadvertent or unauthorized detonation of any nuclear weapon, the Advisory Committee expanded the scope of this tasking to include all types of nuclear weapons in the current and planned stockpile. In order to rescope their tasking, the Advisory Committee formulated the following issue statement for investigation:

> (U) Should the United States implement a system for post-launch destruct for all nuclear weapons? If so, what types of systems should be implemented? What improvements are required?

(U) METHODOLOGY

(U) The Advisory Committee conducted a thorough and objective study of various post-launch destruct concepts. In addition to the taskings to and support received from its Technology Working Group and Remote Destruct Study Group which are discussed below, the Advisory Committee invited and specifically considered the inputs from leading civilian experts from both inside and outside the government. The Committee also assessed the potential need for such devices in the context of both the changed international security environment and its overall investigation of the failsafe and risk reduction capabilities of the current and programmed Nuclear Command and Control System.

(U) To support its fact finding and concept development for the post-launch destruct investigations, the Advisory Committee established the Remote Destruct Study Group, under the direct supervision of the Chairman of the Technology Working Group. The Remote Destruct Study Group was made up of 40 military and civilian representatives from the Office of the Secretary of Defense, the Joint Staff, staffs of the nuclear Commanders in Chief, the Services, the National Security Agency, the Department of Energy's National Laboratories, and other Department of Defense Agencies.

Members were primarily field grade military officers and equivalent grade civilians, each with 15 to 25 years experience in their respective fields. A cadre, formed by the Remote Destruct Study Group Chairman and five additional members, synthesized the detailed technical work, based on extensive inputs received from other members. A Red Team, from Sandia National Laboratories, was formed to provide an independent assessment of the Study Group's findings. Private sector representatives were also consulted on an as-needed basis.

(U) At the Advisory Committee's direction, the Study Group conducted a three-phased study (research, development, and evaluation) to address post-launch destruct concepts for all United States nuclear weapons. This study addressed all ICBMs, SLBMs, air launched cruise missiles, sea launched cruise missiles, short range attack missiles, and nuclear bombs. At each stage of its work, the Study Group presented detailed in-progress reviews to the Advisory Committee to support its deliberations and to receive further guidance.

(U) The analysis tool known as Quality Functional Deployment (QFD) provided a structure in which relationships between critical factors of remote destruct and operational requirements could be identified, tracked, and documented throughout the study. This methodology also guided the Study Group in developing evaluation criteria and kept the evaluation process on track. The critical factors to be considered in the development of post-launch destruct concepts were identified on the basis of inputs describing the minimum system requirements that were received from the Joint Staff, the Services, the nuclear CINCs, and the nuclear weapons technical community. These minimum requirements addressed both sides of the assure-assure against balance mandated for the NCCS. Based on these critical factors, a set of evaluation criteria for post-launch destruct concepts were developed and presented to the Advisory Committee. The Advisory Committee, after review and discussion, approved these criteria.

(U) The Study Group received over 150 briefings at more than 16 separate DoD and DOE sites on technologies and weapons operations, and conducted an extensive literature search of over 100 (classified and open) sources. The Study Group determined from this effort that a post-launch destruct system must fulfill five basic functions: detect the launch of a nuclear weapon; assess the errant nature of the launch; communicate that assessment to decision-makers and issue a remote destruct command to the weapon in its launch sequence or in flight; preclude a nuclear detonation and/or terminate flight; and confirm destruction of the weapon.

(U) Five "types" of remote destruct options, discussed below, emerged in the course of research: passive, active enable, active destruct, bi-national, and open source. Concepts of operations were then developed for each option. A description of these concepts, along with a listing of technical questions were forwarded to the organizations supporting the Study Group and these agencies provided detailed analysis of options to include concept

implementation; evaluation criteria; engineering-based judgements of life cycle cost, schedule, and technical risk; nuclear safety and security considerations; and mission and operational impact. The Study Group then used these analyses to refine the options.

(U) With the five options fully developed, the Study Group established five corresponding subgroups, with members of the Study Group cadre assigned as subgroup chairmen. Each subgroup evaluated its option with respect to remote destruct effectiveness (fulfilling the five functions); safety issues (nuclear and environmental); vulnerabilities; projected development time and technical risk; projected development, production and fielding costs; impact on weapon system and mission capability; political viability; operational impact; and termination and recall considerations. The evaluation then underwent independent comprehensive reviews by the Study Group and Red Team to ensure completeness and validity, with the final results forwarded for review to the Technology Working Group and then to the Advisory Committee to support its research and deliberations.

(U) The Advisory Committee concurrently solicited additional information and concepts, receiving a number of briefings from noted experts on conceptual post-launch destruct systems and how they might be implemented. Many of these experts also presented their views on the perceived requirements for such a system, potential failsafe enhancements provided, how it might contribute to risk reduction and increased international confidence in the control of U.S. nuclear weapons, and how it might be shared with other nations and deployed in lieu of expensive and potentially destabilizing defensive systems. During the course of its deliberations, the Advisory Committee also solicited the post-launch destruct views of other non-government individuals who appeared before the Committee on other subjects. These included noted experts in the areas of nuclear weapons safety, arms control, and risk reduction. These inputs were discussed during the Committee's deliberations and are summarized in a section below on post-launch destruct pros and cons.

(U) As was the case in all areas of its review, the Advisory Committee did not consider the desirability or feasibility of post-launch destruct systems in isolation from either world events or its other findings. Both the need for and the likely acceptability of post-launch destruct systems, as an additional risk reduction measure in the changed international security environment were addressed. It also considered its findings, including potential enhancements identified in the course of this review, relative to the effectiveness of the current and programmed NCCS and its capability to assure against unauthorized or inadvertent launches or detonations of U.S. nuclear weapons. At the same time, the Committee remained keenly aware of the continuing role of nuclear weapons in United States deterrence strategy and the need to assure the responsive use of nuclear weapons when authorized by the President.

(U) OBSERVATIONS AND ASSESSMENTS

Post-Launch Destruct Concepts (U)

(U) The Advisory Committee determined that the five post-launch destruct concepts, described below, fell into two general categories: passive (which are automatic controls and require no external intervention) and active (which require external actions after launch).

(U) Passive post-launch destruct devices are an extension of pre-launch controls and are designed to be failsafe. Like other pre-launch controls, they are passive in the sense that no external action is required for them to function. Passive systems use existing weapon system monitors to detect the launch environment and automatically destroy the weapon system (by inducing guidance system malfunction, warhead disablement, or by triggering a conventional explosion) after a predetermined period of time following launch so as to provide safe-separation and minimize environmental effects. For authorized launches, the post-launch destruct system must be turned off prior to launch. A secure code, received in the EAM which authorizes launch, would perform this disengagement function.

(U) Passive post-launch destruct concepts share one major similarity and several major dissimilarities with coded control devices and other pre-launch controls discussed above. They are similar in that all operational actions are identified prior to launch. Unlike pre-launch controls, however, which are developed to prevent launch, passive post launch systems are intended to come into play after launch occurs to terminate the launch or flight or to disable the weapon.

(U) The Advisory Committee considered four active post-launch destruct concepts:

- (U) Active Enable. Active Enablement systems are also designed to be failsafe and are similar to Passive systems. These systems require an enablement code received after launch or release from the appropriate higher authority which turns off the destruct devices and allows the authorized arming and fuzing sequences to occur. If the enablement code is not received within a preset time interval, the weapon system is automatically destroyed.

- (U) Active Destruct. Active Destruct systems require remote detection and assessment of all unauthorized missile launches by an appropriate higher authority who transmits a secure destruct command to either the on-board devices or to weapons systems able to intercept and destroy the missile. Unauthorized launch transmitters would be added to all nuclear cruise missiles to provide a global detection capability. As a subset of this concept, the Advisory Committee specifically investigated potential adaptation of

current missile destruct systems used to ensure range safety during peacetime missile test flights.

• (U) Binational. These concepts are risk reduction measures and are similar to Active Destruct. They require a shared remote detection and assessment capability for all unauthorized missile launches by multiple national authorities, any of which can transmit a Destruct Command. The destruct system can be contained onboard or employ national systems to provide an intercept capability.

• (U) Open Source. The Advisory Committee met with non-governmental individuals who have proposed both passive and active post-launch destruct ballistic and cruise missile concepts in the public media. The Committee compared these concepts, retaining those areas described by the authors that differ from the concepts as described above.

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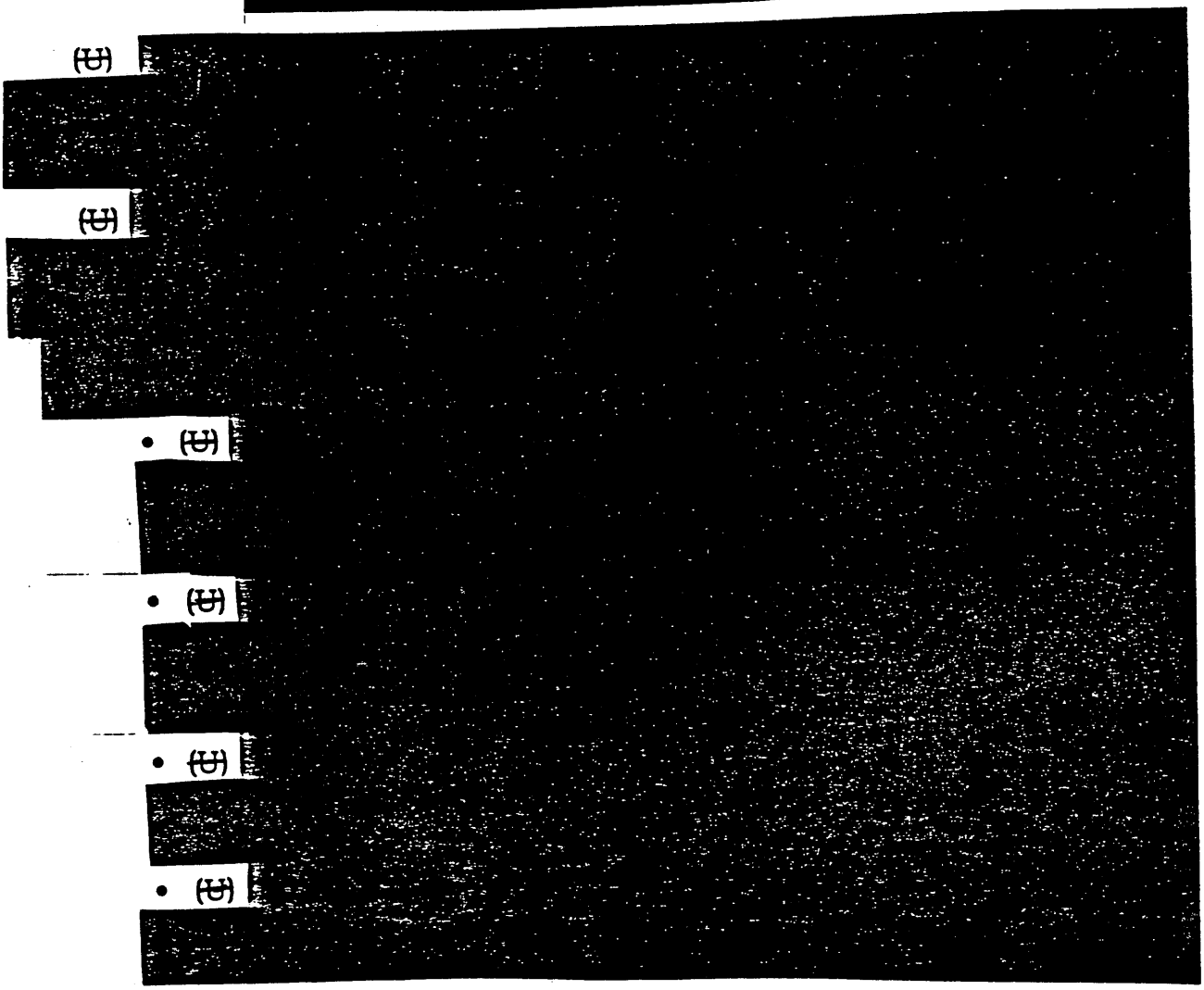

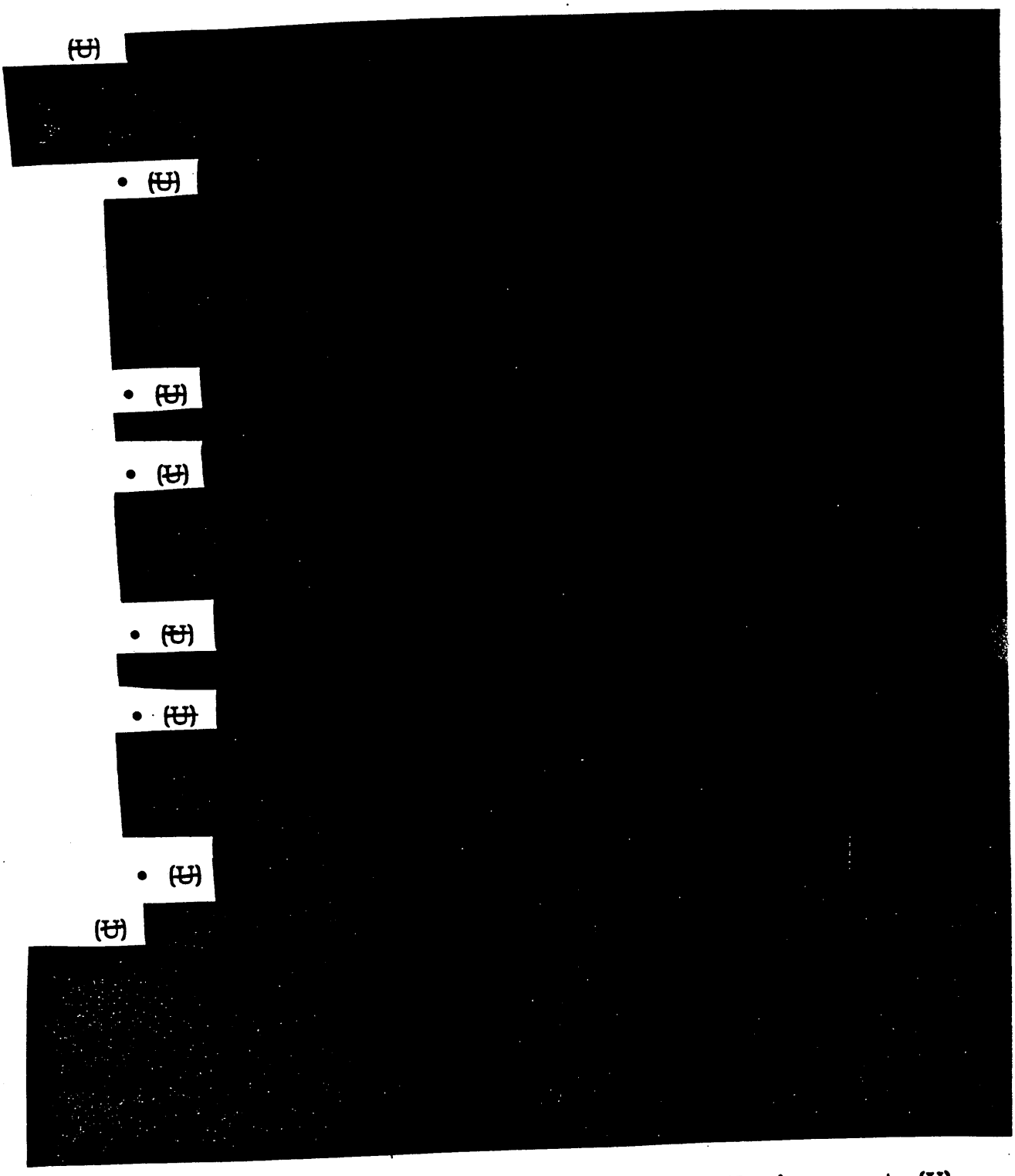

Impacts of Technology and the Changed Security Environment (U)

(U) Along with due consideration of the information and opinions provided on the desirability and feasibility of a post-launch destruct system, the Advisory Committee considered the impacts of technological advances

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(U) RECOMMENDATIONS

~~(U)~~ The Advisory Committee recommends the Secretary of Defense:

- ~~(U)~~ [redacted]
- ~~(U)~~ [redacted]

ISSUE 3: SAFETY AND SECURITY (U)

(U) Are current DoD procedures, equipment, and facilities adequate to maintain the required standards of nuclear weapons safety, security, and control under the full range of stockpile conditions?

- (U) Sub-issue 3-1 (Personnel Reliability): What enhancements should be made to the DoD Personnel Reliability Program to provide the required level of protection to nuclear weapons?

- (U) Sub-issue 3-2 (Nuclear Weapons Physical Security): Are physical security standards and procedures adequate to protect nuclear weapons, both in storage and in transit?

- (U) Sub-issue 3-3 (Computer and Information Security): Are computer and information security adequately maintained in light of the evolving threat? What enhancements should be made?

- (U) Sub-issue 3-4 (Delay Against Unauthorized Use): What means of protection can prevent unauthorized use of a nuclear weapon if physical control is lost to an adversary?

- (U) Sub-issue 3-5 (Recapture and Recovery): What improvements should be made to enhance protection against detonation of a nuclear weapon in the event that all other layers of protection fail and an adversary gains physical control of a weapon?

(U) BACKGROUND

(U) The overall system of maintaining the required standards of safety, security, and control is impressive. Its success in preventing unauthorized or inadvertent use is based upon a multi-layered approach which is discussed in detail in Chapter Three. This approach recognizes that while the maintenance of actual physical control of a weapon in a safe environment is paramount, no single factor can be made perfect under every condition.

(U) Even before the initiation of the FARR, the DoD, in concert with the DOE as appropriate, had taken effective actions to respond to previous high-level panels in the areas of safety, security and control. In keeping with its Charter, the Advisory Committee's review emphasized security and control. Safety issues were considered by the Advisory Committee but only as they related to the assure-assure against balance.

(U) These initiatives noted above, the President's Nuclear Initiatives, and other DoD and DOE long-term efforts (e.g., introduction of newer and more secure systems, backfit of more effective weapons to current systems) are making the U.S. nuclear stockpile safer and more secure. While the precise numbers of the U.S. nuclear weapons arsenal are changing in this

fluid security environment. Table 5 describes the essential composition and direction of the arsenal in the future. Also, corrective actions have been initiated to address deficiencies noted during the FARR review. The net effect of these initiatives is the continuing strengthening of the individual layers of security and control.

(U) The Advisory Committee recognizes that the current system of safety, security, and control was developed to optimize trade-offs between reliability vs. system complexity, readiness vs. control, weight vs. yield, etc. in relation to the then current threat and security environment. In response to the new environment, the U.S. is considering options to readdress the balance between these often competing goals. As part of this emphasis, continuing "Red Team" assessments are critical to identifying vulnerabilities reflecting current and evolving threats and to maintaining operational capabilities. One factor that should be kept in perspective is that with the shift in force posture and focus, continuing emphasis on the entire system of command, control and communications; training; exercises; and readiness is necessary to ensure that the weapons could be redeployed in a crisis or in response to changing U.S. security requirements.

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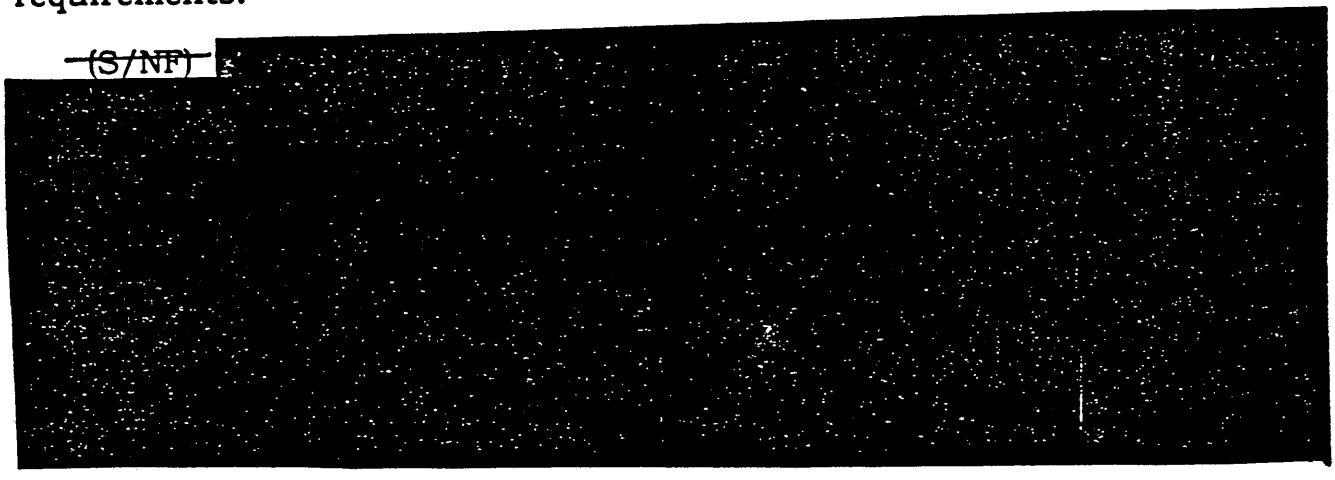


(U) METHODOLOGY

(U) The Advisory Committee established the Weapons System Review Study Group consisting of 32 members from 17 organizations deeply involved in all aspects of nuclear command and control. The Study Group was organized into three initial review groups to optimize use of the assembled expertise. Some Study Group members served on more than one review group because of their unique experience and talents.

- (U) Unauthorized Launch - The first group examined the potential for Unauthorized Launch Analysis program enhancements by (1) reviewing existing Unauthorized Launch Analysis assumptions, criteria, methodologies, and results for adequacy, compatibility with postulated threats, and detail; and (2) surveying typical sites and operations for weapon systems of concern. In

some cases, weapon system trainers were visited in conjunction with site and ship visits.

- (U) Inadvertent Launch - The second group investigated the adequacy of all other nuclear safety analyses by (1) reviewing failure modes and effects, and inadvertent launch and other analyses for adequacy, compatibility with postulated accident conditions, specificity, and results; and (2) surveying typical sites and operations for weapon systems of concern. The group also evaluated the efficacy of the overall nuclear weapons safety program process.

- (U) Security - This group determined the potential for security program enhancements by reviewing (1) all weapon storage area Site Security Folders, (2) waivers, exceptions, and variances and inspection results, (3) current issues relative to security forces, (4) current security research and development programs, and (5) typical storage and transshipment sites and security operations. Additionally, security concerns were solicited from site security forces.

(U) Detailed briefings were received in appropriate areas.

(U) The review groups identified potential areas of concern and a seven-member Red Team was formed. The Group correlated weapon system design features, common functions (movement, maintenance, training, etc.), and weapon stockpile-to-target sequences to identify potential problem areas.

(U) Areas of concern were solicited from knowledgeable persons through visits to 34 commands and organizations, including those within the DOE nuclear weapons complex.

(U) Findings from the 1984-86 Joint Chiefs of Staff Nuclear Command and Control Study relating directly to nuclear weapons and their facilities were reviewed against the backdrop of today's fluid security environment.

(U) All review groups correlated data and potential issues and enhancements were identified for consideration by the core Study Group.

(U) The Study Group's core group evaluated issues to identify recommendations to the Advisory Committee and those which amounted to minor program enhancements. (These latter items were the subject of separate correspondence from the Study Group chairman to appropriate cognizant offices). Potential issues were reviewed with Red Team members.

(U) The Study Group chairman periodically briefed the Advisory Committee on evolving issues and intermediate findings of its review and received guidance from the Committee. In all cases, members of the Study

Group were encouraged to make any minority or dissenting opinions known to the Advisory Committee.

(U) Based upon its review of safety, security and control, the Advisory Committee identified five sub-issues as meriting further detailed review.

~~(S)~~ [redacted]

(U) SUB-ISSUE 3-1: PERSONNEL RELIABILITY

(U) What enhancements should be made to the DoD Personnel Reliability Program to provide the required level of protection to nuclear weapons?

(U) BACKGROUND

(U) It is national policy to protect nuclear weapons from unauthorized or inadvertent use or damage due to accident. The national security and welfare, require, therefore, that only those personnel who have demonstrated unswerving loyalty, integrity, trustworthiness and discretion of the highest order shall be employed in nuclear weapons duties. The Personnel Reliability Program (PRP) is one element of a multi-faceted DoD program to preclude the loss, theft, sabotage, unauthorized use, accidental damage, or destruction of a nuclear weapon.

(U) The significance and importance of the Personnel Reliability Program will continue to increase in the future. Critical information continues to be disseminated, computer hackers will become more capable and economic pressures become greater. As a result, demands on personnel will increase.

(U) METHODOLOGY

(U) Multiple facets of personnel security in the nuclear command and control system were examined by the Weapon Systems Review Study Group with special emphasis on: methods to ensure fidelity of critical NCCS personnel and the potential role of polygraphs in the PRP.

(U) The methodology used to review procedures for determining and ensuring personnel reliability included:

- (U) A thorough review of all national and DoD-level personnel reliability guidance.

- (U) Discussions with appropriate officials to determine (1) implications of eliminating questions on arrest history, credit history, drug/alcohol use and mental health, and organizational affiliations, and (2) possible alternative methods of determining the fidelity of personnel in critical nuclear command and control positions.

- (U) Review of recommendations to the DoD office with responsibility for personnel reliability on the incorporation of polygraph testing for PRP personnel. Validity of the observations and recommendations were coordinated with the Director of the Defense Polygraph Institute. Further, current and former

personnel managers were questioned on their views of the role of polygraph testing.

(U) OBSERVATIONS AND ASSESSMENTS

(U) The PRP is applicable only to DoD military, civilian, and, in special cases, contract personnel who have access to, or control access to, war reserve nuclear weapons, nuclear weapon systems, nuclear components, or sealed authenticators. In all cases, PRP personnel must be U.S. citizens or U.S. nationals.

(U) The PRP system includes "critical" and "controlled" billets with personnel assignment based upon their degree of access to nuclear weapons, components or supporting materials and technical knowledge of the system. In addition to these two types of billets, requirements are established for specially designated billets whose holders undergo extraordinary reliability testing (i.e., counter-intelligence scope polygraph).

(U) While adherence to PRP administrative procedures may be waived during wartime, particularly in a combat theater, the philosophy and practical requirements of the PRP continuously remain in effect. Commanders must continue to apply their best professional judgement and select only the most trusted individuals to perform nuclear weapon duties.

(U) A wide range of nuclear command and control positions (Table 13) comes under the PRP and there are approximately 58,000 DoD personnel (56,447 military, 1,388 DoD civilian, and 144 civilian contractors) in the program. All candidates for the program undergo initial screening to determine competency, stability and dependability prior to assuming their nuclear command and control responsibilities. Screening includes a personal security investigation, medical evaluation, review of personal records, and a personal interview. Upon certification, PRP personnel are subjected to a continual evaluation process, both on and off duty, to assure their ability to perform their PRP duties. Decertification (temporary or permanent) from these duties is required whenever an individual fails to meet reliability standards. Decertification can result from alcohol or drug abuse, conviction of a serious offense, physical or mental condition, poor attitude, or a lack of motivation.

(U) In 1991, less than 3% of all PRP personnel were permanently removed from their nuclear weapons duties. Since 1984, this percentage has declined from a high of about 5%.

(U) Four important changes have affected the PRP in the last several years. First, the DoD has developed a better appreciation of the threats to the NCCS. This appreciation is derived from lessons learned in recent espionage/insider cases and the threat posed by the increasing sophistication of computer hackers.

EXAMPLES OF PRP POSITIONS* (U)

- Commanders; delivery unit
- Pilots and crew; delivery aircraft
- Delivery unit personnel and supervisors (who, by the nature of their assigned duties -- weapons handling, transporting or launching -- could cause the unauthorized launch, release or firing of a nuclear weapon)
- Commanders, personnel and supervisors; nuclear support units (e.g., maintenance, retrofits, limited life component changes)
- Personnel in the command and control line
  - Control or use authenticators and EAMs
  - PAL teams and management personnel
  - Staff officers who could direct the employment of nuclear weapons
  - Personnel who control or use nuclear missile targeting tapes
- Nuclear weapon handling and transport personnel
  - Transport aircraft and vehicle crew and operators
  - Crane operators
  - Storage and supply clerks
- Explosive Ordnance Disposal personnel
- Nuclear weapons security guards
- Weapons delivery system maintenance personnel and supervisors
- Inspectors
- Custodial unit personnel
- Communications security personnel (who receive, maintain and distribute sealed authenticators, PAL material, or related codes)

*PRP positions are "critical" or "controlled", depending on the degree of access to nuclear systems and related equipment and technical knowledge.

UNCLASSIFIED

Table 13

(U) A second important development involves a challenge posed by Congressional restrictions and litigation which could limit the DoD's ability to assess the reliability of people to be assigned to and holding nuclear command and control positions and other positions of the utmost sensitivity. Congress has imposed restrictions on the number of people to whom the DoD can administer polygraph examinations. National guidance recognizes the extraordinary sensitivity of selected special nuclear command and control positions (discussed below) and mandates counter-intelligence scope polygraph examinations. Also, pending litigation has challenged the intrusiveness of background investigation questions on certain behavioral factors such as arrests, drug and alcohol abuse, mental health problems, organizational memberships, and credit history. The net effect of these efforts to protect individuals' privacy, if implemented, is that the Department's ability to assure that only individuals of the highest personal integrity and reliability serve in these sensitive positions will be hampered.

(U) Third, the massive downsizing of the U.S. nuclear arsenal has improved PRP implementation. The retrograde of Army weapons from overseas and other force adjustments anticipating the President's Nuclear Initiatives and arms control agreements have reduced the number of people in the PRP from about 76,600 in 1989 to 67,000 in 1990 to 58,000 in 1991.

(U) Finally, at the same time the program is shrinking, new DoD guidance will strengthen provisions for assured reliability. These strengthened provisions, which are being drafted for implementation under the direction of the Assistant Secretary of Defense (Command, Control, Communications and Intelligence), include:

- (U) Institution of additional reliability tests (i.e., counter-intelligence scope polygraph) for selected personnel filling "specially designated nuclear command and control positions". These positions include, but are not necessarily limited to: personnel with access to the nuclear command and control coding and authentication processes and a communications medium necessary to transmit release, execution, or termination orders; personnel involved in the preparation and production of nuclear command and control coding and authentication documents and equipment; personnel involved in preparation and production of nuclear weapons targeting tapes and materials; and maintenance and security personnel who could have an adverse impact on system performance for nodes and equipment that represent near-single-point-failure elements for the nuclear command and control system.

- (U) More restrictive pre-service and in-service drug and alcohol abuse disqualifying standards (e.g., anabolic steroid abuse, any hallucinogen use, and alcohol abuse rehabilitation failure).

- (U) Development of a formal training course for installation PRP administrators.

- (U) Development of PRP procedures during transition-to-war and wartime.

- (U) Development of a PRP management information system.

(U) CONCLUSIONS

(U) People compose the most important layer in the system of positive measures. Efforts to deploy, protect and operate nuclear weapons systems fundamentally and ultimately depend on the loyalty, reliability and capability of NCCS personnel. The Advisory Committee concludes that sophisticated technological safeguards, while important and necessary, cannot substitute for attention to effective personnel reliability, training, exercise, and inspection programs. The DoD's careful attention to selecting the most capable and loyal personnel to conduct nuclear weapons-related activities and its attentive implementation of programs to monitor their reliability will continue to be essential in maintaining the Department's record of effective nuclear security and control.

(U) RECOMMENDATIONS

(U) The Advisory Committee recommends the Secretary of Defense:

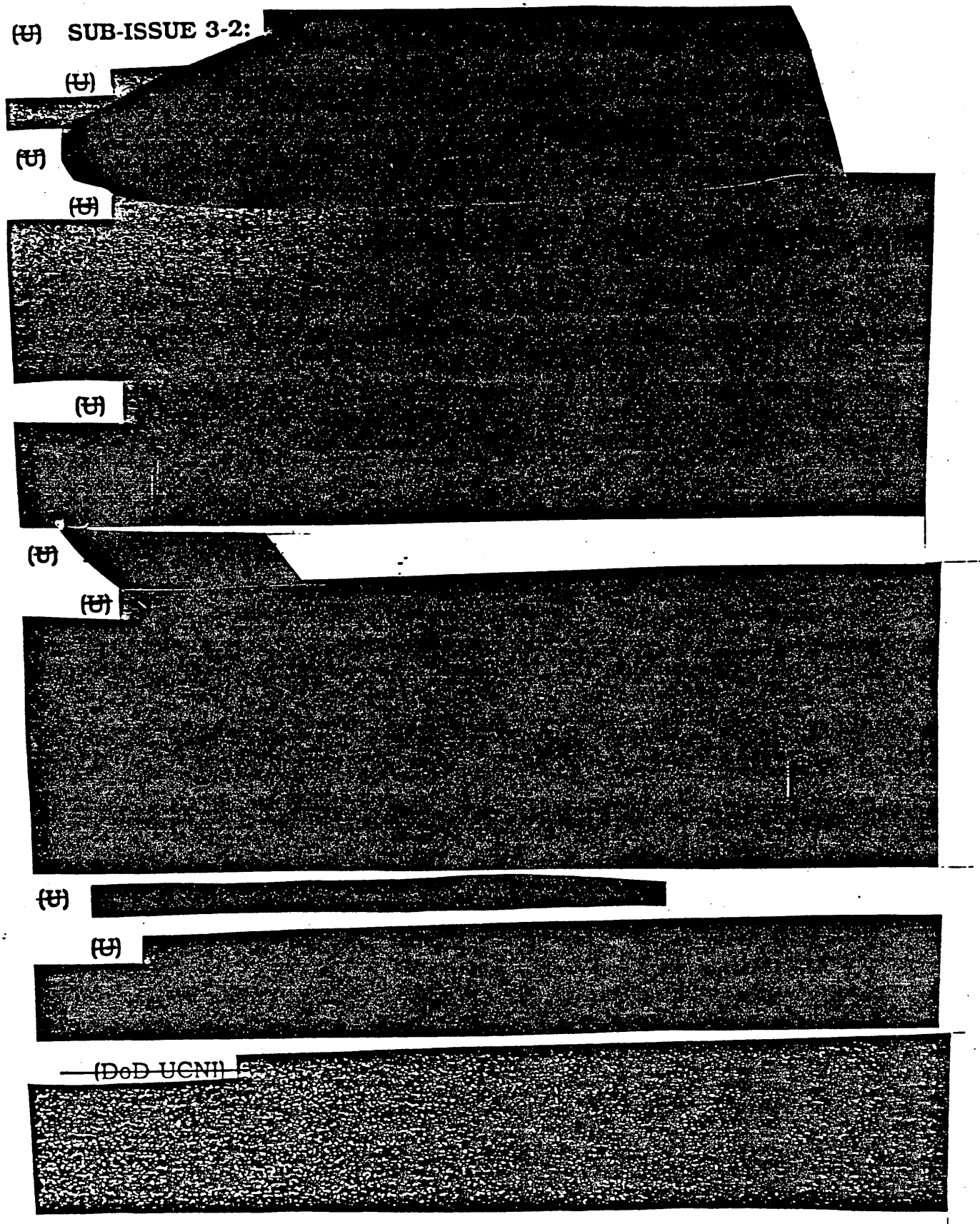
- ***(U) Maintain strong continuing commitment to the highest personnel reliability standards. Specifically maintain a vigorous Personnel Reliability Program (PRP) for DoD and contractor personnel involved in all aspects of nuclear command and control (weapons handling, maintenance and transportation, software read/write access, control/access to nuclear command and control code material, etc.).***

- ***(U) Continue vigorous opposition to current legal challenges to certain background questions on DD Form 398 (DoD Personnel Security Questionnaire (BI/SBI)) and DD Form 398-2 (DoD Personnel Security Questionnaire (National Agency Check)) for those personnel assigned nuclear command and control responsibilities. Current and pending lawsuits, if litigated successfully against the DoD, would prohibit the use of behavioral inquiry in the consideration of personnel for security clearances to sensitive nuclear command and control responsibilities.***

- ***(U) Emphasize the equal importance of initial investigation and reinvestigation in both the selection and the retention of personnel with NCCS responsibilities.***

- *(U) For personnel assigned to the NCCS, ensure every appropriate precaution is taken to enhance personnel reliability. In accordance with national guidance, administer random and aperiodic counter-intelligence scope polygraph examinations to those individuals who are assigned to "specially designated nuclear command and control positions."*

(U) SUB-ISSUE 3-2:



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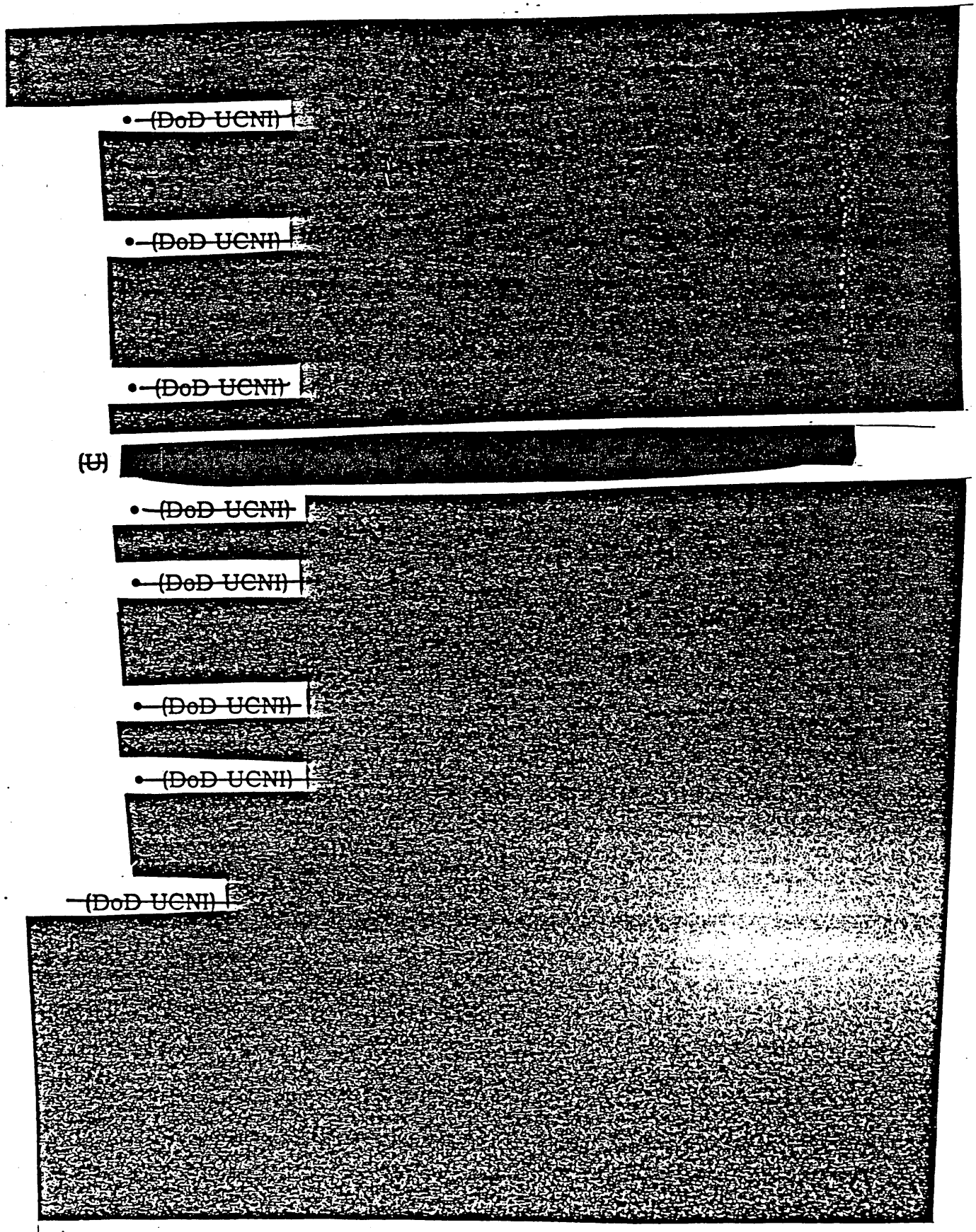

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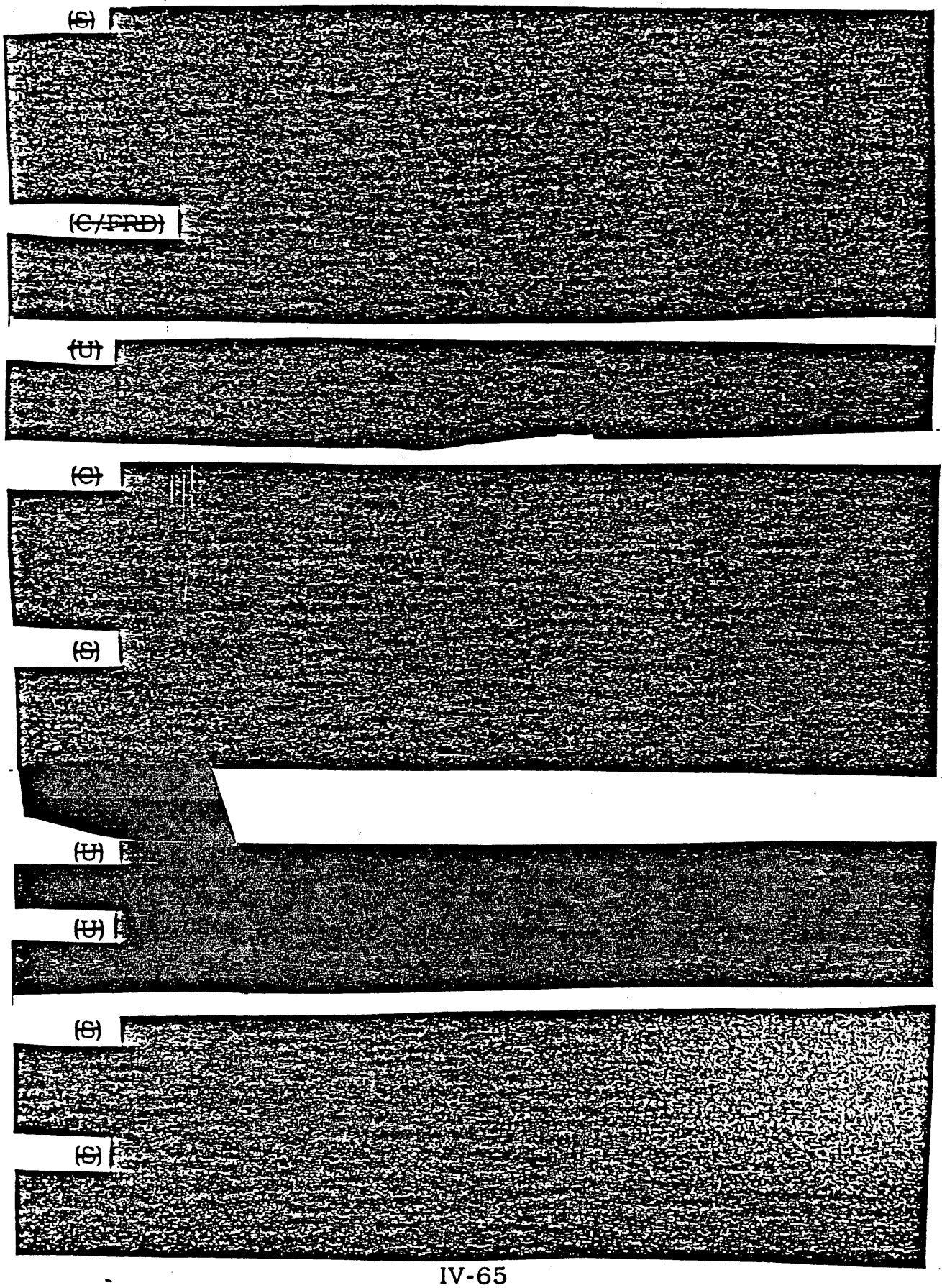

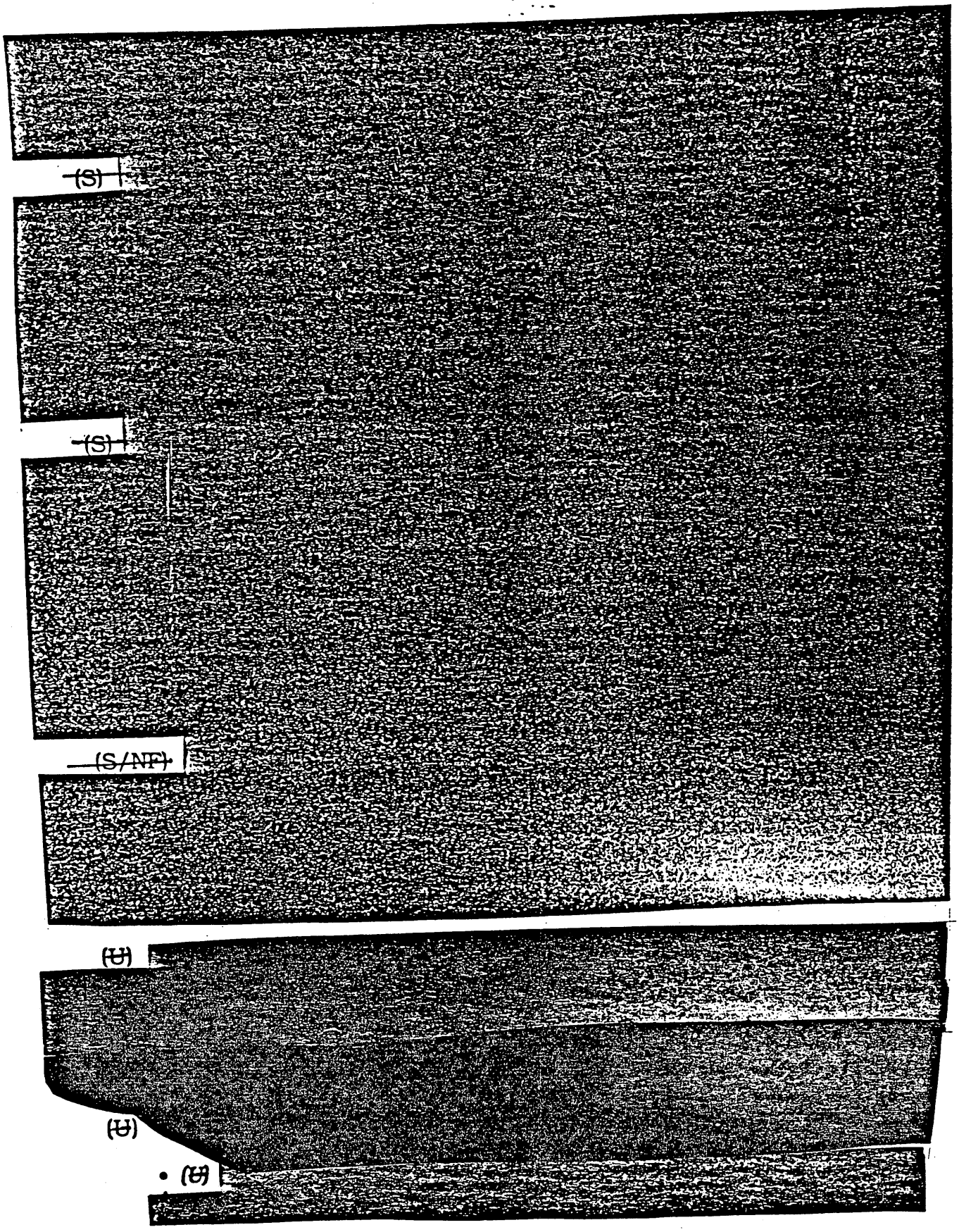

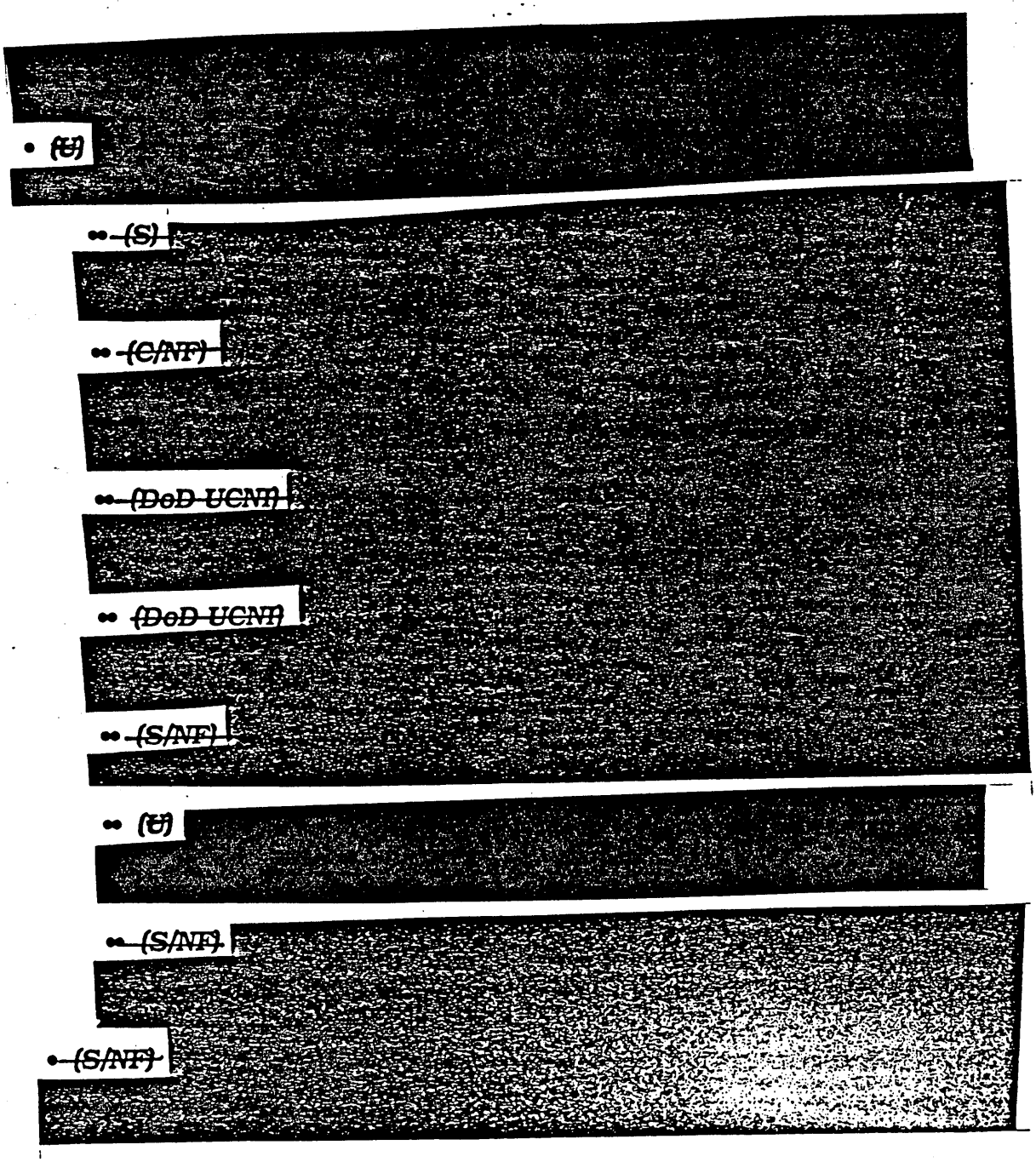

(U) SUB-ISSUE 3-3: COMPUTER AND INFORMATION SECURITY

(U) Are computer and information security adequately maintained in light of the evolving threat? What enhancements should be made?

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(U) METHODOLOGY

(U) Personnel from both the NCCS Assessment Study Group and the Weapons System Review Study Group conducted site visits and detailed research and analyses of NCCS facilities using automated systems. Additionally, discussion papers on specific points were prepared by both the staff and supporting agencies and provided to the Advisory Committee. Outside experts also briefed the Advisory Committee on appropriate aspects. The Advisory Committee specifically directed detailed investigation of: potential vulnerabilities of automated nuclear command and control systems, both to computer "hackers" and to insiders circumventing procedural controls intent on modifying NCCS software; vulnerabilities to a wide range of physical attacks or natural disasters; and potential vulnerabilities caused by inadequate control over various phases of automated system hardware, software or firmware development or acquisition.

(U) The NCCS Assessment Study Group assigned a Red Team to investigate whether insiders or outside hackers, circumventing procedural controls by modifying NCCS software, could cause an unauthorized launch or release of nuclear weapons. The Red Team reviewed the process flow diagrams to identify all command, control and communications systems that are used to prepare, inject, relay, or receive EAMs. The Team visited representative sites to examine physical security and software procedures and to determine the degree of difficulty involved in gaining access to key EAM handling systems. Independent of the Study Group efforts, the Advisory Committee asked the National Security Agency to assess the security of computer systems used in nuclear weapon systems and the nuclear command and control communications system.

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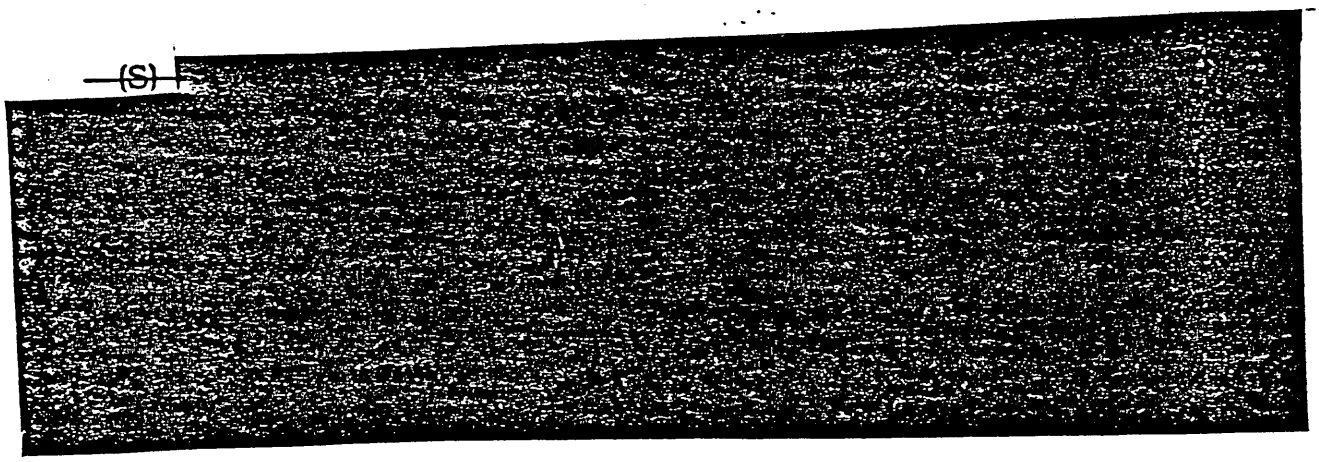

(U) Additional briefings were received on results and methodology used for adversarial analyses of software in the TOMAHAWK cruise missile and ICBMs.

(U) Assessment of this issue was also supported by the NCCS Assessment Study Group's investigation of the possibility of false attack warning due either to insiders or hackers. The observations, conclusions and recommendations pertaining to that issue are discussed in an earlier section. However, many points germane to the overall issue of information security were noted during this investigation and are discussed in this section.

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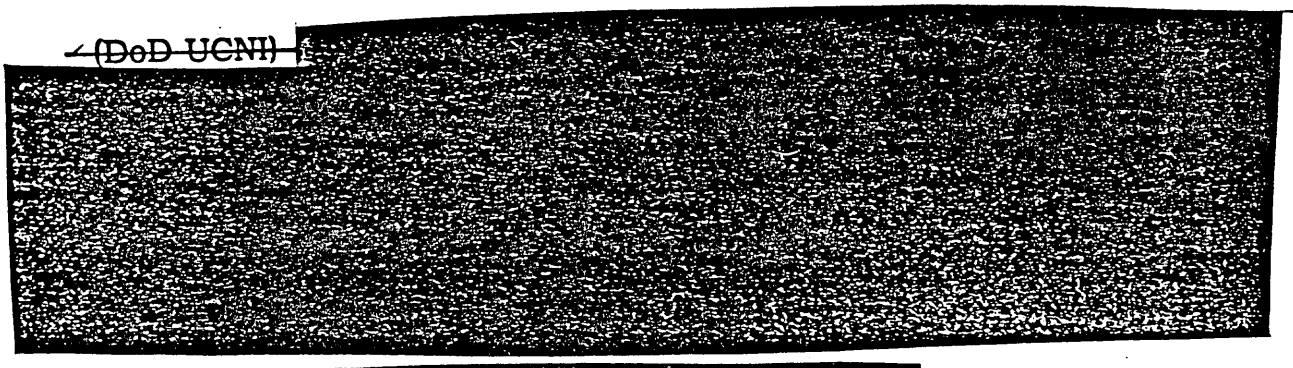

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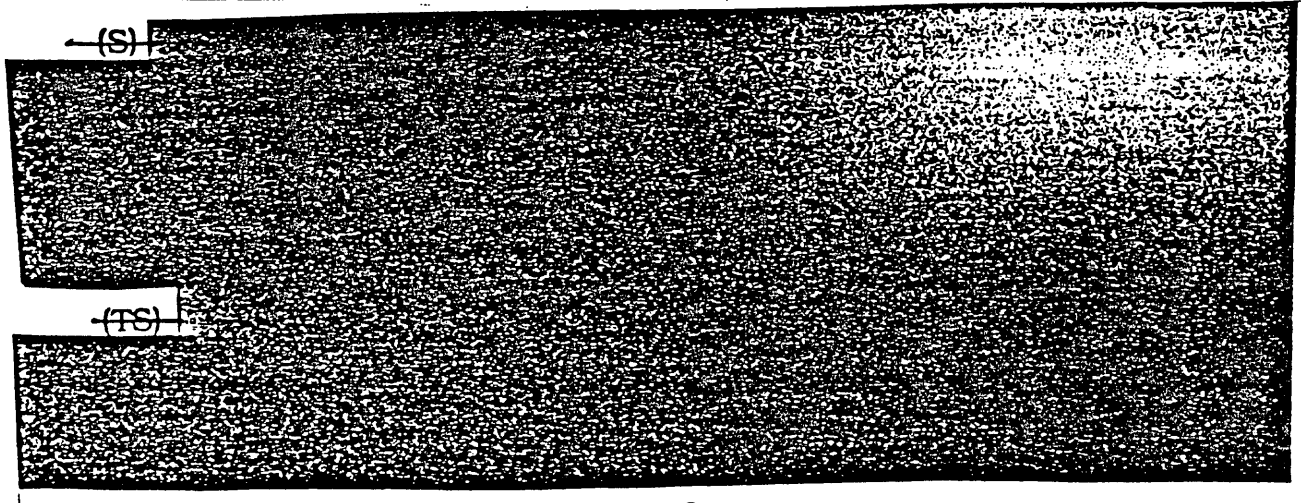

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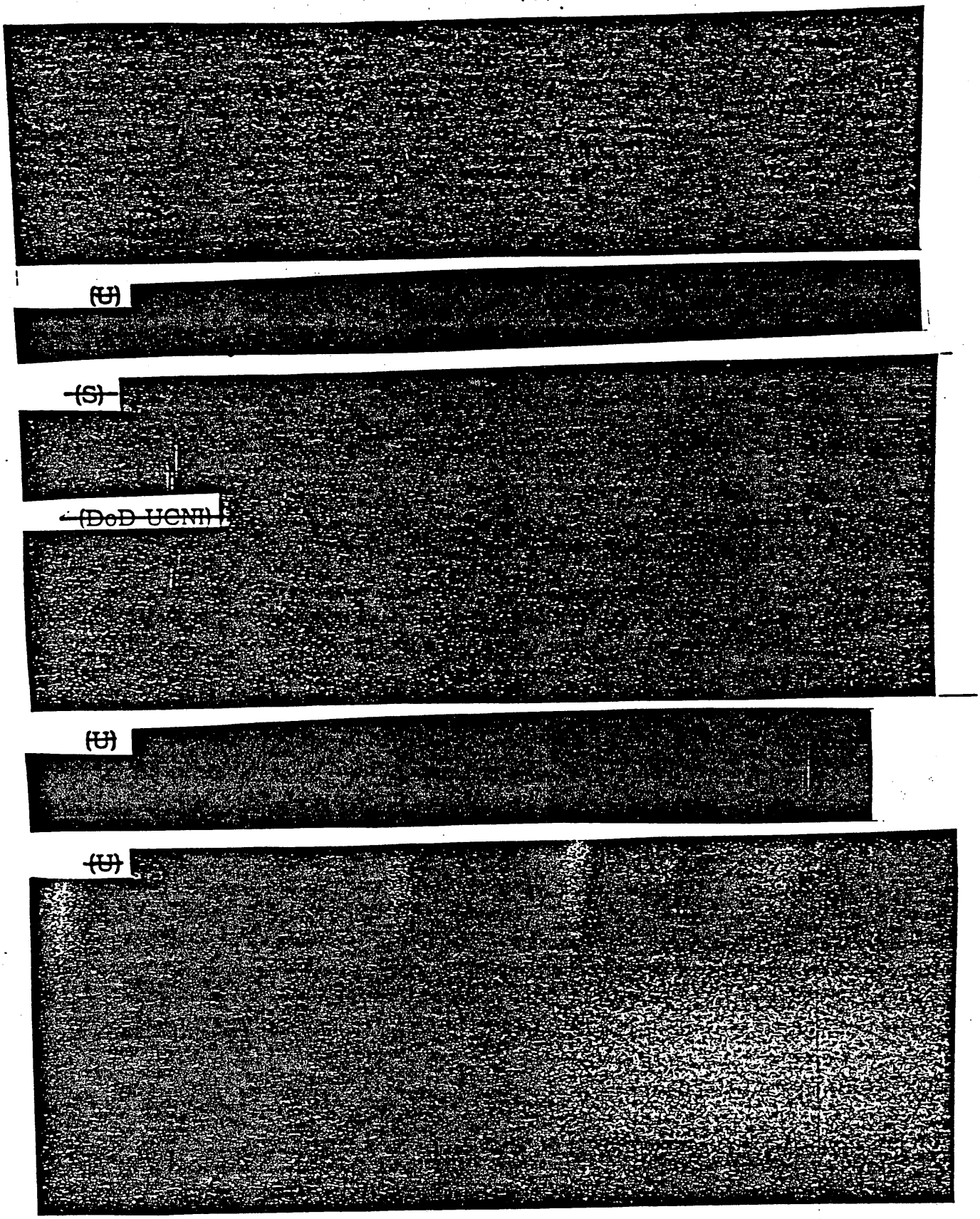

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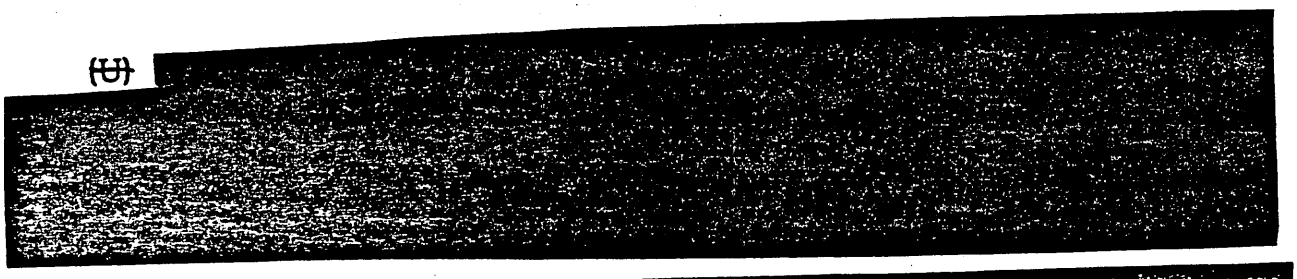

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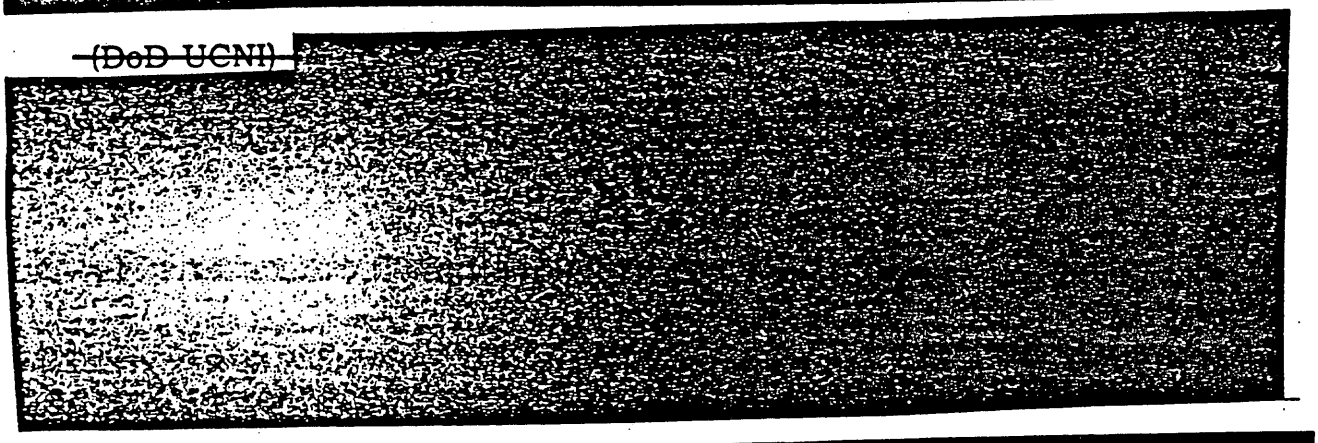

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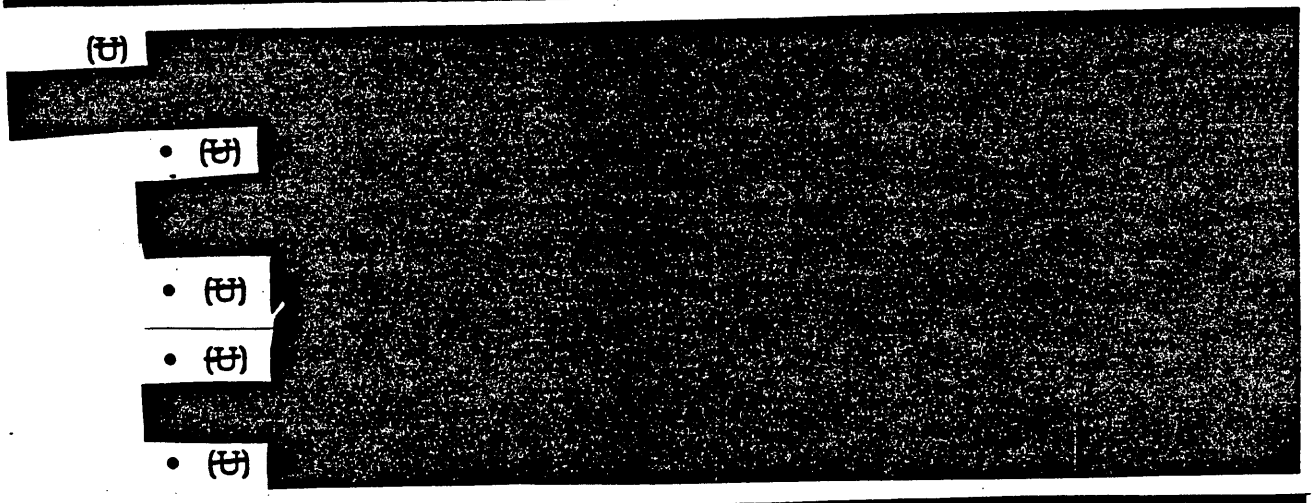

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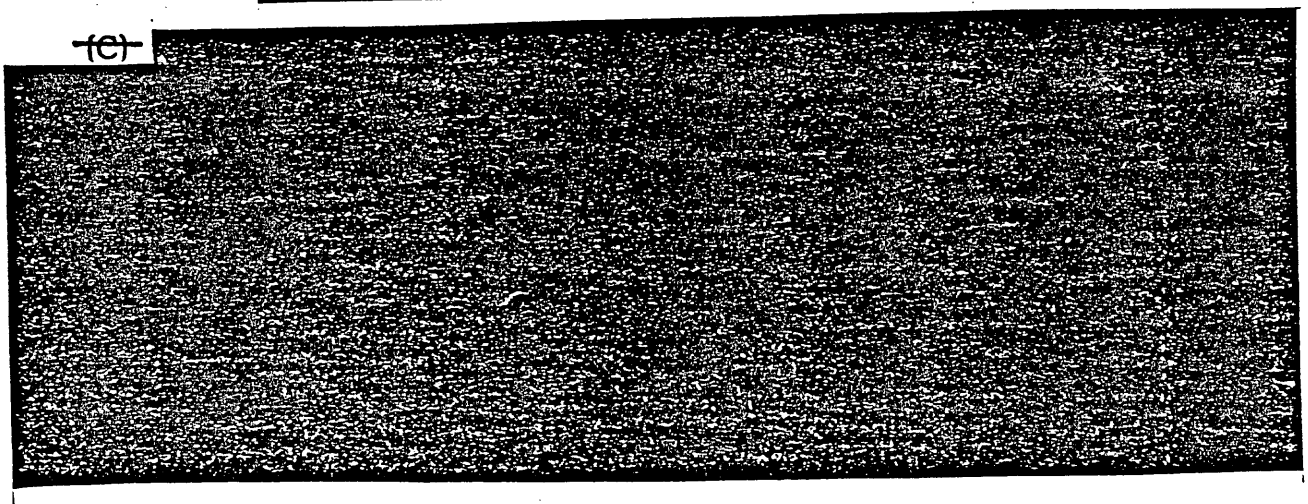

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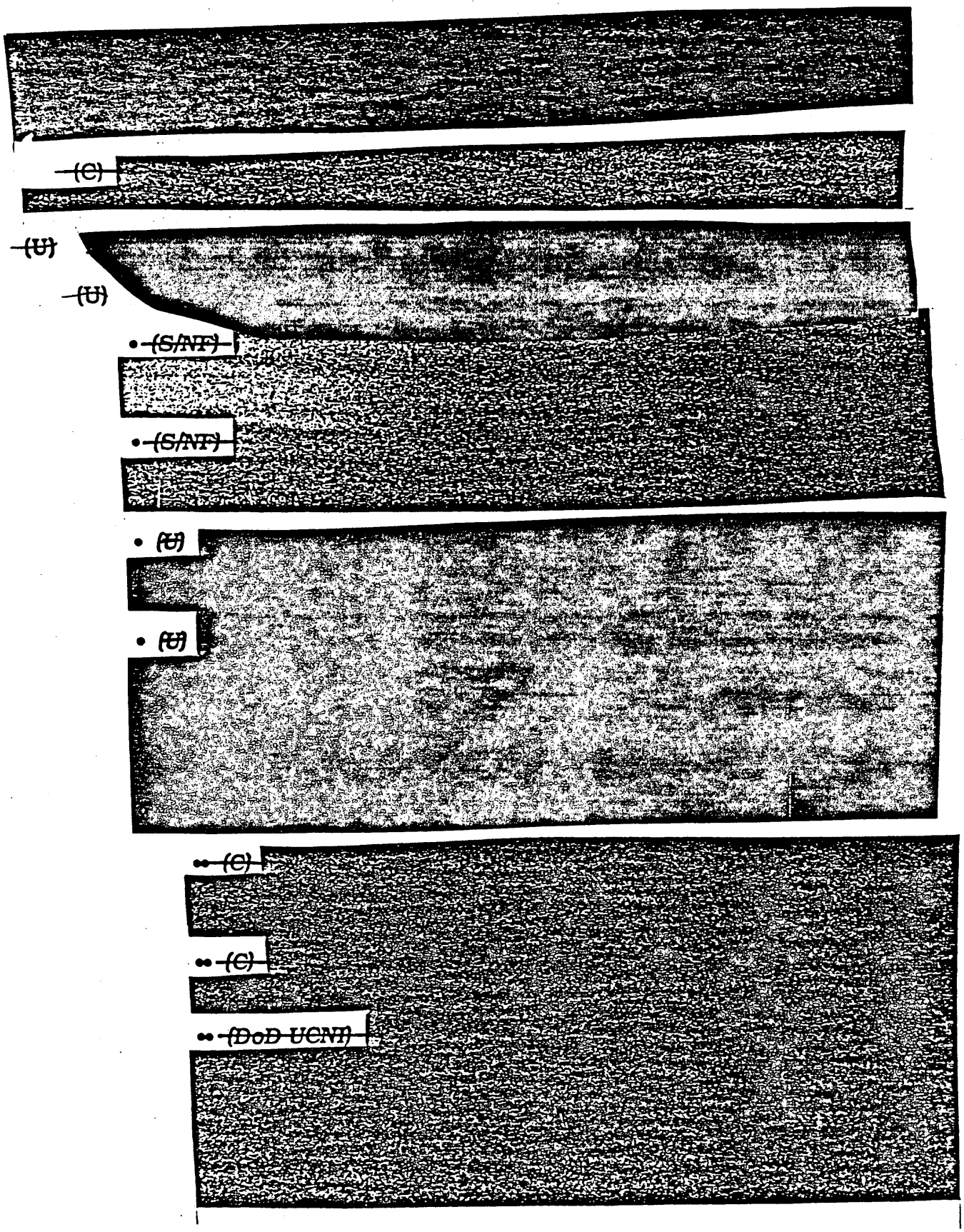

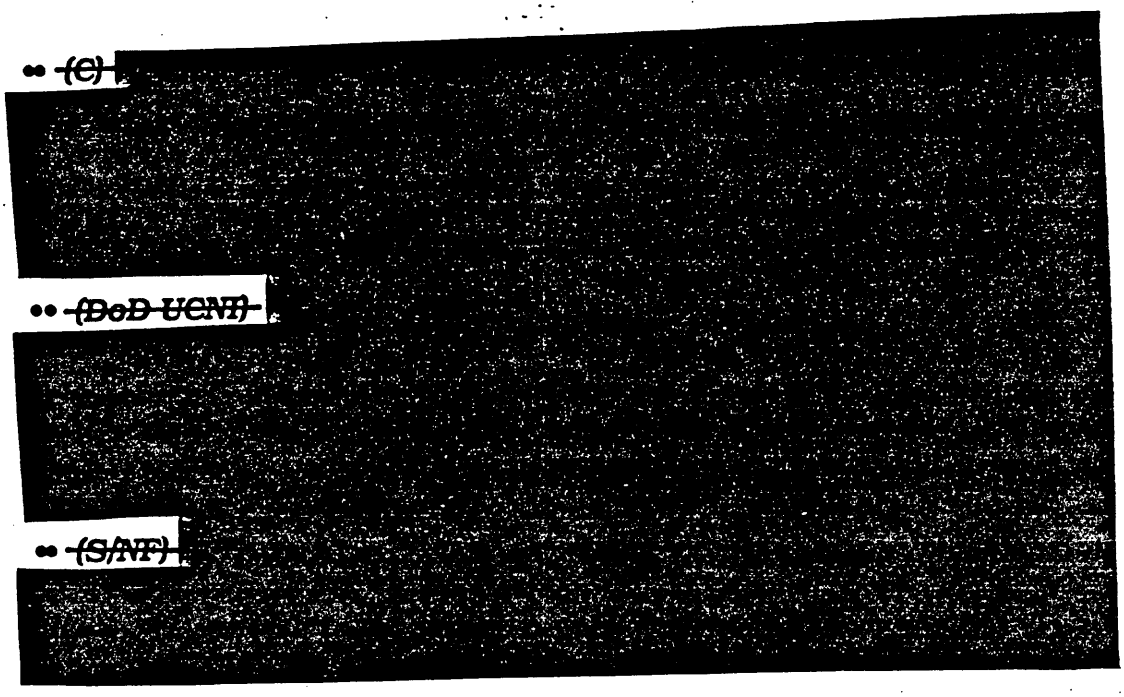

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(U) SUB-ISSUE 3-4: DELAY AGAINST UNAUTHORIZED USE

(U) What means of protection can prevent unauthorized use of a nuclear weapon if physical control is lost to an adversary?

(U) BACKGROUND

(U) The overall system of maintaining the required standards of safety, security and control to prevent unauthorized or inadvertent use is based upon a multi-layered approach as discussed in Chapter Three (Figure 4). This series of mutually reinforcing safeguards and positive measures addresses all aspects of the weapon life-cycle to include: personnel reliability; physical security; weapon design (including use control devices, safety advances, and environmental sensing devices); procedures; and recapture/recovery if control is lost. This approach recognizes that while the maintenance of actual physical control of a weapon in a safe environment is paramount, no single factor can be made perfect under every condition.

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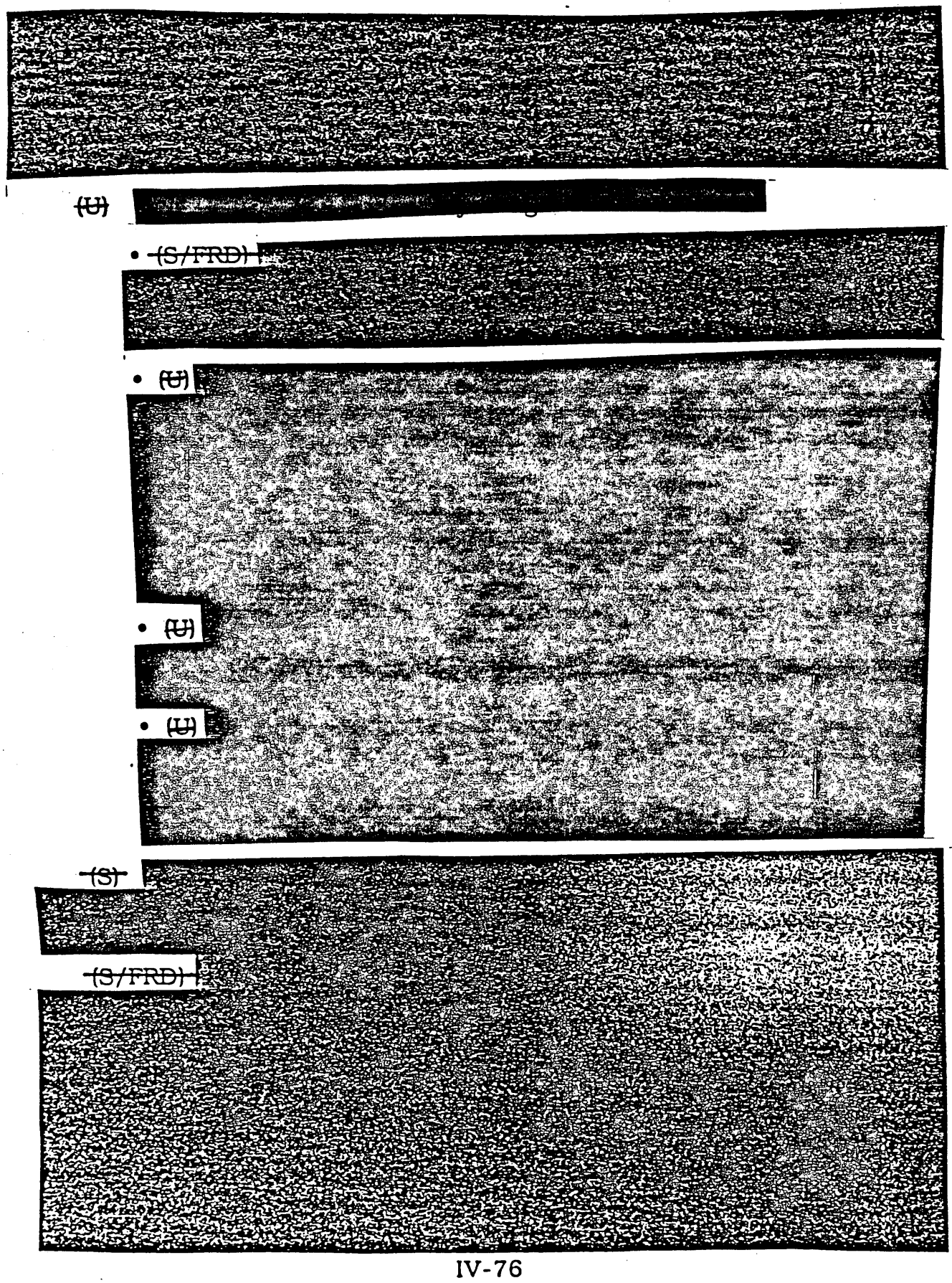

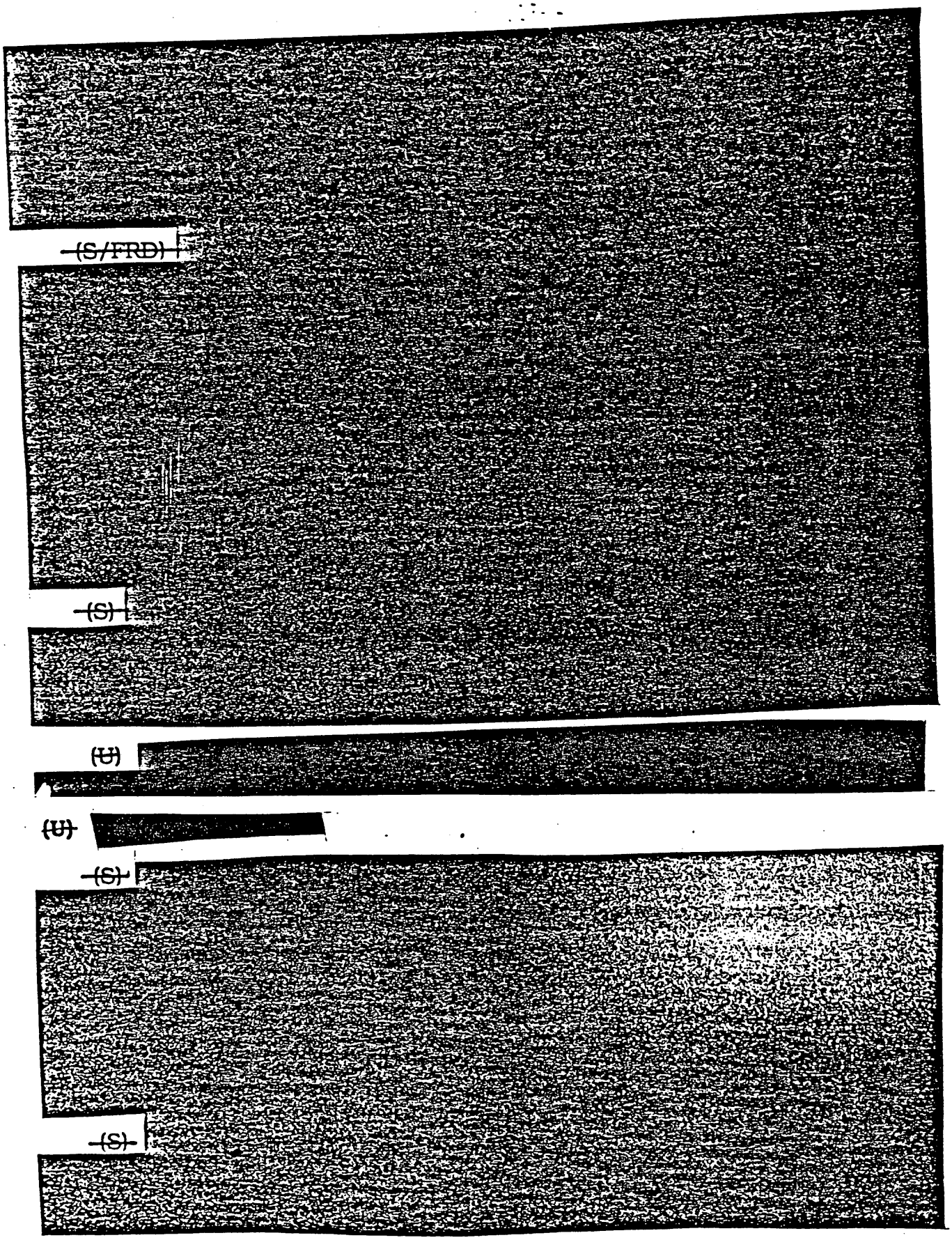

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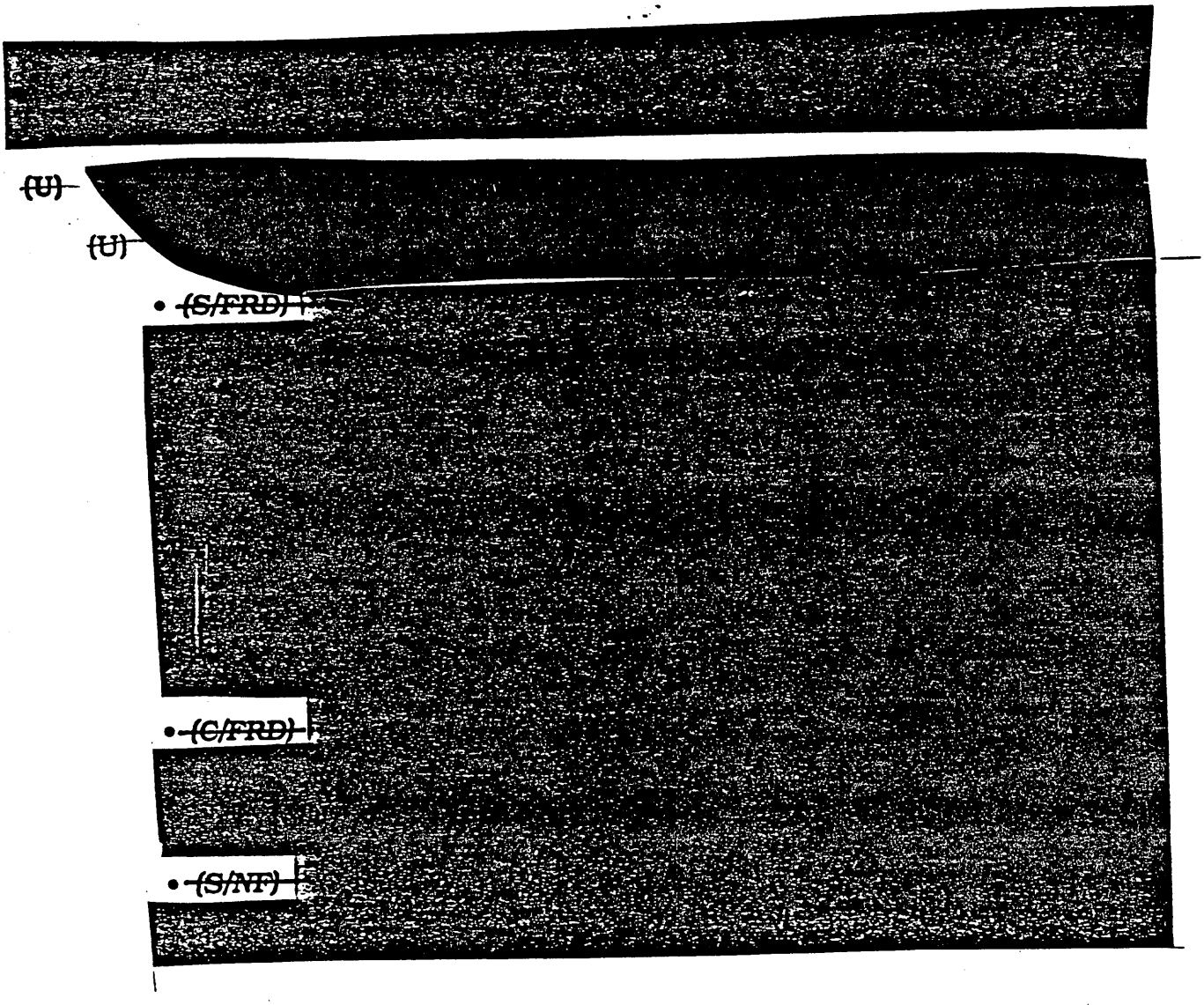
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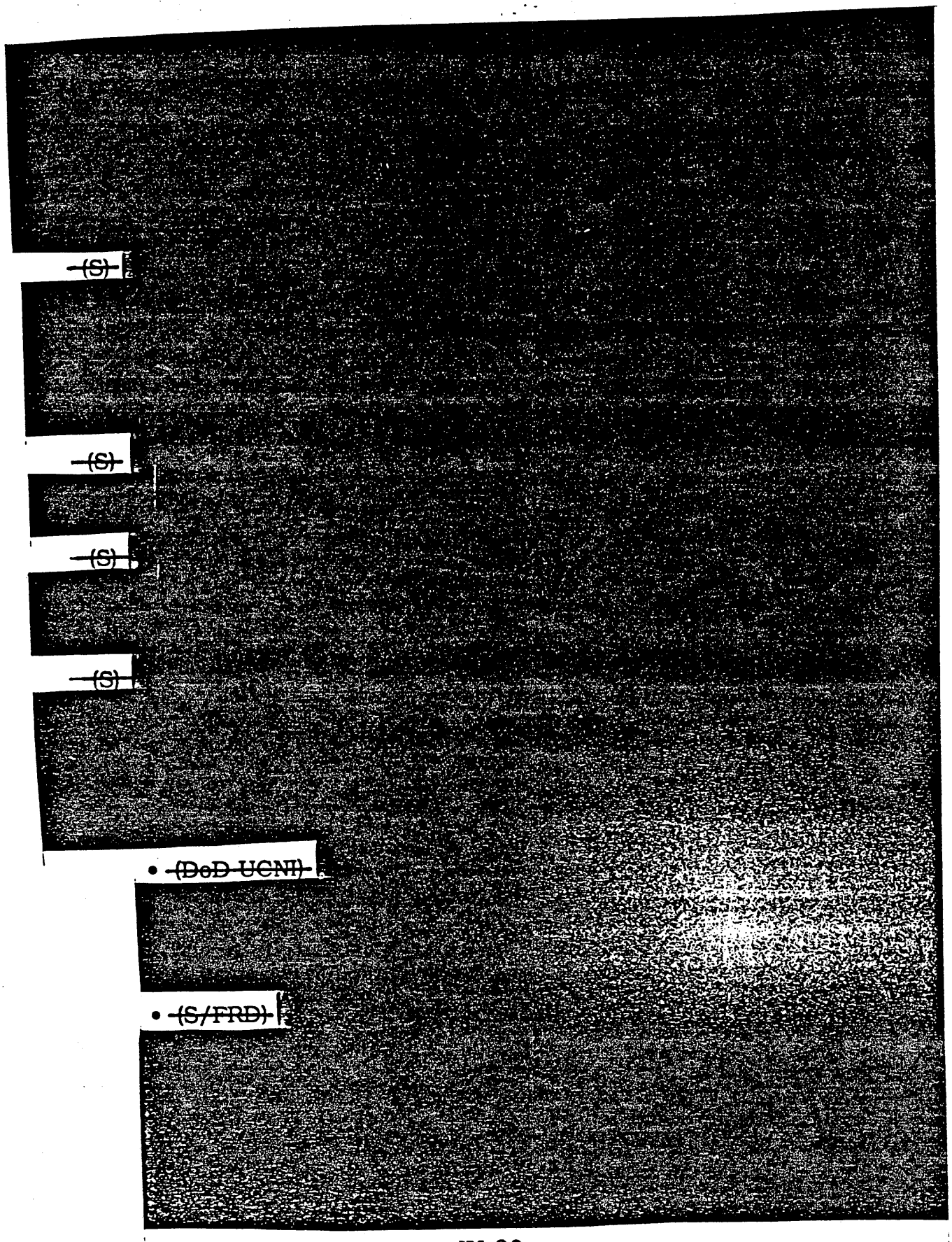

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(U) RECOMMENDATIONS

(U) The Advisory Committee recommends the Secretary of Defense:

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CHAPTER FIVE
NUCLEAR COMMAND AND CONTROL SYSTEM OVERSIGHT AND POLICY (U)

(U) ISSUES

(U) Among the specific issues considered by the Advisory Committee were:

- (U) What measures should be taken to improve oversight of the Nuclear Command and Control System (NCCS)?

- (U) Should the DoD develop a consolidated positive measures policy that addresses all nuclear weapons safety, security, and control requirements (including positive control devices, materials and procedures) to increase confidence in our ability to prevent unauthorized or inadvertent use of nuclear weapons? If so, what should be included in this policy?

(U) BACKGROUND

(U) Effective and demanding oversight of all aspects of the NCCS is an essential element of the system for a safe and reliable nuclear deterrent force. Due to the complexity and scope of the NCCS, this oversight system itself is very complex, with responsibilities assigned to many offices and organizations.

(U) NCCS oversight is conducted at all echelons within DoD and is characterized by two types of oversight.

- (U) Line Oversight: Directive authority to review, monitor and/or assess NCCS elements by agents who are assigned primary line responsibilities within the area of concern.

- (U) Independent Oversight: Directive authority to review, monitor and/or assess NCCS elements by agents who have no primary line responsibility within the area of concern.

(U) The Advisory Committee examined this issue to determine if the oversight structure and mechanisms are overly complex, to determine if consistency in the application of standards and requirements is being maintained, to determine if the oversight system can respond effectively to the changing environment, and to evaluate the effectiveness of follow-up on oversight comments and results.

(U) METHODOLOGY

(U) The Advisory Committee's review of NCCS oversight focused on a detailed and thorough evaluation of the structure, organization, and effectiveness of the organizations and agencies within DoD with NCCS responsibilities. The initial assessment was conducted by the U.S. Nuclear Command and Control System Support Staff and included a complete examination of governing documentation, discussions with oversight staffs, agencies and commands, and the development of descriptive diagrams which illustrate oversight mechanisms. A formal briefing was developed and presented to the Advisory Committee. Following the briefing and extended discussions, key judgments and recommendations were developed.

(U) Additionally, the Policy and Requirements Study Group examined oversight. This study group was chaired by the Director of Strategic Forces Policy, from the Office of the Assistant Secretary of Defense for International Security Policy. The group included representatives from the National Security Council, appropriate offices of the Secretary of Defense, responsible defense agencies, the Joint Staff, and the Services. It conducted an extensive review of U.S. policy documents pertinent to nuclear failsafe and risk reduction. The Study Group identified criteria for the document review, developed review checklists to provide uniform assessments, and reported review results.

(U) The review included:

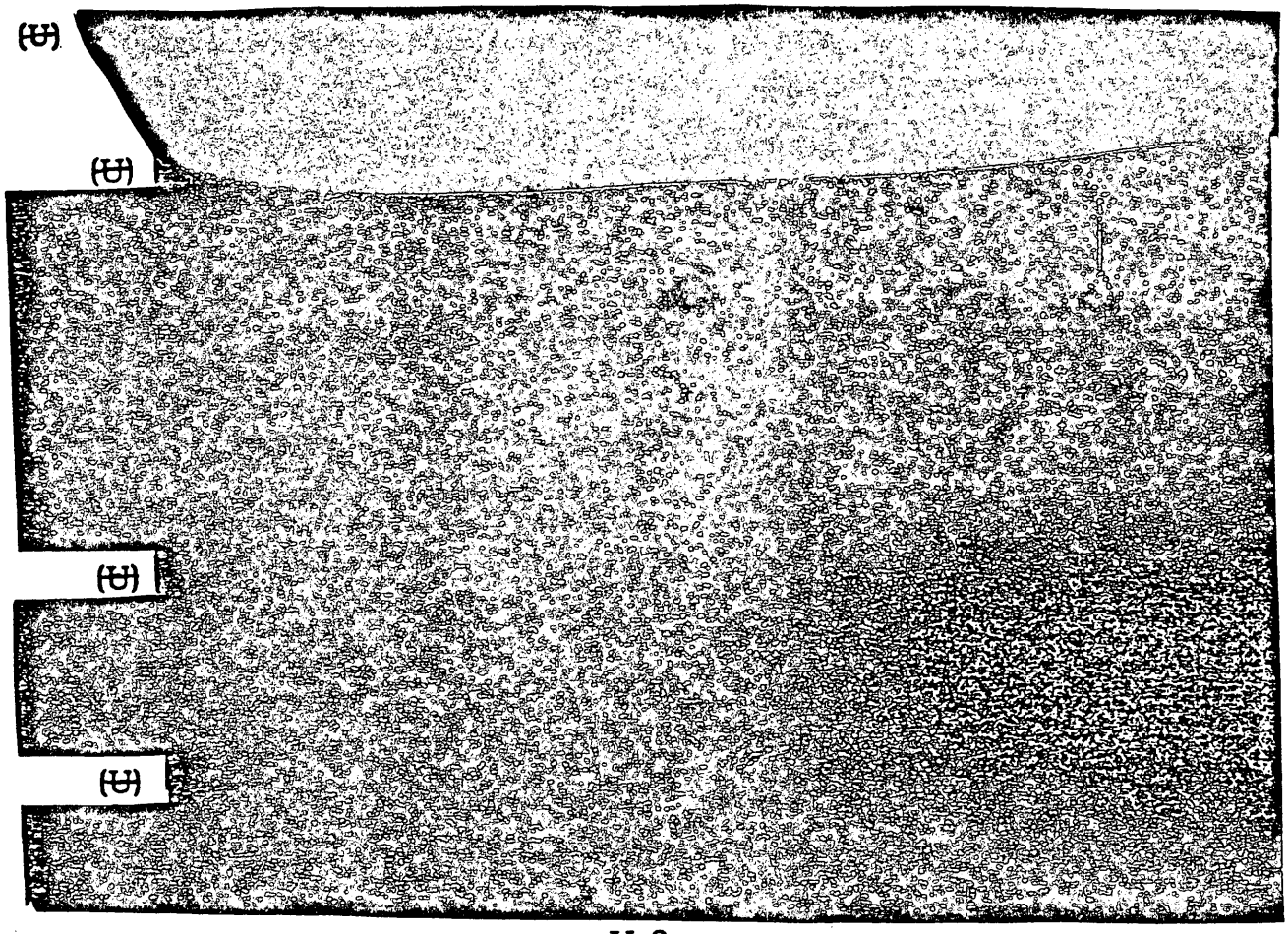
- (U) 28 pertinent arms control and disarmament agreements.
- (U) 31 national policy document (National Security Decision Directives and National Security Directives)
- (U) 18 DoD directives and instructions
- (U) The Policy Guidance for the Employment of Nuclear Weapons (NUWEP)
- (U) The FY 1992-1997 Defense Planning Guidance (DPG)
- (U) 12 Joint Staff Publications

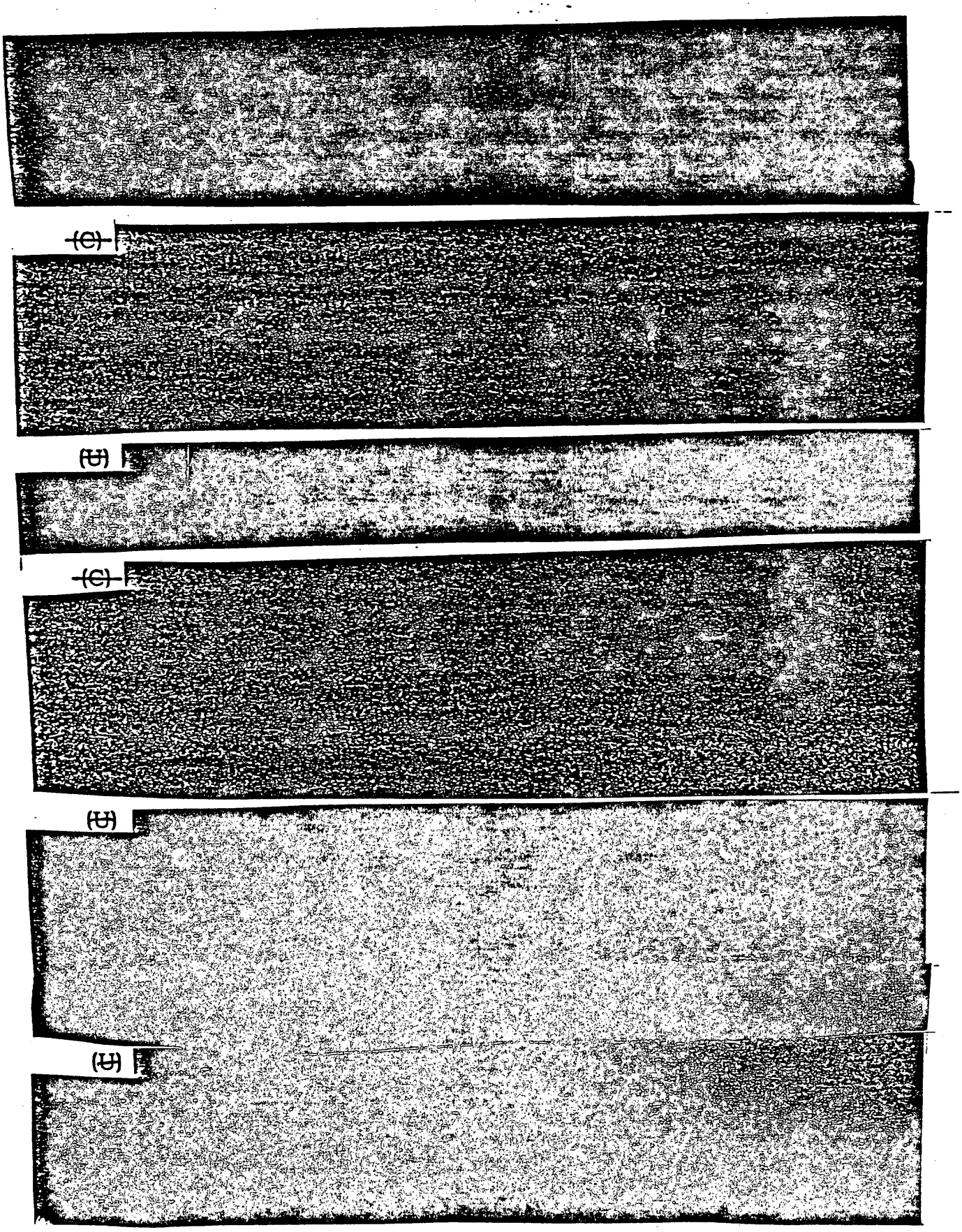
(U) The Advisory Committee also investigated whether a need existed for the development of a consolidated positive measures policy that addresses all aspects and requirements of nuclear weapons safety, security, and control in a single document. The Policy and Requirements Study Group was assigned to examine this issue.

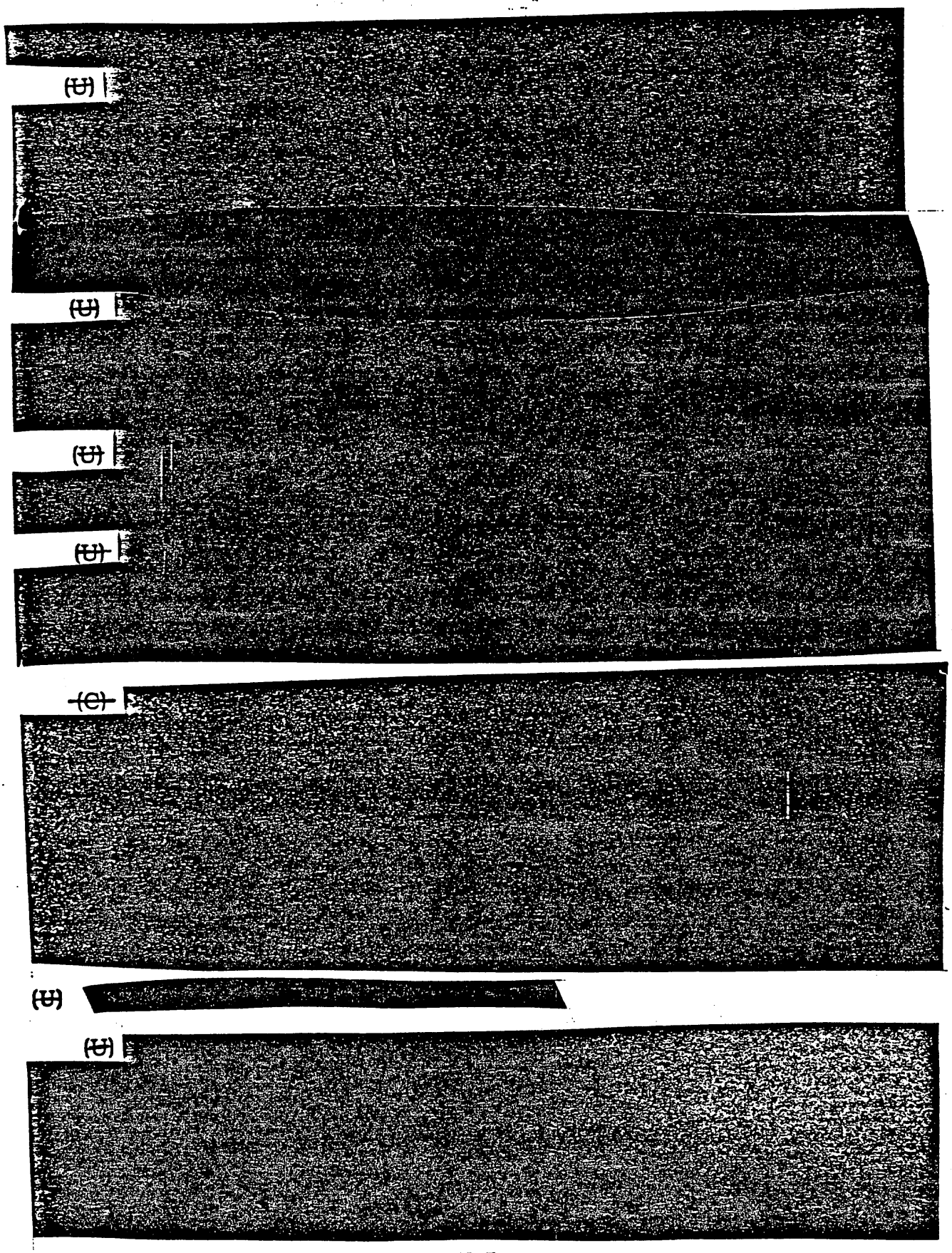
(U) In response to a specific request from the Advisory Committee, an additional review examined DoD nuclear weapons safety and security policy and the adequacy of its implementation in the Services and NATO.

(U) The Policy and Requirements Study Group coordinated with the other Working and Study Groups to assess their proposals and to provide recommendations on potential policy implications. The Group also examined the specific issues associated with a proposed comprehensive positive measures policy, enhanced external control over naval weapons, a post-launch destruct system for nuclear weapon systems, and the peacetime readiness posture of ballistic missiles. These reviews consisted of a series of meetings and discussions centering on the policy ramifications of each of these proposals. Alternative approaches were considered and recommendations were briefed to the Advisory Committee.

(U) As a part of the oversight review, the Weapons Systems Review Study Group specifically examined the management structure within DoD for the conduct of nuclear weapons systems Unauthorized Launch Analyses. Briefings were received on Unauthorized Launch Analysis methodologies used for various weapons systems, the methodology to determine the adequacy of security at all Army nuclear weapon storage sites, and on various adversarial analyses. The Group compared observations and data from the preceding with DoD standards and criteria, to determine if gaps or deficiencies existed. The group formulated draft recommendations and the proposed summary and recommendations were reviewed for factual correctness by organizations having related program responsibilities.







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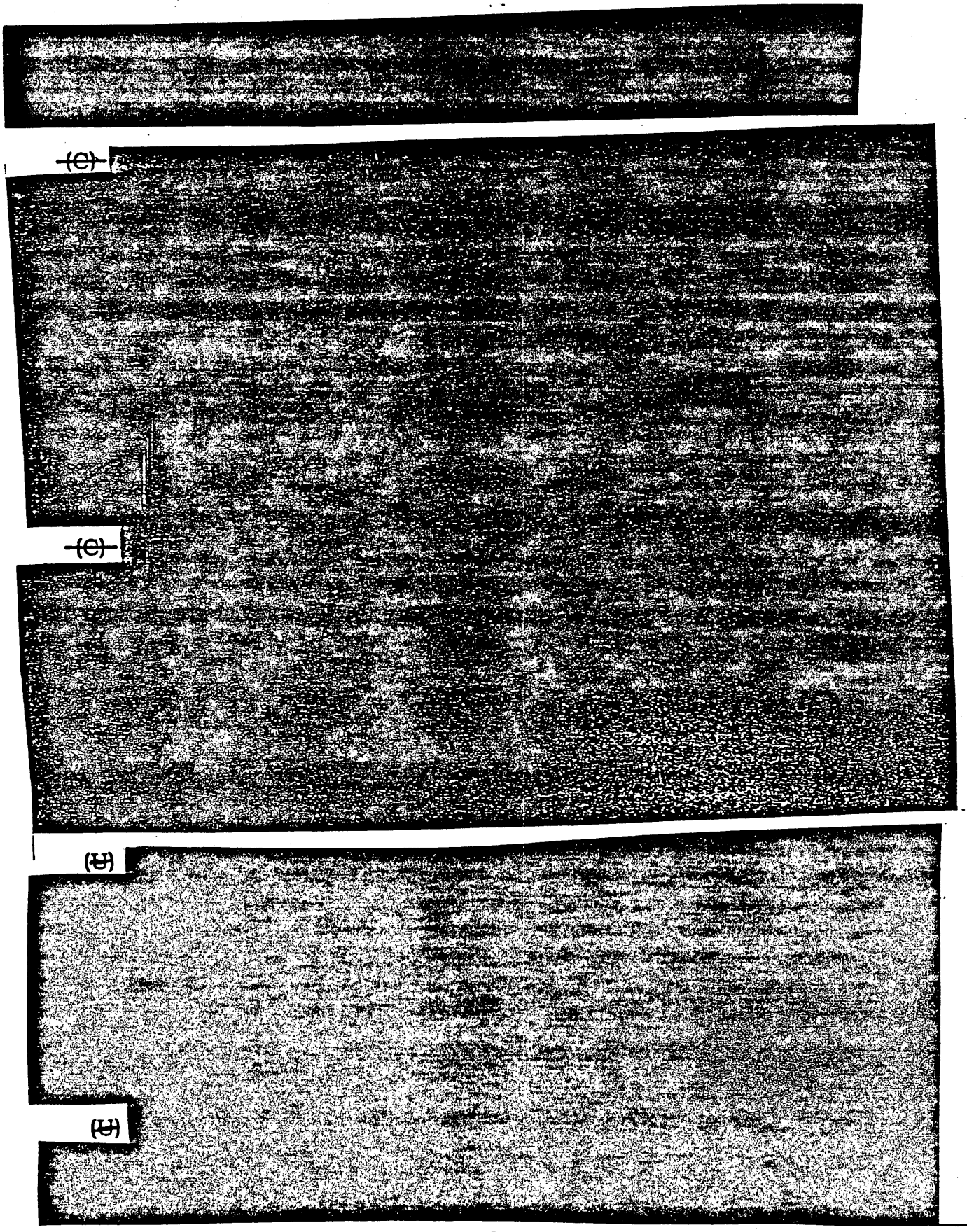

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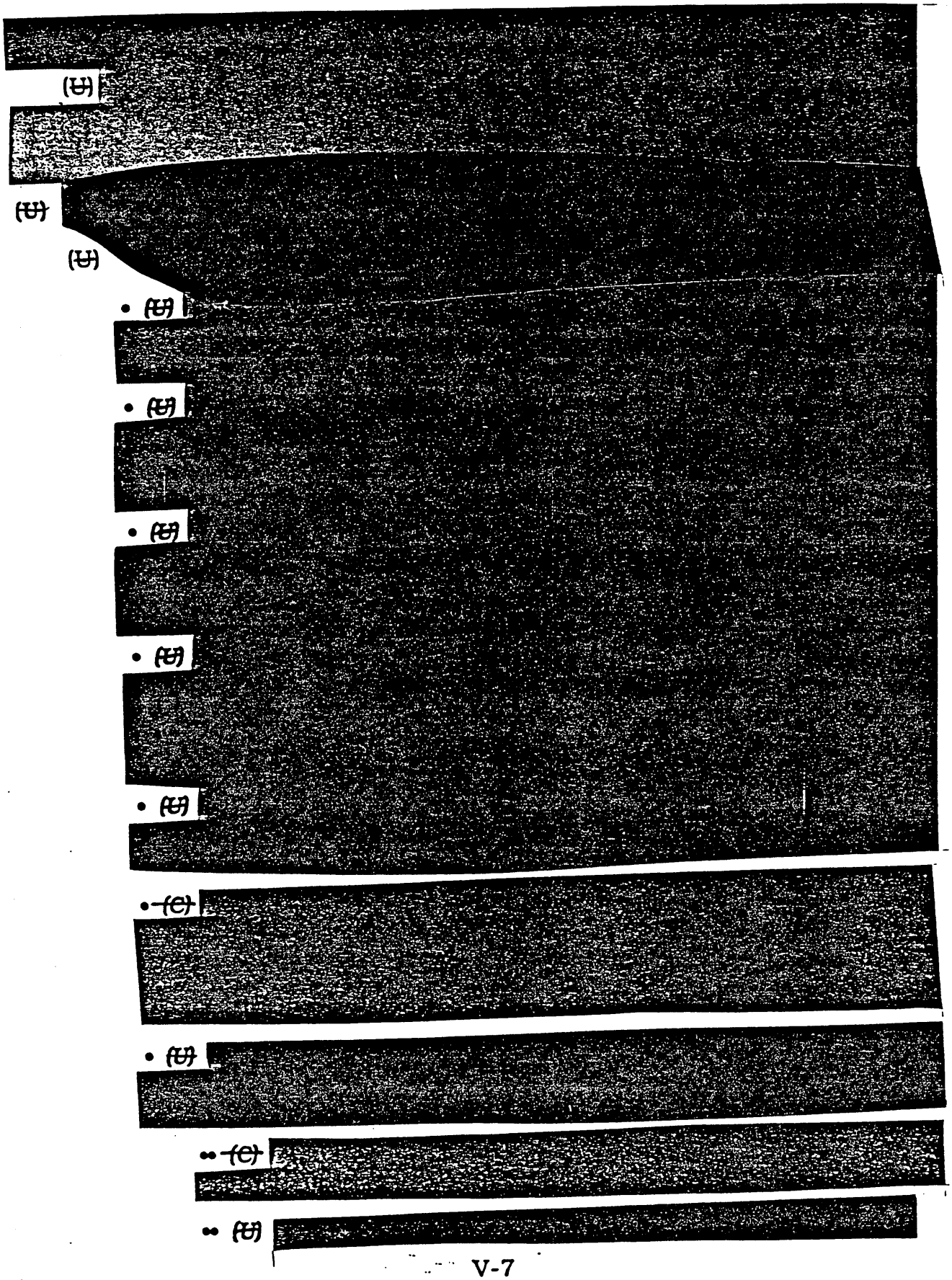

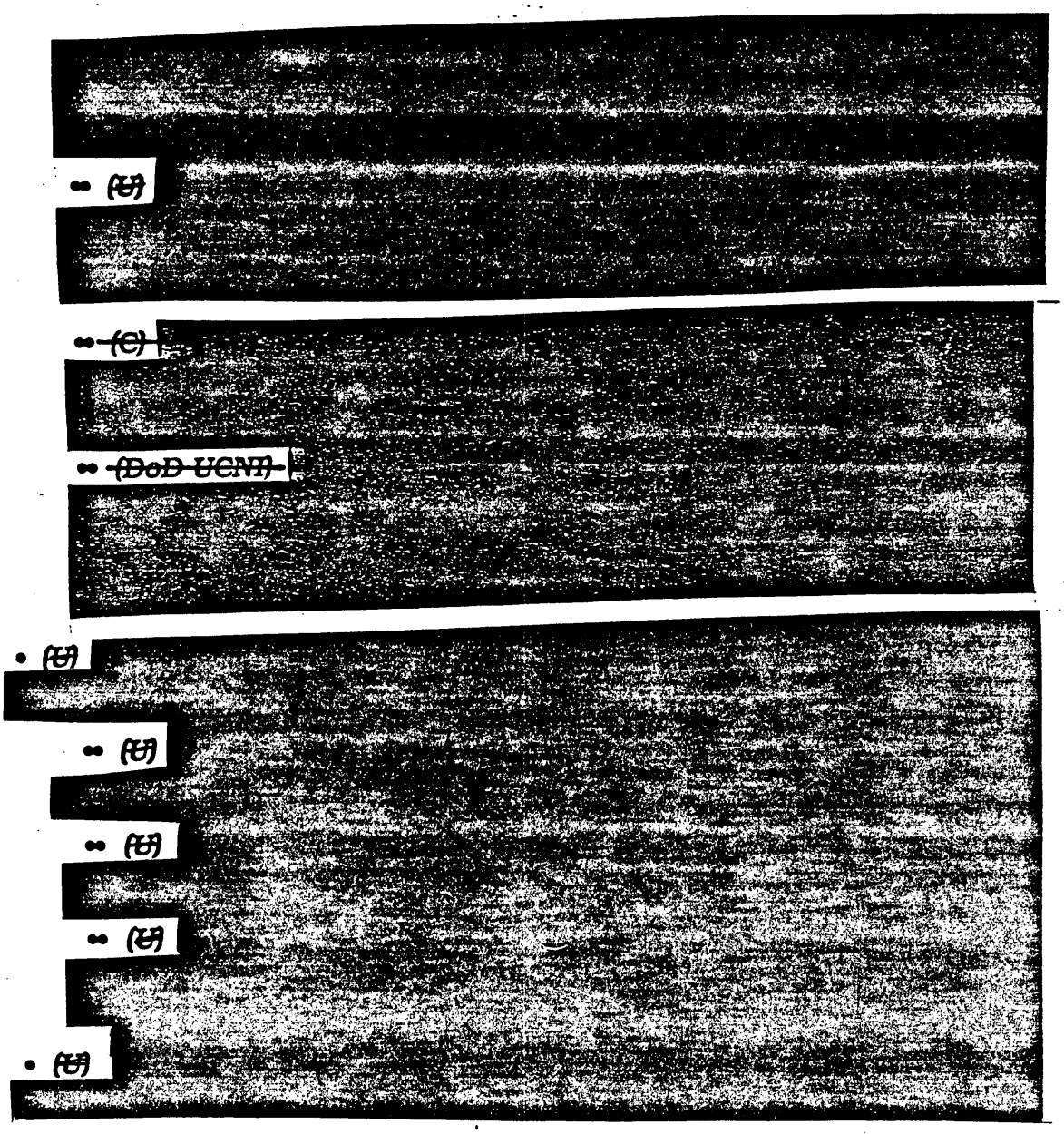

CHAPTER SIX
RISK REDUCTION (U)

(U) The Advisory Committee considered two broad issues in its risk reduction[1] deliberations:

- (U) What confidence-building and predictability measures (including sharing of appropriate technologies, systems, information and procedures) should be implemented to reduce the risk of nuclear hostilities with any power?

- (U) Given the dramatically altered world situation and changing strategic threat, what measures should be taken to improve U.S. intelligence collection and analysis such that information on nuclear weapons and devices is provided with sufficient accuracy and timeliness to enhance the full range of risk reduction measures? Additionally, what measures should be taken to refocus and integrate the efforts of all organizations responsible for both strategic and tactical warning and the tracking and control of proliferation of nuclear weapons, other weapons of mass destruction, and advanced weapons technology?

(U) BACKGROUND

(U) Risk Reduction measures are applicable to the prevention of nuclear hostilities, no matter how these hostilities might be initiated: whether by accident, as an unauthorized act, or as a deliberate attack by a national or sub-national entity. These measures have traditionally been implemented in two forms. The first is direct communications links and associated procedures derived through formal agreements between governments to avoid misinterpretation of intentions or actions and to avoid potentially dangerous confrontations between forces. The second is through arms control negotiations and treaties to limit or prescribe certain behaviors and reduce the size, destructive power, and proliferation of nuclear arsenals. The historical focus of these measures has been to reduce the risks of nuclear war between the superpowers and many such agreements and treaties are in effect.

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[1](U) Risk Reduction: That combination of confidence-building and predictability measures that would reduce the probability of outbreak of nuclear war as a result of accident, miscalculation, misinterpretation, terrorism, or unexpected technological breakthrough. These measures can be taken unilaterally or multilaterally, but in all cases the existence of these measures are communicated with others to ensure their effectiveness. In certain cases, they require multilateral participation.

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(U) Dramatic changes in the international security environment call for a reevaluation of risk reduction efforts. New risk reduction initiatives, concepts and dialogues may become increasingly germane in confronting the new challenges and opportunities of the twenty-first century.

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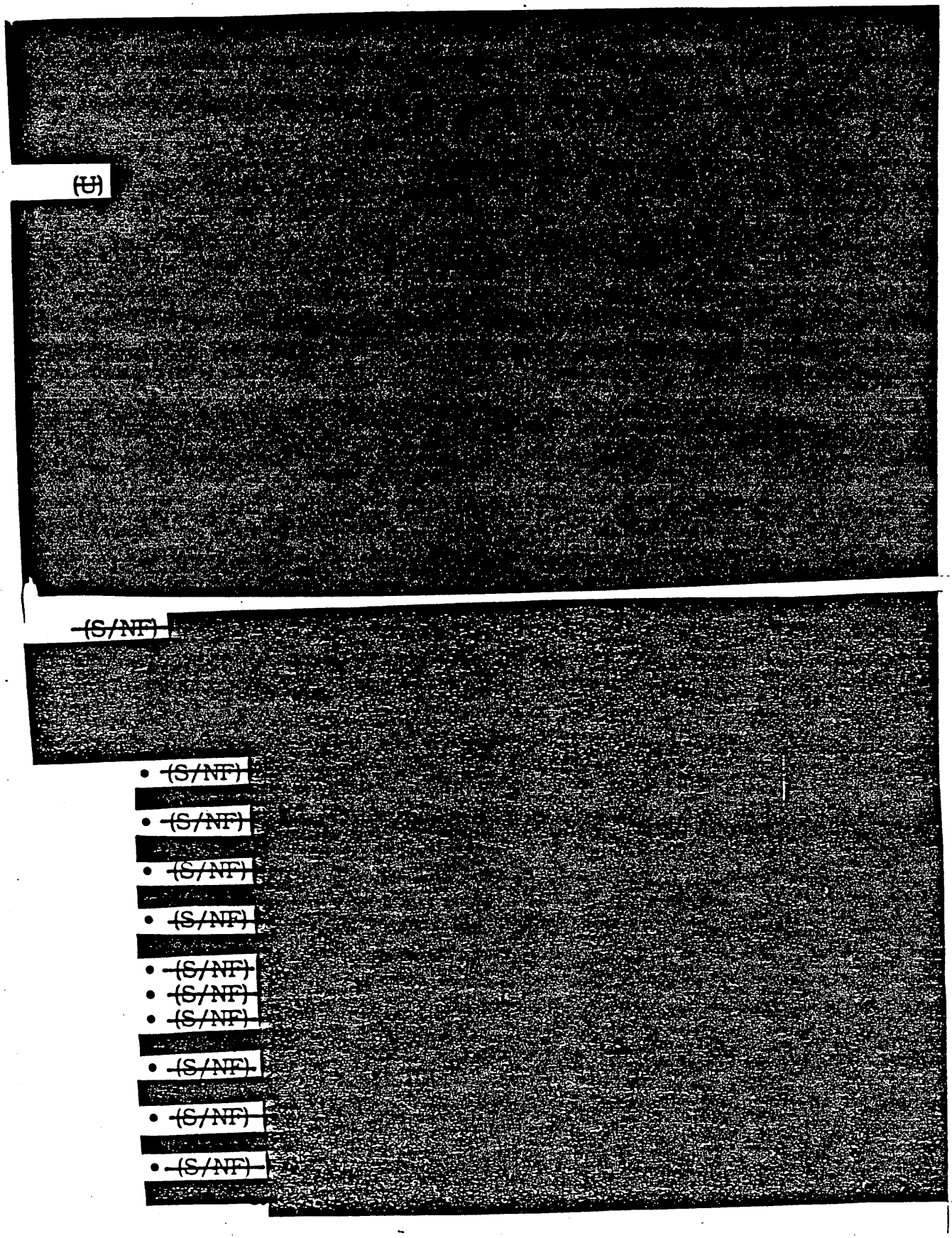
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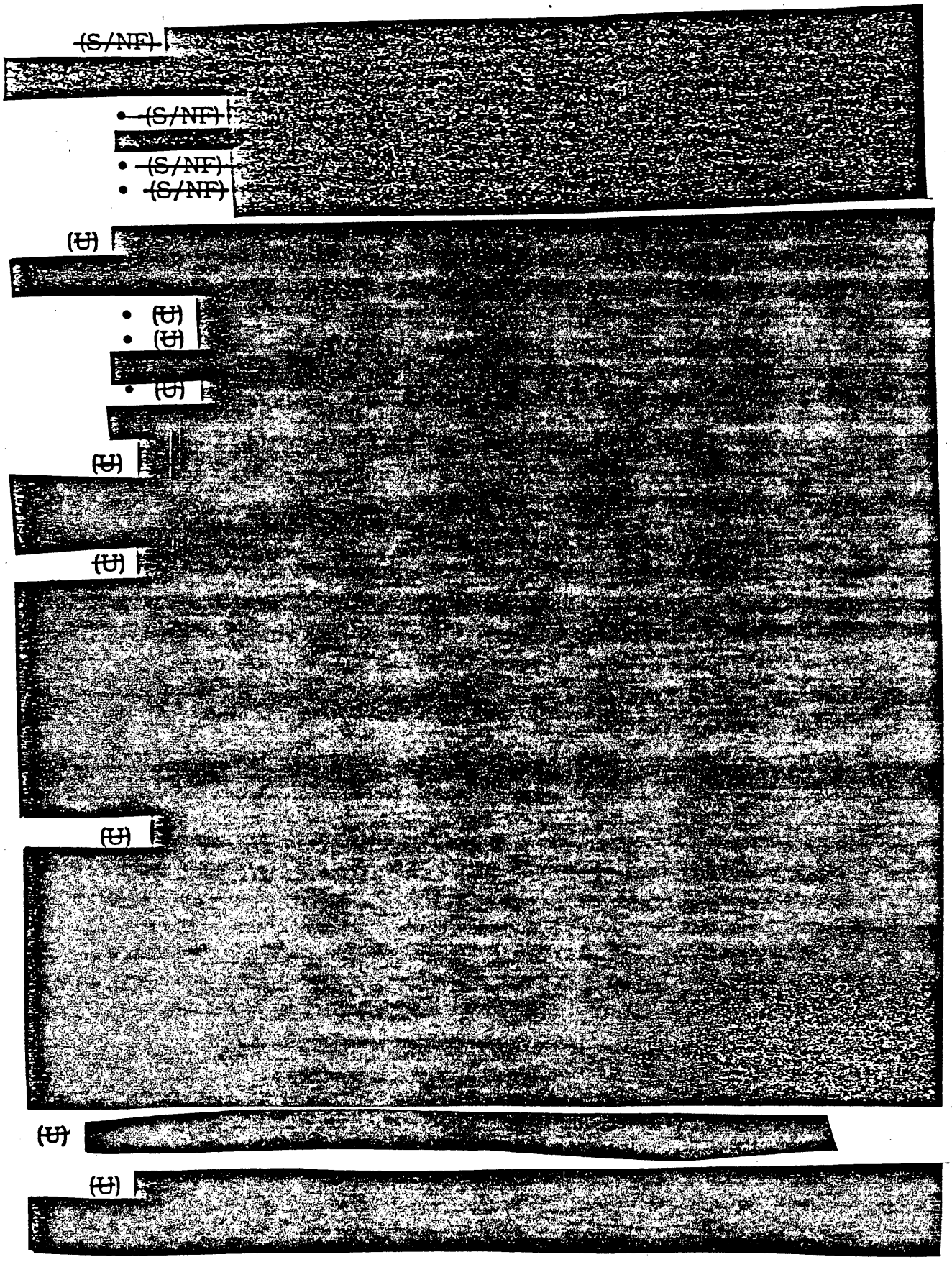

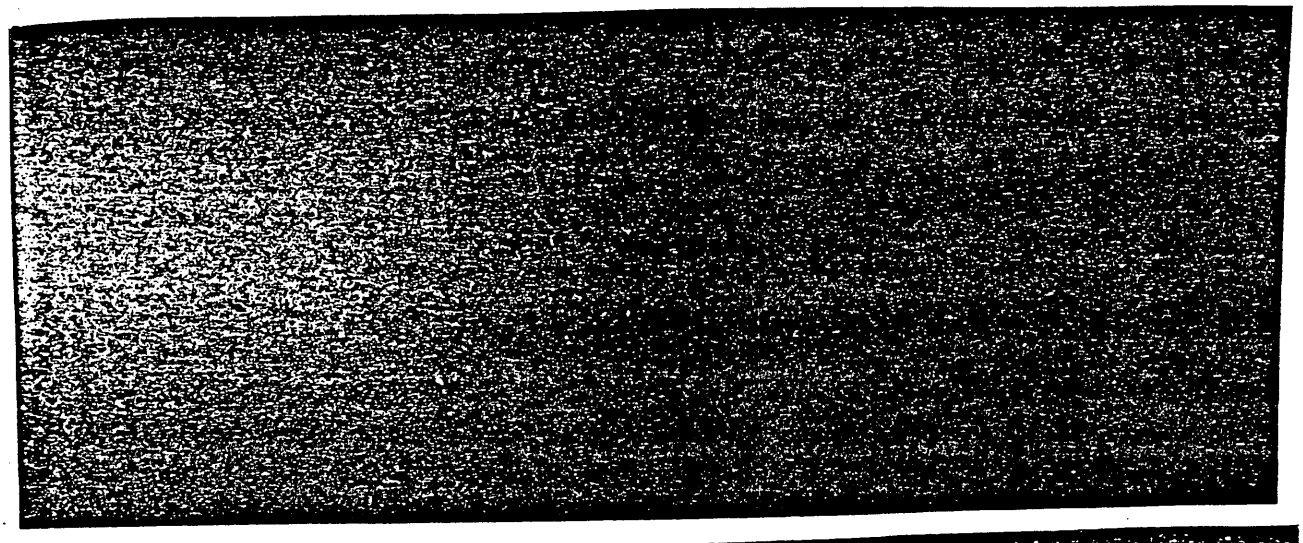

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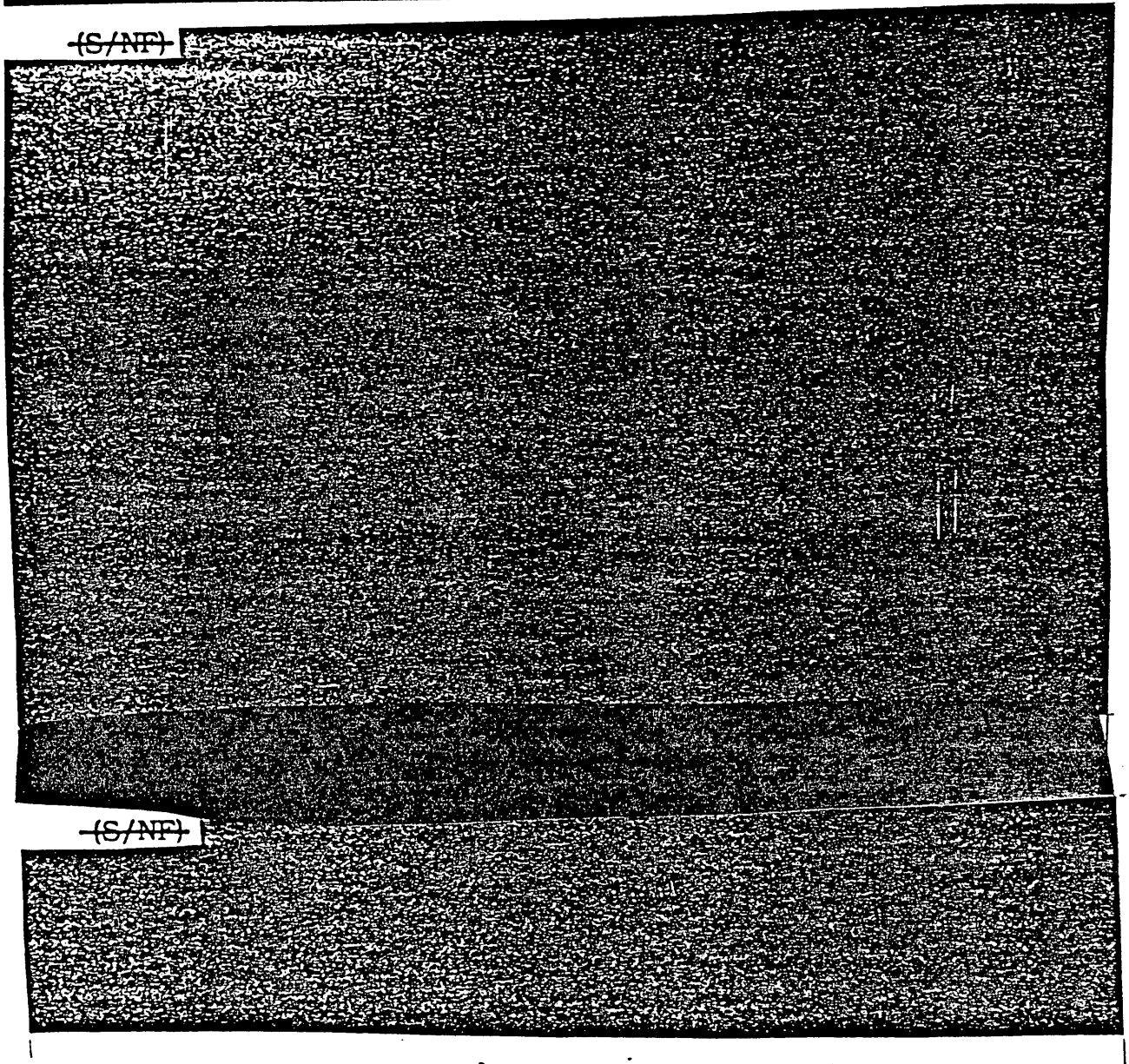

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UNITED STATES-SUPPORTED RISK REDUCTION ACTIVITIES (U)

Middle East:
-- Middle East peace process
-- Arms Control and Regional Security Working Group (with Russia)
-- Israeli proposal for "hotline" with Syria and advanced notification of military maneuvers
-- Initiative on non-proliferation and arms transfer restraint
-- Arms registry

Asia:
-- Republic of Korea/Democratic People's Republic of Korea denuclearization declaration
-- Joint Nuclear Control Commission, inspection regime
-- Proposed South Asian non-proliferation conference (with Pakistan, India, China, and Russia)
-- Indian interest in Incidents at Sea Agreement with Pakistan
-- Indo-Pakistani Agreement on protection of and exchange of data on nuclear facilities
-- Indo-Pakistani senior military "hotline" and exercise notifications

Latin America:
-- United States-Brazilian Resolution on hemispheric security and arms control (to the Organization of American States)
-- Treaty of Tlatelolco nuclear free zone (less Cuba)
-- Argentine-Brazil-Chile Agreement to ban biological and chemical weapons
-- Argentine-Brazilian Accounting and Control Committee Agreement on nuclear safeguards (with the International Atomic Energy Agency)

Europe:
-- "Open Skies" Treaty (overflight regime) and extension to States of the former Soviet Union
-- North Atlantic Cooperation Council
-- NATO Permanent Representatives meeting on crisis management
-- Conference on Security and Cooperation in Europe
  -- Conflict Prevention Center
  -- Communications Network

International:
-- Nuclear Non-Proliferation Treaty
-- Missile Technology Control Regime
-- International Atomic Energy Agency Safeguards
-- United Nations' "Transparency in Armaments" Resolution, Arms Transfer Register
-- Workshop on Arms Transparency
-- United Nations' study, confidence-building measures in space
-- Negotiations on global chemical weapon ban

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TABLE 14

- *(U) Expand appropriate bilateral and regional information exchange and risk reduction measures with nations in areas of greatest proliferation concern.*

- *(U) Establish multilateral agreements for consultation in the event of a nuclear weapons incident. These measures would rely on timely and assured communications.*

- ~~(S)~~ [redacted]

- *(U) Establish crisis communications capabilities among appropriate nations of a region.*

- *(U) Transfer and/or exchange, in appropriate cases, nuclear weapon safety technology; physical security technologies, techniques, and concepts; and use control/denial concepts (with certain restrictions) to selected nations (consistent with the provisions of the Nuclear Non-Proliferation Treaty and other proliferation control agreements), to reduce the risks of an accidental or inadvertent nuclear weapon detonation, unauthorized use, or acts of terrorism that might lead to misinterpretation, miscalculation, or hostilities. This transfer and/or exchange should be conditional on mechanisms that ensure this information does not degrade efforts to prevent the proliferation of nuclear weapons, enhance the operational effectiveness of the recipient nation(s), or jeopardize the safety, security or control of U.S. nuclear weapons systems.*

- *(U) The National Laboratories can play a distinctive and important role in the process of determining appropriate technologies, procedures, systems and system data to consider.*

States of the Former Soviet Union (U)

(U) Specifically, with respect to the states of the former Soviet Union, the Advisory Committee recommends the Secretary of Defense:

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- *(U) To exploit the current window of opportunity for meaningful risk reduction that now exists with the Republics of the former Soviet Union, the United States should move beyond the traditional arms reduction agenda and pursue new initiatives (DoD is already pursuing many of these initiatives). These areas include:*

  - *(U) Joint measures (e.g., intelligence sharing) to reduce proliferation;*

  - *(U) Joint initiatives to provide timely warning;*

  - *(U) Overview of U.S. and Russian/Commonwealth of Independent States command structures;*

  - *(U) A lexicon on command and control terminology which would support future cooperative efforts and confidence-building measures;*

  - *(U) A dialogue on nuclear command and control oversight, command and control assessment techniques, and use control policies and standards with the aim of improving both sides' command and control capability to prevent unauthorized launches; and*

  - *(U) Discussions on early deactivation of forces to be reduced under signed agreements.*

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Undeclared/Emerging Nuclear States (U)

- *(U) Consider a Multilateral Nuclear Incidents Agreement, open to all nations, patterned after the U.S.-USSR "Accident Measures" and "Prevention of Nuclear War" agreements, and neutral and silent with respect to possession/development of nuclear weapons, as a*

particularly attractive risk reduction model for this category of nations.

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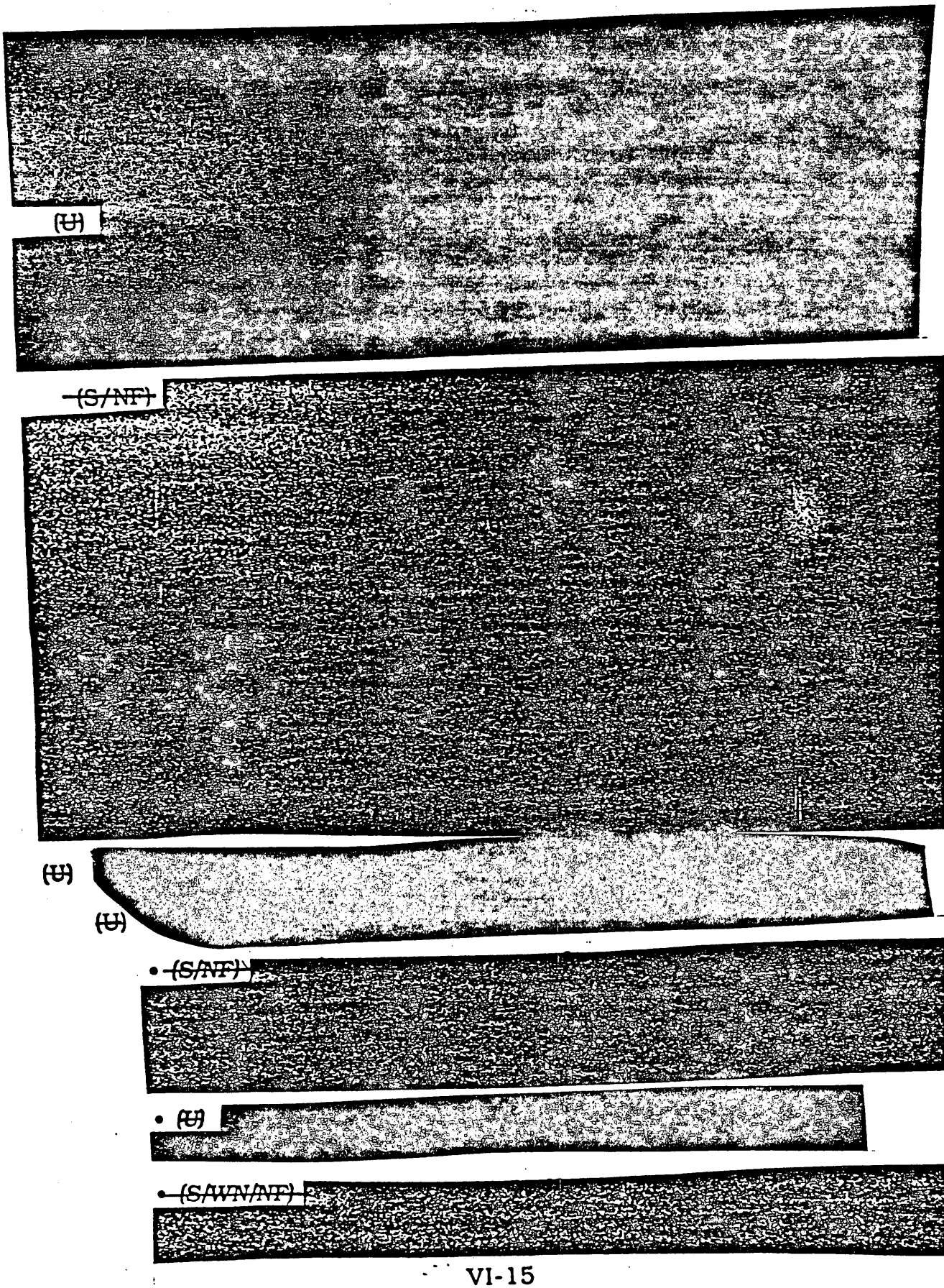

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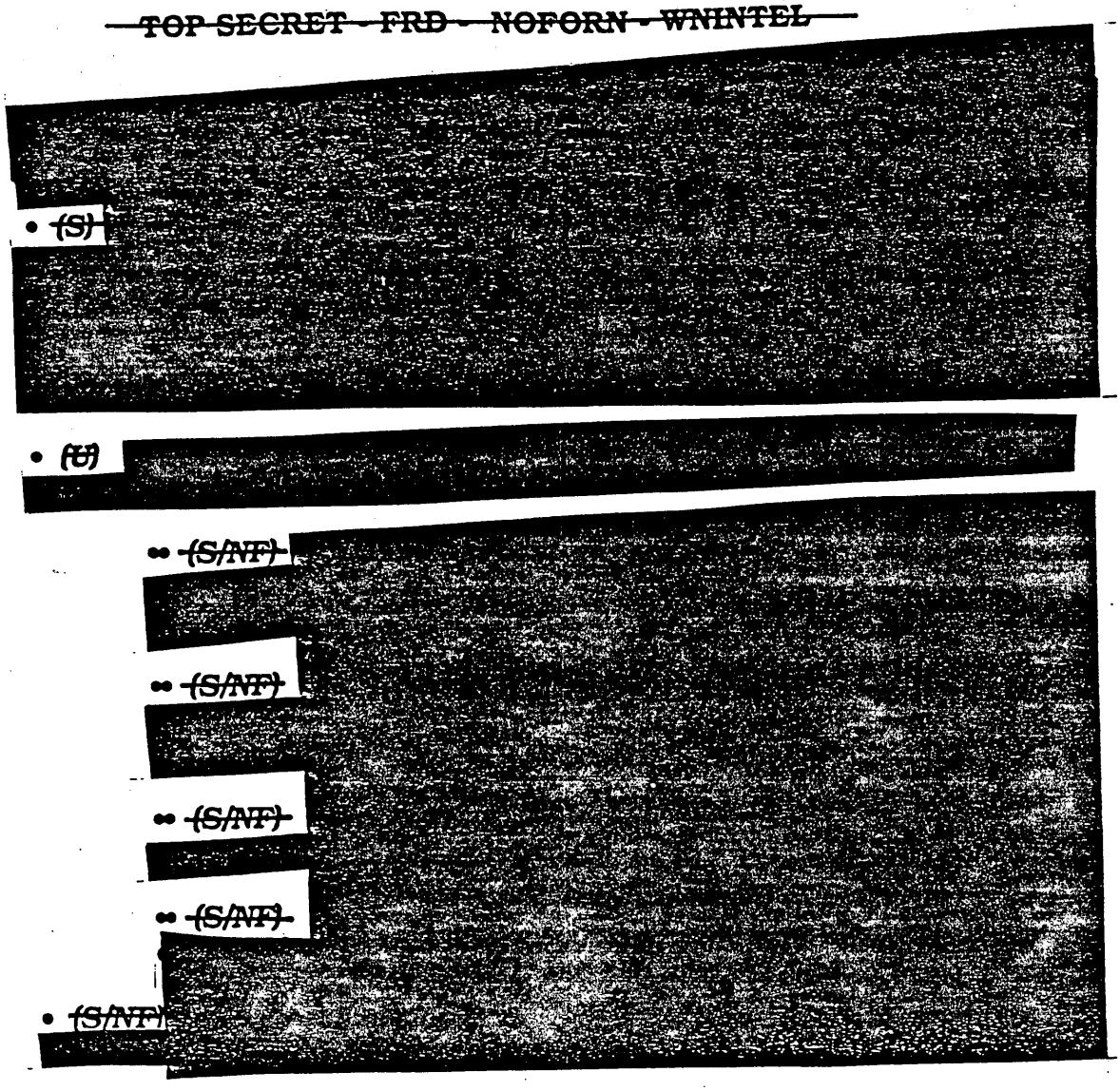


APPENDIX A

The FARR (Charter, Organization, Methodology)

(U) Introduction:

(U) The Fail-safe and Risk Reduction Review (FARR) was initiated at the direction of the Secretary of Defense to assess the current and programmed Nuclear Weapons Command and Control System capability to meet the dual requirements of assurance against unauthorized use and timely, reliable execution when authorized by the President. A specific tasking was to identify opportunities for positive measures to enhance nuclear weapon safety, security and control and reduce the risk of the outbreak of nuclear hostilities due to miscalculation, accident, or deliberate action.

(U) The Charter for the Advisory Committee for Nuclear Fail-safe and Risk Reduction, published in the Federal Register on 20 December 1990, is reproduced on the following pages. The members of the Advisory Committee were chosen and appointed by the Secretary of Defense in March 1991. The first meetings took place in May 1991 and for the next 18 months an extensive and comprehensive, top-to-bottom, independent, review of the U.S. nuclear command and control process was conducted. The five-member Advisory Committee was supported by over 150 personnel which were formed into specific working and study groups from over 50 government organizations and agencies in the U.S. Nuclear Command and Control System. Additionally, the Advisory Committee solicited and received the testimony and views of many prominent individuals from both inside and outside the government on the issues of improving the fail-safe and risk reduction nature of the U.S. nuclear command and control process.

CHARTER

ADVISORY COMMITTEE
FOR
NUCLEAR FAIL-SAFE
AND
RISK REDUCTION

1. Title: Nuclear Fail-safe and Risk Reduction Advisory Committee.

2. Committee's Terms of Reference.

a. Purpose. To assess the current and programmed Nuclear Weapons Command and Control Systems capability to meet the dual requirements of assurance against unauthorized use and timely, reliable execution and to identify opportunities for positive measures to enhance fail-safe measures and reduce the risk of the outbreak of nuclear war due to miscalculation or accident.

b. Scope. The review will examine the nuclear weapon command and control process from the NCA to the individual weapon. The study will focus on identifying opportunities to enhance the fail-safe and risk reduction capabilities of the NCCS consistent with national security policy and the requirement for assured authorized execution. The period of interest of the study will be 1991 to 2011.

c. Approach.

(1) An independent Executive Committee composed of three distinguished civilians or retired military from the private sector and two high level OSD officials will guide, provide formal review and approve the review findings. The committee will be chaired by the distinguished civilian designated by the Secretary of Defense. While the committee as a whole should possess knowledge of the political, technical, and military issues involved, part of the criteria for selection of some of its members will be to include persons without current involvement in the nuclear chain of command. Study Executive Committee Members will be appointed for a one year term and approved by the secretary of Defense using the procedures specified in "DOD Directive 4205.2, (CAAS)," January 27, 1986.

(2) A Committee Staff chaired by a Staff Director will conduct the study and support the Executive Committee in preparing the final report.

(a) The Staff Director will form subcommittees as required to study functional areas designated by the Advisory Executive Committee (e.g., policy, procedures, current and future system, technology, etc.).

(b) Committee Staff and subcommittee membership should be tailored according to areas of expertise and responsibility. Members may include representatives from all NCCS agencies.

(3) The study will be conducted in three phases. Phase I will review current NCCS requirements and assess the effectiveness of existing positive measures in meeting the dual requirement of assuring against unauthorized or inadvertent use while assuring timely and reliable use when authorized. Phase I will involve three subcommittees which will focus on: (a) current safety, security, and control measures; (b) risk reduction measures; and (c) technological opportunities for post-launch command destruct of nuclear weapons and coded control of nuclear weapons at sea. Each subcommittee will document any deficiencies found and identify available or emerging positive measures that may correct those deficiencies and improve the fail-safe and risk reduction capabilities of the NCCS. Phase II will integrate the findings of Phase I and assess the feasibility of improving NCCS fail-safe and risk reduction measures while maintaining the balance of assuring against unauthorized use and assuring use when authorized. Phase III will develop the final report including recommendations to correct identified deficiencies and obtain fail-safe and risk reduction improvements.

d. Objectives:

(1) Assess the effectiveness of existing positive measures for safety, security, and control in the command and control of nuclear weapons as they relate to assured execution and unauthorized use.

(2) Assess the effectiveness of existing positive measures for fail-safe and reducing the risk of outbreak of a nuclear war as a result of an accident, miscalculation, terrorism, or unexpected technological breakthrough.

(3) Determine what technological and procedural opportunities exist for changing the current system of positive measures in order to enhance the fail-safe and risk reduction capabilities of the NCCS.

(4) Assess the impact such changes may have on US national policy, deterrence posture, military operational capabilities, and system costs.

(5) Produce a prioritized list of recommendations for changes in or additions to US Fail-safe and Risk Reduction measures as appropriate.

3. Period of Time Estimated: 1 year.

4. Official to Whom Group Reports: Secretary of Defense.

5. Organization Responsible for Providing Support: U.S. Nuclear Command and Control System Support Staff.

6. Description of Duties: Functions and goals of the Executive Committee are to provide advice and recommendations to the Secretary of Defense on matters dealing within the general scope of activity outlined in para 2 above.

7. Estimated Annual Operating Cost in Dollars and Man-Years: $488,985.00 per year/10.8 man-years. (Of this cost, $406,585 is programmed.)

8. Estimated Number of Frequency of Meetings: Approximately eight meetings of 2-3 day duration.

9. Composition:

a. The Secretary of Defense shall:

(1) Designate a Chairman of the Executive Committee from the membership.

(2) Authorize the U.S. Nuclear Command and Control System Support Staff (NSS) to support the Executive Committee in its mission.

(3) Direct the Department of Defense and the NCCS supporting agencies (in his role as the NCCS Executive Agent) to provide support as required to the study.

b. Membership: The Executive Committee will be limited to no more than five persons, three from the private sector and two from DoD, who will be appointed for a one year term on the basis of their expertise in the areas for which the committee is responsible. Efforts will by made to assure that the non-government committee members are well-balanced as to their represented interests and functions to be performed during the course of the study. Committee members will be approved by the Secretary of Defense using the procedures specified in "DoD Directive 4205.2, (CAAS)," January 27, 1986.

10. Responsibilities:

a. Director, Nuclear Command and Control System Support Staff shall:

(1) appoint the Staff Director (Federal designated official), who will be responsible for the proper functioning of the Executive Committee in accordance with DoD Directive 5105.4, "DoD Federal Advisory Committee Management Program," September 5, 1989. The Staff Director shall call the meetings, approve the agenda, attend each meeting, and adjourn meetings when he or she determines it to be in the public interest.

b. The Chairman of the Executive Committee is responsible for:

(1) assuring agenda and supporting documents that facilitate decision making by the Executive Committee are prepared and distributed well in advance of scheduled meetings.

(2) presiding at all Executive Committee meetings.

(3) assuring that the issues are addressed completely.

(4) assuring appropriate reports as well as other documents and records of the Executive Committee, including financial records, are prepared and maintained on file.

(5) assuring that the final Executive Committee report, covering all necessary issues, is prepared and delivered to the Secretary of Defense in a timely manner.

11. Termination Date: Approximately one year from the date of this charter, but not longer than two years.

12. The executive Committee shall operated in accordance with the provisions of DoD Directive 5105.4, "DoD Federal Advisory Committee Management Program," September 5, 1989.

13. Date Charter filed: 20 December 1990.

(U) Organization:

(U) As specified in the Charter, a Federal Advisory Committee, composed of two distinguished civilians from the private sector, a retired high ranking military officer and two high level OSD officials, was appointed by the Secretary of Defense. The Chairperson of the Advisory Committee was Ambassador Jeane J. Kirkpatrick, former U.S. Ambassador to the United Nations and distinguished scholar. The other members included the Honorable Stephen J. Hadley, Assistant Secretary of Defense for International Security Policy; the Honorable Duane P. Andrews, Assistant Secretary of Defense (Command, Control, Communication and Intelligence) and Director, U.S. Nuclear Command and Control System Support Staff; Admiral Robert L. J. Long, USN (Retired), former Vice Chief of Naval Operations and former Commander in Chief, U.S. Pacific Command; and the Honorable, Arthur B. Culvahouse, former White House legal counsel.

(U) The Advisory Committee was supported by a Committee Staff from the U.S. Nuclear Command and Control System Support Staff, plus working and study groups made up of personnel from within the nuclear weapons command and control communities. The overall organization is depicted in Figure A-1.

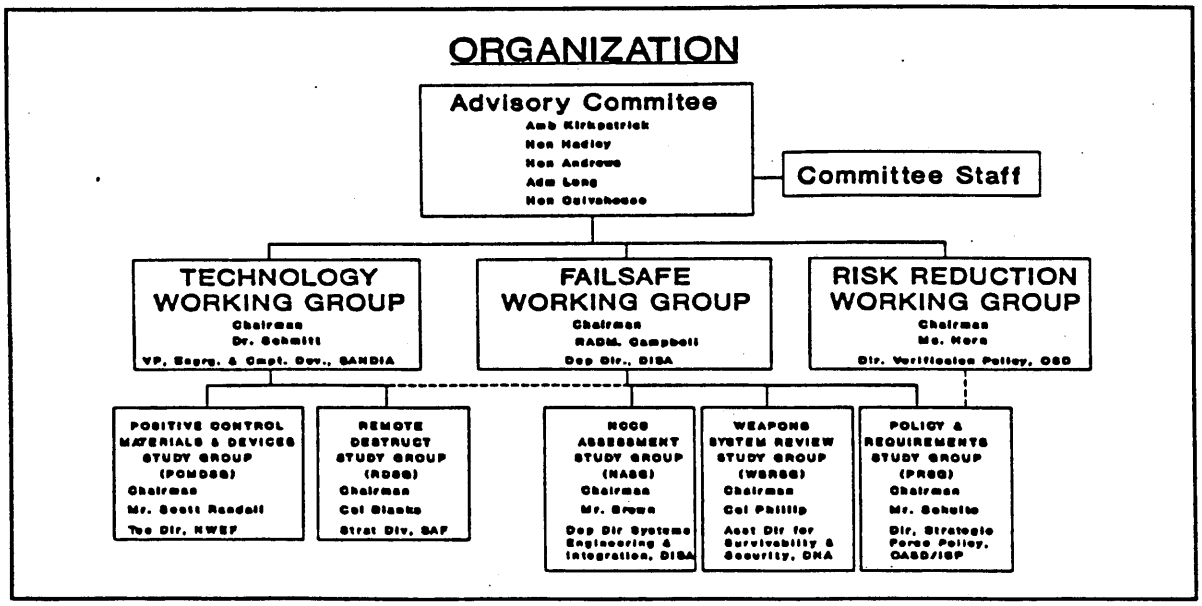


Figure A-1

(U) These groups were established by the Advisory Committee to conduct detailed investigations and analyses of issues. Following guidance of the Committee, they presented their findings and recommendations in a series of briefings and written reports which the Advisory Committee used to formulate its judgments, recommendations and the Final Report for the Secretary of Defense. The following Chairpersons of the Working and Study Groups were selected because of their experience and expertise in the areas of interest to the Fail-safe and Risk Reduction Review:

(U) Technology Working Group:

Dr. Heinz W. Schmitt, Vice President, Engineering and Component Development, Sandia National Laboratory

(U) Remote Destruct Study Group:

Col Randolph M. Blanks, USAF, Chief, Strategic Division, Directorate of Strategic and Airlift Forces, Office of the Secretary of the Air Force

(U) Positive Controls Materials & Devices Study Group:

Mr. Scott R. Randall, Technical Director, Naval Weapons Evaluation Facility

(U) Fail-safe Working Group:

RADM Arlington F. Campbell, USN, Deputy Director, Defense Information Systems Agency (DISA)

(U) Nuclear Command and Control System (NCCS) Assessment Study Group:

Dr. Jeremy M. Kaplan, Deputy Director Systems Engineering & Integration, Defense Information Systems Agency, (May 1991-Dec 1991)

Mr. Bruce J. Brown, Deputy Director Systems Engineering & Integration, Defense Information Systems Agency, (Jan 1992-Present)

(U) Weapons Systems Review Study Group:

Col Frank M. Willingham, USAF, Chief, Nuclear Security Division, Defense Nuclear Agency (May 1991-Aug 1991)

COL Joseph P. Phillip, USA, Assistant Director, Nuclear Survivability and Security, Defense Nuclear Agency (Sep 1991-Present)

(U) Policy and Requirements Study Group:

Mr. Gregory L. Schulte, Director for Strategic Force Policy, Office of the Assistant Secretary of Defense (International Security Policy)

(U) Risk Reduction Working Group:

Mrs. Sally K. Horn, Director, Verification Policy, Office of the Assistant Secretary of Defense (International Security Policy)

(U) Shortly after the initial meetings of the Advisory committee, specific tasking were developed for each of the supporting working groups. The following are these specific taskings which were assigned:

- (U) Technology Working Group (TWG) Tasking:

a. (U) Purpose. Support the Advisory Committee by conducting investigations and developing descriptions of technological opportunities to implement new or improve current and programed nuclear command and control hardware, software and equipment related to fail-safe and/or risk reduction.

b. (U) Scope. Develop system technical descriptions which include applicability of advanced technologies and an assessment of technical risk, incremental performance impacts, additional system vulnerability, mission impact and resource requirements. In coordination with the other working groups, develop a full discussion of pros and cons for each system/equipment described.

c. (U) Specific Objectives.

1. (U) Develop technical descriptions and alternatives (with pros/cons and associated cost estimates) in response to issues and initiatives identified by the Fail-safe and Risk Reduction Working Groups.

2. (U) Directly address the technical means of implementing (including a broad range of technical alternatives):

(a) (U) Use of cryptographically coded electronic locking devices on all nuclear weapons system at sea.

(b) (U) Installation of post-launch destruct capability on/for intercontinental and submarine launched ballistic missiles and on/for nuclear cruise missiles with extended flight times (e.g., greater than approximately 30 minutes). [Note: During the course of the study this specific objective was expanded to include an investigation installing post-launch destruct capability on/for short range attack missiles and nuclear bombs.]

- (U) Fail-safe Working Group (FWG) Tasking:

a. (U) Purpose. Support the Advisory Committee by identifying, reviewing, and describing current policy, requirements, procedures and systems associated with fail-safe and risk reduction in the command and control of nuclear weapons. Develop policy and requirement alternatives, as appropriate, and make findings for equipment and technological improvements in fail-safe and risk reduction.

b. (U) Scope. Policy and requirements review to examine national, departmental, Service, and CINC planning and policy documents. Nuclear Command and Control (NC2) process review to include the system from the NCA to the lowest element exercising command and control. As applicable, include systems and processes which provide information and facilitate decision making. Duplicate assessment of virtually identical segments of the NC2 process was not required.

c. (U) Specific Objectives.

1. (U) Policy and Requirements.

(a) (U) Review existing nuclear command and control policy and identify guidelines and direction related to fail-safe and risk reduction.

(b) (U) Identify and define nuclear command and control requirements related to fail-safe and risk reduction as established by national, SECDEF, and Joint Staff policy.

(c) (U) Provide findings on policy/requirements deficiencies and develop alternatives for short/long term improvements to correct deficiencies.

2. (U) NC2 System Procedures and Equipments.

(a) (U) Develop system and process descriptions for command and control of nuclear weapons. Focus descriptions on positive measures and devices related to existing or potential opportunities for improved fail-safe and risk reduction. In system and process description, include communications channels, types of message formats, and procedures used at all levels where actions occur. Include both SIOP and non-SIOP processes. As appropriate, request assistance from the Technology Working Group to develop system/equipment technical descriptions and assessments.

(b) (U) Adopt a rigorous methodology and determine opportunities to improve or implement procedures and/or equipment to enhance the fail-safe measures for Nuclear Command and Control. Insure the methodology facilitates identifying accidental and inadvertent risks as well as risks associated with deliberate unauthorized acts.

(c) (U) Develop findings and alternatives for procedures and equipment to exploit opportunities to improve the fail-safe command and control of nuclear weapons. For each finding, develop a full discussion of potential impacts on the dual requirement for timely assured execution and assurance against unauthorized use and provide an estimate of costs to implement findings. Coordinate technical alternatives with the Technology Working Group for an assessment.

- (U) Risk Reduction Working Group (RRWG) Tasking:

a. (U) Purpose. Support the Advisory Committee by identifying, reviewing, and describing current practices, facilities, equipment, and procedures associated with reducing the risk of nuclear hostilities as a result of an accident, miscalculation, misinterpretation, terrorism, unexpected technological breakthrough or deliberate act. Develop alternatives and present findings germane to risk reduction.

b. (U) Scope. Limit the risk reduction review to areas under the purview of the Department of Defense. Focus will be on those portions of the NC2 process designed to prevent or mitigate against a nuclear exchange as a result of an accident, miscalculation, misinterpretation, or unauthorized act. [Note: During the review this scope was expanded to include areas outside the immediate purview of the Department of Defense but

which included strong DoD interest as it related to nuclear risk reduction.]

c. (U) Specific Objective.

1. (U) Characterize and assess the nuclear risk reduction features of the NC2 process and identify opportunities for improvement.

2. (U) Based on policy criteria and requirements for risk reduction measures received from the Policy and Requirements Study Group, identify current risk reduction measures, elements employing these measures, and what type of crises and/or risks these measures can mitigate against.

3. (U) Identify any additional appropriate measures that could improve the existing risk reduction capabilities of the NC2 process.

4. (U) Identify pros and cons of implementation of such risk reduction enhancements including the uncertainties associated with a not yet stabilized new international politico-military environment.

5. (U) Provide an estimate of costs associated with implementing assessed enhancement options.

(U) Participating Organizations:

(U) All government departments and agencies which are a part of the U.S. Nuclear Command and Control System were tasked with supporting the efforts of this Advisory Committee. Each of the Chairpersons of supporting working and study groups was asked to gather together the expertise required in order to complete the assigned tasking. Personnel from the following government organizations, agencies and offices provided supporting participation in the working and study groups during the conduct of the Nuclear Fail-safe and Risk Reduction Review:

1. National Security Council (NSC)

2. Central Intelligence Agency (CIA)

3. National Communications System (NCS)

4. U.S. Nuclear Command and Control System Support Staff (NSS)

5. Department of Energy (DOE)

   a. Deputy Assistant Secretary for Military Applications (DASMA)

   b. Associate Director for Weapon Safety

   c. Sandia National Laboratory (SNL)

   d. Los Alamos National Laboratory (LANL)

   e. Lawrence Livermore National Laboratory (LLNL)

6. Department of Defense (DoD)

   a. Office of the Secretary of Defense (OSD)

      (1) Office of the Assistant Secretary of Defense (Command, Control, Communications and Intelligence (OASD/C3I)

      (2) Office of the Assistant Secretary of Defense for International Security Policy (OASD/ISP)

      (3) Office of the Assistant Secretary of Defense for International Security Affairs (OASD/ISA)

      (4) Office of the Assistant to the Secretary of Defense for Atomic Energy (OATSD/AE)

      (5) Office of the Principal Deputy Under Secretary of Defense for Strategy and Resources (OPDUSD/S&R)

   b. Defense Agencies

      (1) Defense Information Systems Agency (DISA)

      (2) Defense Intelligence Agency (DIA)

      (3) Defense Nuclear Agency (DNA)

      (4) Defense Technologies Security Administration (DTSA)

(5) National Security Agency (NSA)

(6) Strategic Defense Initiative Organization (SDIO)

c. Joint Chiefs of Staff (JCS)

(1) Operations Directorate (J-3)

(2) Strategic Plans and Policy Directorate (J-5)

(3) Command, Control, Communications and Computer Systems Directorate (J-6)

(4) Force Structure, Resource, and Assessment Directorate (J-8)

d. Commanders-in-Chief of the Unified and Specified Commands (CINCs)

(1) US Atlantic Command (LANTCOM)

(2) US Pacific Command (PACOM)

(3) US Strategic Command (STRATCOM) [Strategic Air Command (SAC)]

(4) US Space Command (SPACECOM)

(5) North American Air Defense Command (NORAD)

(6) US European Command (EUCOM)

e. Military Services

(1) US Army

(a) Army Staff

(b) US Army Nuclear and Chemical Agency (USANCA)

(c) US Army Strategic Defense Command (USASDC)

(2) US Air Force

(a) Office of the Secretary of the Air Force (OSAF)

(b) Air Staff

(c) Air Force Directorate of Nuclear Surety (AF-DNS)

(d) Air Force Logistics Command (AF-LC)

(e) Air Force Space Command (AFSPACECOM)

(f) Ballistic Missile Office (BMO)

(g) Aeronautical Systems Division (ASD)

(3) US Navy

(a) Navy Staff

(b) Strategic Systems Program Office (SSP)

(c) Cruise Missile Program Office (CMPO)

(d) Naval Weapons Evaluation Facility (NWEF)

(e) Naval Surface Warfare Center (NSWC) Dahlgren

(f) Naval Sea Systems Command (NAVSEA)

(g) Naval Air Systems Command (NAVAIR)

(4) US Marine Corps

(a) Office of the Commandant of the Marine Corps (OCMC), Plans Division

(U) Methodology (Advisory Committee):

(U) The Nuclear Fail-safe and Risk Reduction (FARR) Review was conducted using the methodology depicted in Fig. A-2.

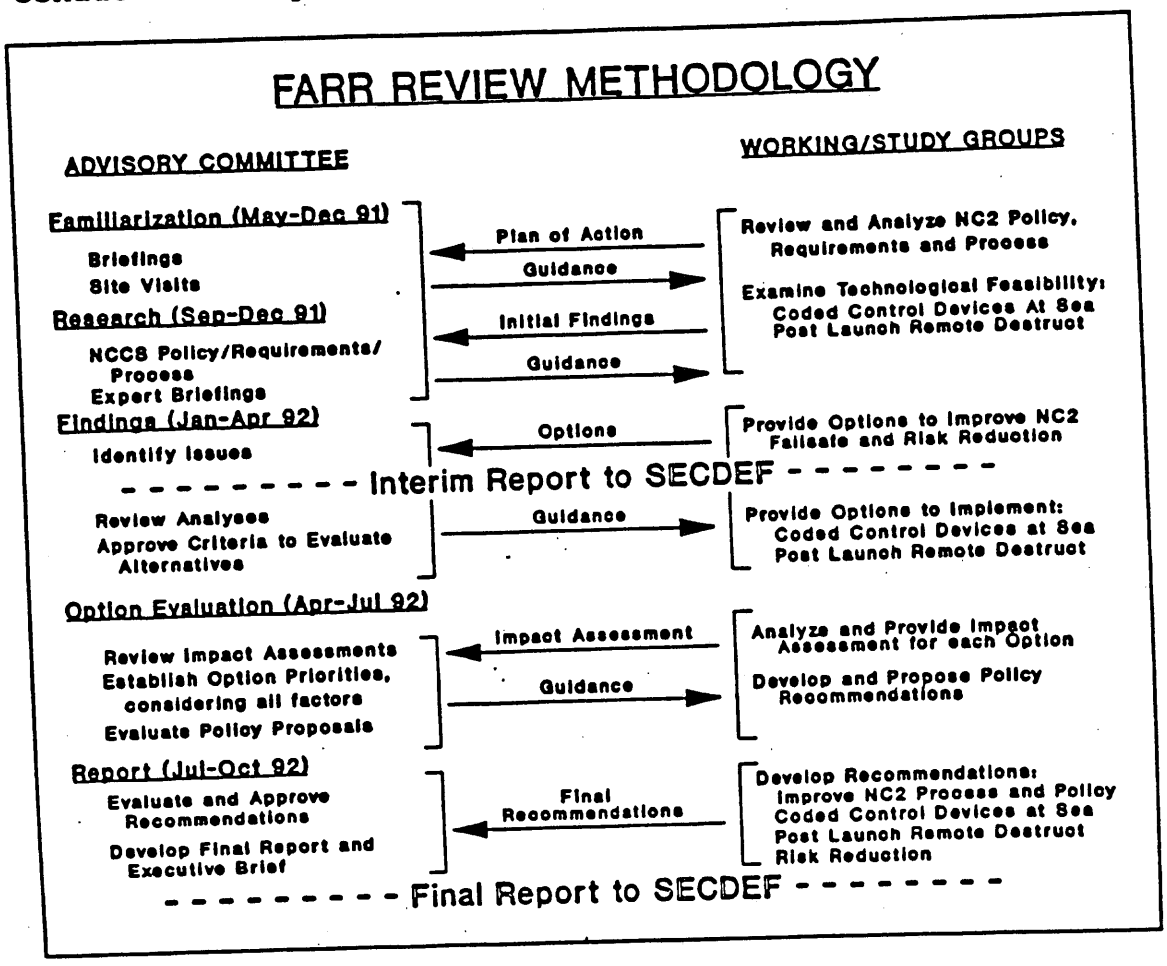


Figure A-2

Throughout the conduct of the review there was an active and dynamic dialogue between the Advisory Committee and the Working and Study Groups supporting them. The following five phases of Advisory Committee activities are identified and described.

1. (U) Familiarization

(U) The members of the Advisory Committee received documents and briefings covering pertinent background material on the command and control of nuclear weapons. The material included definition of the nuclear command and control system (NCCS), the

nuclear command and control (NC2) process, resources, structure, organizational responsibilities, and results of prior studies and ongoing assessments. Site visits were included in the familiarization process to allow committee members to observe, first hand, a broad range of nuclear command and control processes, procedures, equipment, personnel and facilities.

(U) Specific tasking was provided to the Working and Study Groups which responded with proposed plans of action for conducting their assigned analysis, investigation, research, or review.

2. (U) Research

(U) The members of the Advisory Committee received series of briefings from their Working and Study Groups, from government agencies and departments, and from prominent individuals outside of government. These briefings focused on developing understanding of:

a. (U) Existing policy and requirements for positive measures to prevent unauthorized or inadvertent use of U.S. nuclear weapons and to reduce the risk of nuclear hostilities occurring as a result of an accident, misinterpretation, or miscalculation;

b. (U) Existing positive measures, in both the individual weapons systems and in the overall NCCS, for the prevention of unauthorized or inadvertent launch, release, pre-arming, arming, firing, or loss of control of U.S. nuclear weapons;

c. (U) Existing positive measures for reducing the risk of any accident, misinterpretation, or miscalculation leading to nuclear hostilities and for mitigating the outcome of such an event should one occur;

d. (U) The feasibility and desirability of implementing additional nuclear fail-safe and risk reduction measures, to include:

(1) (U) Expanded capabilities for risk reduction, exchange of information, notifications and system measures to promote confidence building between nuclear nations;

(2) (U) Installation of post-launch destruct mechanisms on nuclear weapons; and

(3) (U) Installation of coded control devices on all United States nuclear weapon systems.

3. (U) Findings

(U) Initial findings of the Working and Study Groups were presented for the Advisory Committee's consideration. After reviewing these presentations, the Advisory Committee provided guidance for the Working and Study Groups' further analyses, which focused their research efforts and more precisely defined the scope and breadth of the study areas under investigation.

(U) The Advisory Committee formulated high level issues to be addressed during the conduct of the review and assigned the issues to the appropriate working and study groups. these issues are listed in Chapter One of the basic report. Further guidance was provided to the working and study groups to allow them to analyze and assess the impacts associated with each of the options under consideration.

(U) An Interim Report (briefing) was made to the Secretary of Defense in January 1992 on the current status on the review effort and the emerging themes that the Advisory Committee were considering.

4. (U) Option Evaluation

(U) After considering the results of impact assessments for various options to improve the nuclear command and control process, the Advisory Committee identified strengths and weaknesses of the current command and control system and evaluated the options for improvements and enhancements to system fail-safe and risk reduction capabilities. In this evaluation, the Advisory Committee considered technical feasibility, fiscal costs, and time required for the implementation of such enhancements as well as the potential impacts of such actions on National policy, deterrence posture and assured use when authorized.

5. (U) Report

(U) Working and Study Groups investigations and analyses were documented in final reports to the Advisory Committee. These reports were placed in an archive in the U.S. Nuclear Command and Control System Support Staff offices. After considering the results of the efforts of the Working and Study

Groups, the Advisory Committee made its final judgments on specific recommendations and priorities for changes, improvements and enhancements to the fail-safe and risk reduction capability of the U.S. Nuclear Command and Control System. The Advisory Committee Final report was developed to present these recommendations to the Secretary of Defense.

APPENDIX B

Briefings and Places Visited

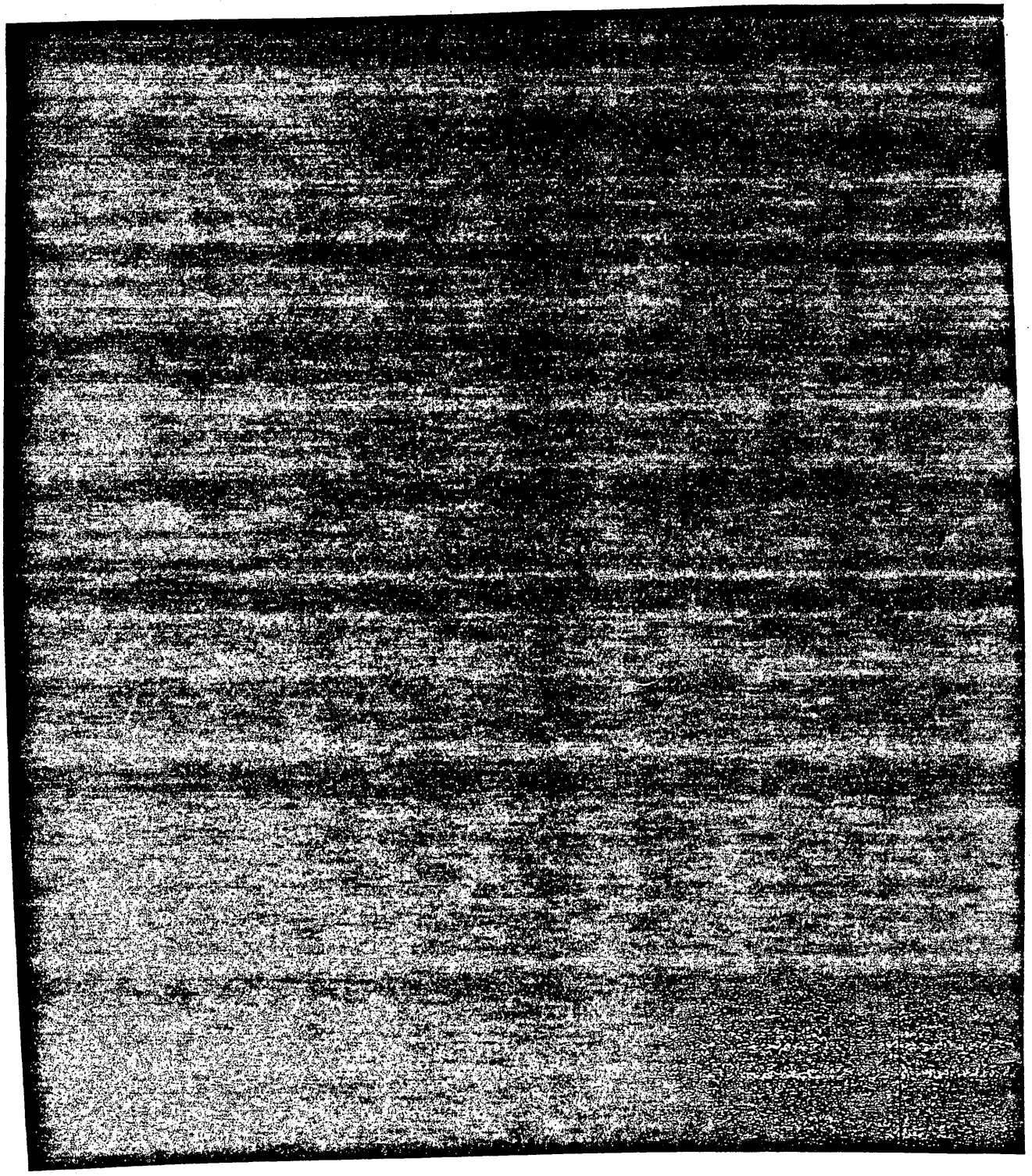
FAIL-SAFE AND RISK REDUCTION REVIEW ADVISORY COMMITTEE

CONSOLIDATED LIST OF COMMITTEE BRIEFINGS AND PLACES VISITED

DATE	TITLE	SPONSOR/BRIEFER
9 May 91	JCS Overview (Review of the 1986 JCS Study on Nuclear Command and Control)	Joint Staff
	National Nuclear Command and Control (NC2) Policy	Dr. John Weinstein, Nuclear Command and Control System (NCCS) Support Staff (NSS)
	Single Integrated Operations Plan (SIOP) Overview	Joint Staff
10 May 91	NC2 Structure, Communications and Connectivity	Joint Staff
	Demonstration in the National Military Command Center (NMCC)	Joint Staff
	Code Security Brief	Mr. Bill Marks, National Security Agency (NSA)
	Federal Advisory Act Brief	DoD General Counsel
	Proposed Review Process	Committee Staff
	Formal Committee Meeting	

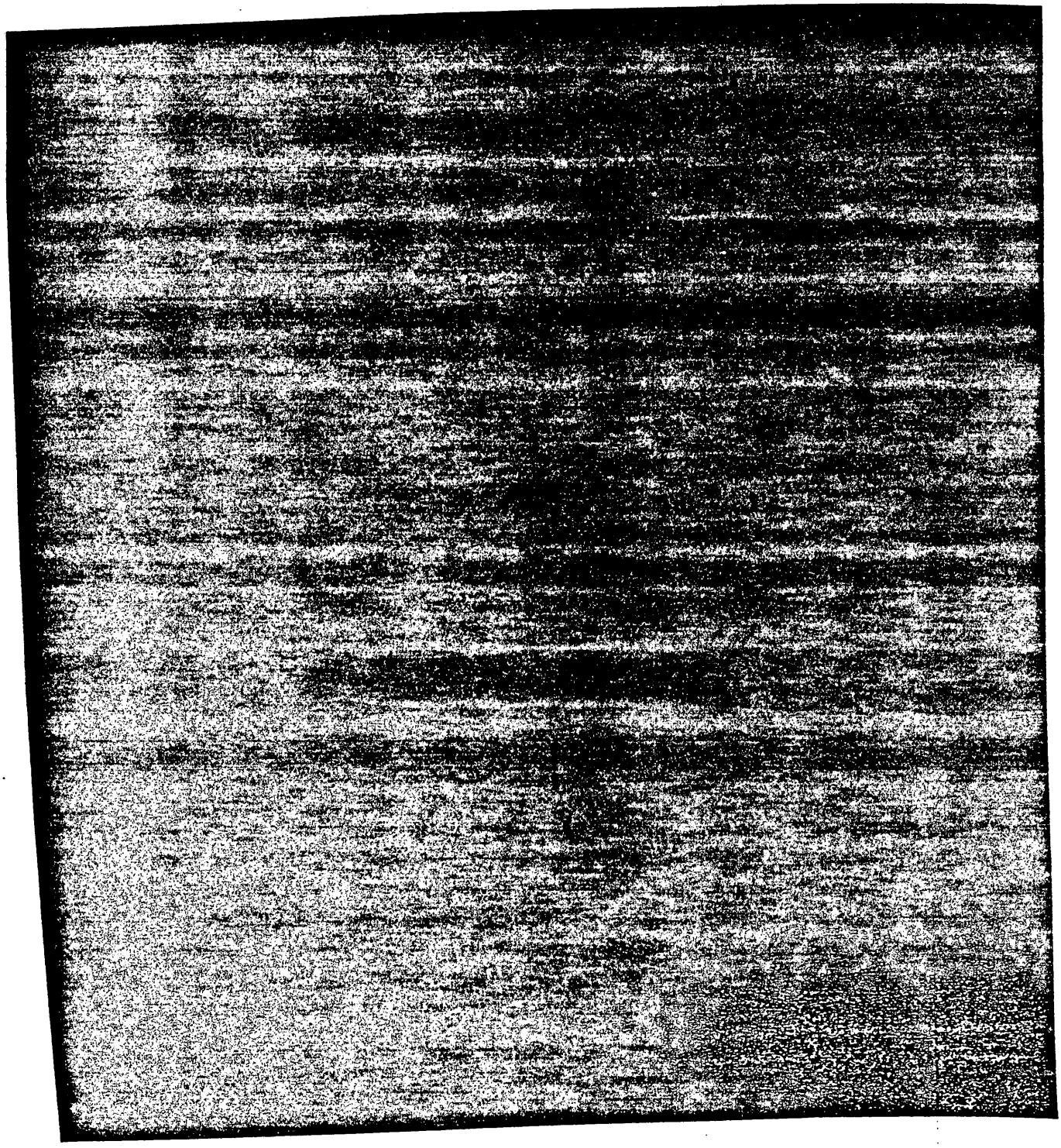
DATE	TITLE	SPONSOR/BRIEFER
20 May 91	Integrated Tactical Warning and Attack Assessment	Joint Staff
	Drell Commission and DOE Study Review	Dr. Robert Barker, Assistant to the Secretary of Defense for Atomic Energy (ATSD/AE)
	Policy Issues Associated with National Security Decision Directive, "Nuclear Weapons Command and Control"	Mr. Frank Miller Mr. John Grimes (OSD)
	Non-Strategic Nuclear Forces Weapons Design and the Role of Safety and Use Control Features	Joint Staff Sandia Nat'l Lab
	Positive Measures to Control Use of Nuclear Weapons	Sandia Nat'l Lab
23-25 Jul	European Command (EUCOM) Site Visit	
23 Jul 91	USEUCOM Stockpile Reduction Overview	Committee Staff
	USEUCOM Stockpile Failsafe Design Features	Committee Staff
	Failsafe Related NCCS Deficiencies	Committee Staff
	Implementation of NSDD "Nuclear Weapons Command and Control" within DoD	Committee Staff
24 Jul 91	USEUCOM Nuclear Command and Control	EUCOM Staff
	USEUCOM Surety Briefing	EUCOM Staff
	EUCOM Headquarters Emergency Action Demonstration	EUCOM Staff

DATE TITLE SPONSOR/BRIEFER



DATE	TITLE	SPONSOR/BRIEFER
3 Sep 91	Permissive Action Links on SLBMs and TLAM(N)s (Woolsey Report) Briefing	Amb. James Woolsey
	Views on Nuclear Failsafe and Risk Reduction	Dr. Richard Brody, Center for Naval Analysis (CNA)
	Technology Working Group Plan	Dr. Heinz Schmitt Col R. Blanks, USAF Mr. Scott Randall
	Failsafe Working Group	RADM A. Campbell
	Risk Reduction Working Group Plan	Mrs. Sally Horn
18 Oct 91	Views on Soviet NC2	Dr. Bruce Blair, Brookings Inst.
	Soviet NC2	Central Intelligence Agency (CIA)
	Soviet Situation	Mr. Art Zuehlke, Defense Intelligence Agency (DIA)
	Other Foreign NC2	CIA, DIA
	Emergency Action Procedures of the CJCS, Vol IV	Joint Staff
	SIOP	Joint Staff
5 Nov 91	Nuclear Weapons Safety Studies	Dr. John Foster, Defense Science Board (DSB)
	Policy and Requirements Study Group Brief	Mr. Greg Schulte Dr. John Weinstein
	Views on Remote Destruct of Nuclear Missiles	Dr. Sherman Frankel

DATE TITLE SPONSOR/BRIEFER



DATE	TITLE	SPONSOR/BRIEFER
10 Dec 91 (Cont'd)	Discussions with Commander U.S. Submarine Force, Atlantic (COMSUBLANT) and Director, Strategic Systems Programs Office (DIRSPO)	VADM Henry Childs RADM John Mitchell
17 Dec 91	Positive Control Study Group Presentation	Mr. Scott Randall
	Nuclear Proliferation	Mr. Gordon Oehler, National Intelligence Officer (NIO) for Nuclear Biological and Chemical (NBC) Proliferation
	Proposed DoD Use Control Policy	Dr. Robert Barker, ATSD/AE
	Use Control - Joint Staff Perspective	Joint Staff
	Notional Remote Destruct System - Joint Staff Perspective	Joint Staff
	Use Control - USAF Perspective	USAF Staff
	Use Control - Navy Perspective	Navy Staff
6 Jan 92	Emergency Action Procedures of the CJCS, Vol IV	Joint Staff
	Interim Report Briefing, Technology Working Group (TWG)	Dr. Heinz Schmitt Col R. Blanks, USAF Mr. Scott Randall
	Emerging Themes - Weapons Systems Review Study Group (WSRSG)	COL Joe Phillip
	Risk Reduction Working Group (RRWG) Key Themes	Mrs. Sally Horn

DATE	TITLE	SPONSOR/BRIEFER
22 Jan 92	Feasibility of Coded Control Devices (CCDs)	Mr. Scott Randall
	Positive Control Devices - Pros and Cons	Dr. Heinz Schmitt/ RADM A. Campbell
	Post-Launch Destruct Devices - Pros/Cons	Dr. Heinz Schmitt/ RADM A. Campbell
	Formal Committee Meeting	
29 Jan 92	Interim Report Delivered to SECDEF	
6 Mar 92	Weapons Systems Review Study Group (WSRSG) Options	COL Joe Phillip
	NC2 Facility Security - "60 Minutes" Tape	
	Personnel Reliability Program and Security	Col Robert Pike (OSD)
20 Mar 92	Use Control Devices Effectiveness Assessment	Mr. Jeff Everett, NSS/Mr. Vern Willen, Department of Energy
	Remote Destruct Study Group (RDSG) Options	Col Randolph Blanks
	Positive Control Materials & Devices Study Group (PCMDSG) Options	Mr. Scott Randall
2 Apr 92	Views on Post Launch Destruct	Dr. Kosta Tsipis
	NCCS Assessment Study Group (NASG) Options	Mr. Bill Thoms
	RRWG Options	Mrs. Sally Horn
24 Apr 92	Safety, Security, and Dismantlement Options	Dr. Robert Barker, ATSD/AE

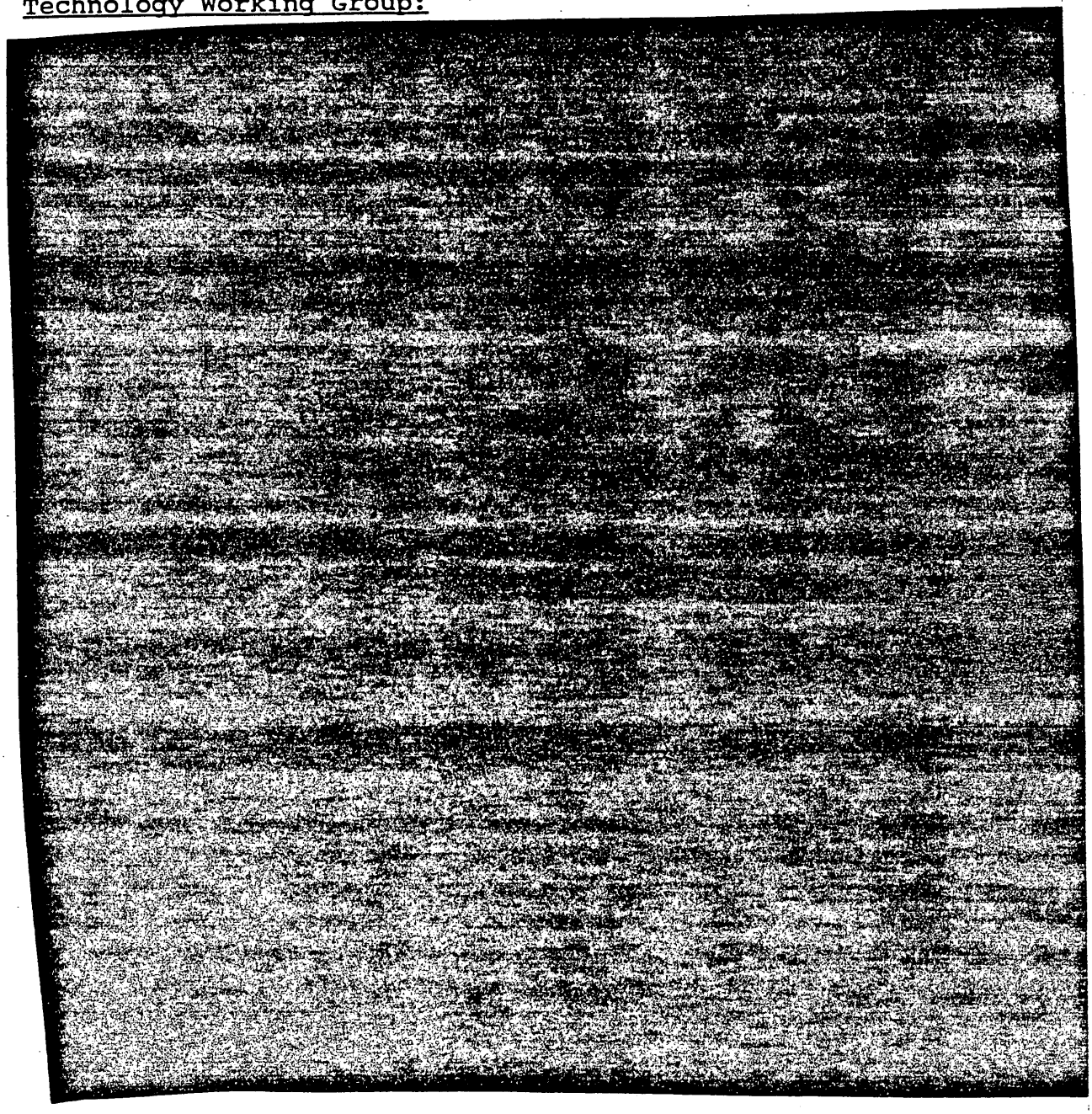
DATE	TITLE	SPONSOR/BRIEFER
24 Apr 92 (Cont'd)	Intelligence Update - Former Soviet Union Weapons Matters	Dr. Larry Gershwin National Intelligence Officer for Strategic System
	DOD NCCS Oversight	LCDR Rick Hagy, NSS
	NASG Assessments I	Mr. Bill Thoms
30 Apr 92	Views on Post Launch Destruct	Dr. Richard Garwin
	Computer Security	Mr. Dan Ryan, OSD
	DoD/DOE "Delay" Programs	Mr. Jeff Everett/ Dr. Ray Reynolds/ Mr. Sanders/ Col Robert Pike
15 May 92	Views on Post Launch Destruct	Dr. Sherman Frankel
	RDSG Final Assessment	Col Randolph Blanks
	PCMDSG Final Assessment	Mr. Scott Randall
5 Jun 92	Strategic Defense Initiative Discussion	Amb. Henry Cooper
2 Jul 92	Views on Failsafe and Risk Reduction	Dr. Fred Iklé
	RRWG Assessment (Issues #5, 6)	Mrs. Sally Horn
	NASG Assessment II	Mr. Bill Thoms
	WSRSG Assessment I	COL Joe Phillip
16 Jul 92	WSRSG Assessment II	COL Joe Phillip

DATE	TITLE	SPONSOR/BRIEFER
16 Jul 92 (Cont'd)	RRWG Assessment (Issue 10)	
	- Intelligence Support related to Risk Reduction	Mr. Brooks Shelton
	- DOD Efforts to Counter Proliferation	Mr. Sokolsky
	- Intelligence Community Efforts to Support Countering Proliferation	Mr. Gordon Oehler
	- Strategic and Tactical Warning of Nuclear Attack	Mr. Bill Thoms
11 Aug 92	PRSG Assessment	Mr. Gary Betourne
	WSRSG Specific Issues Briefing	COL Joe Phillip
	OCONUS Site Security Review	COL Joe Phillip
8 Sep 92	Final Report Deliberations (Executive Session)	
25 Sep 92	Final Report Deliberations (Executive Session)	
30 Oct 92	Formal Meeting, Approval of Final Report	

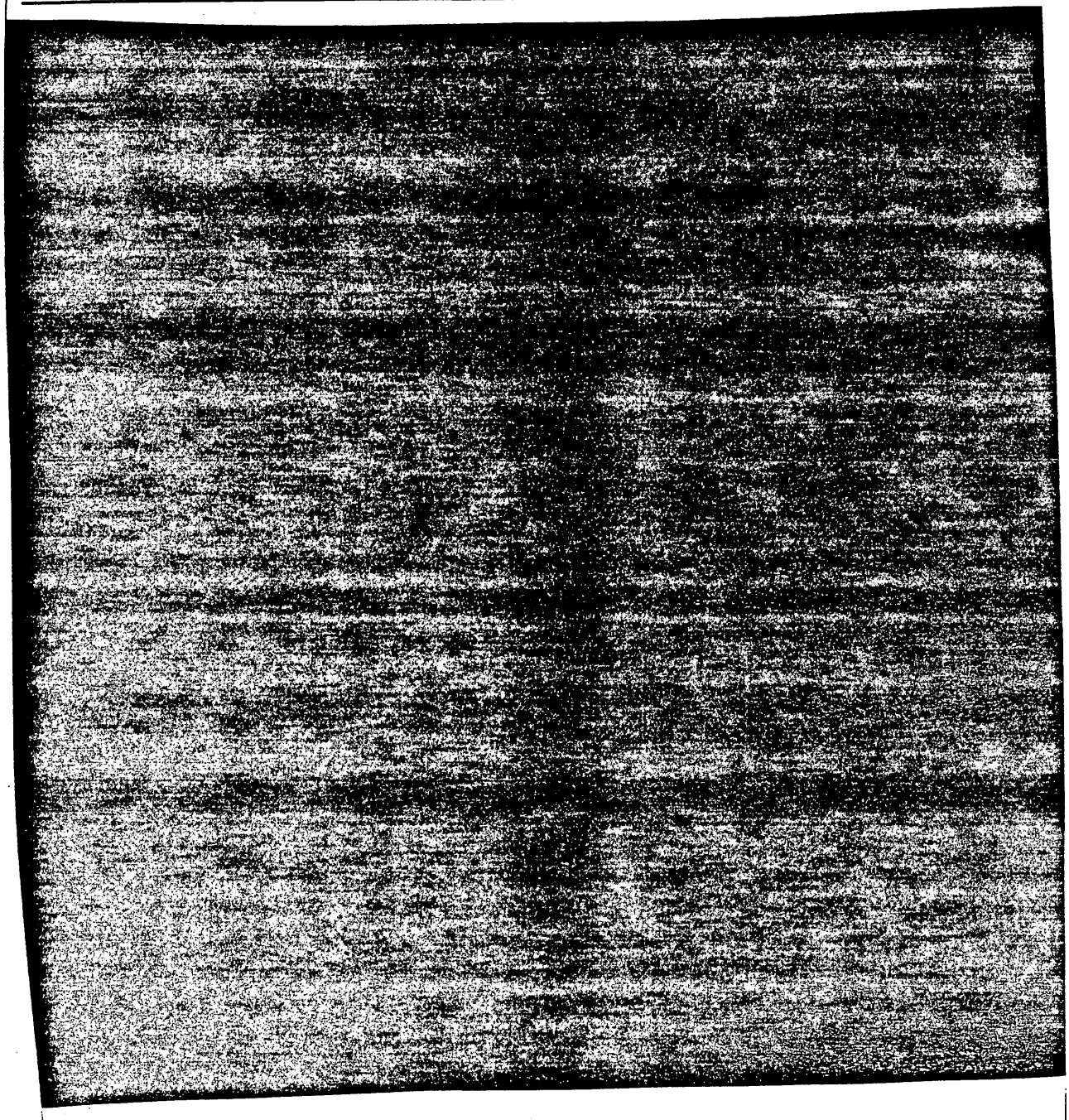
Working and Study Groups

BRIEFINGS AND PLACES VISITED

Technology Working Group:



DATE	TITLE	SPONSOR/BRIEFER/ LOCATION



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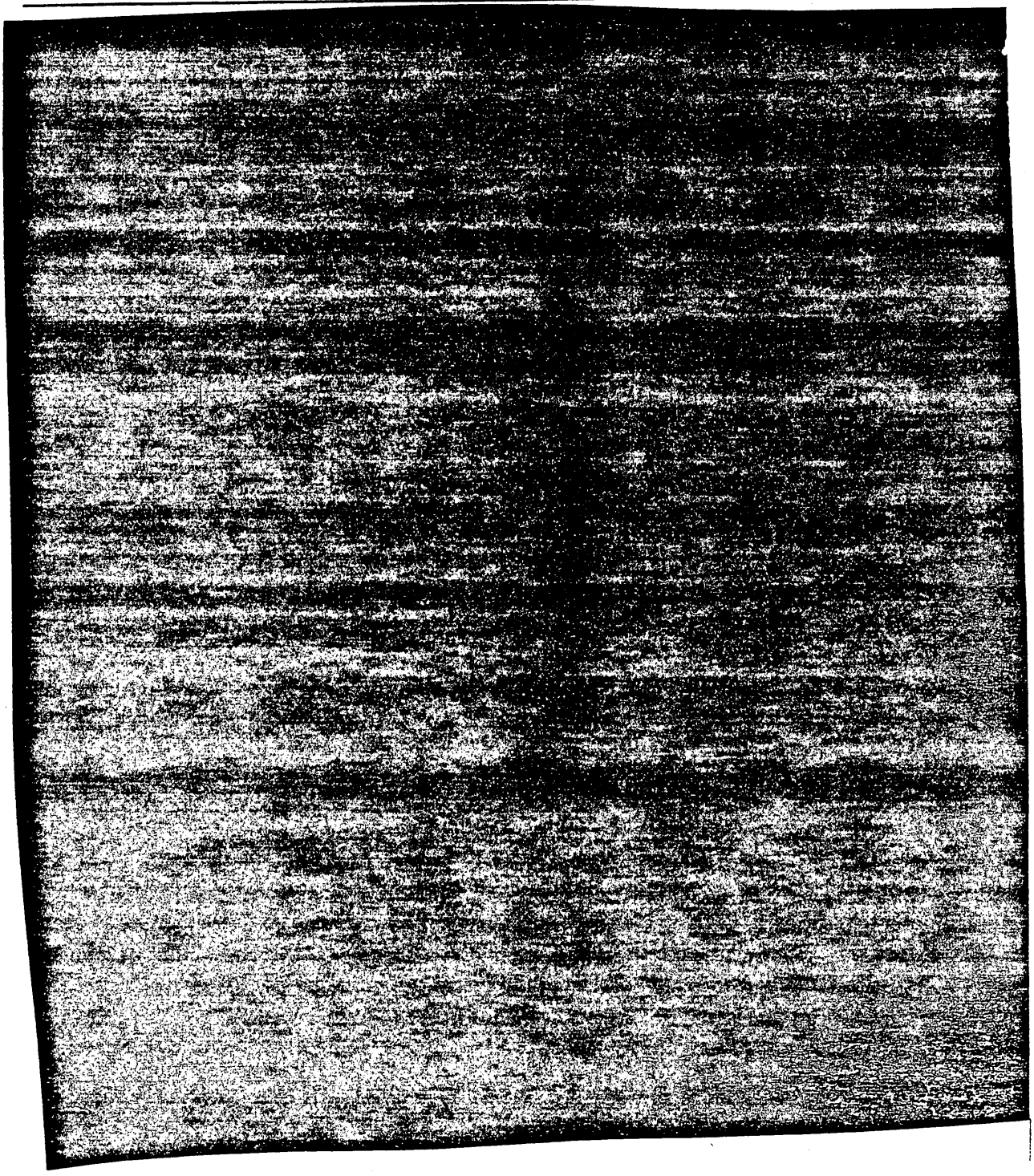

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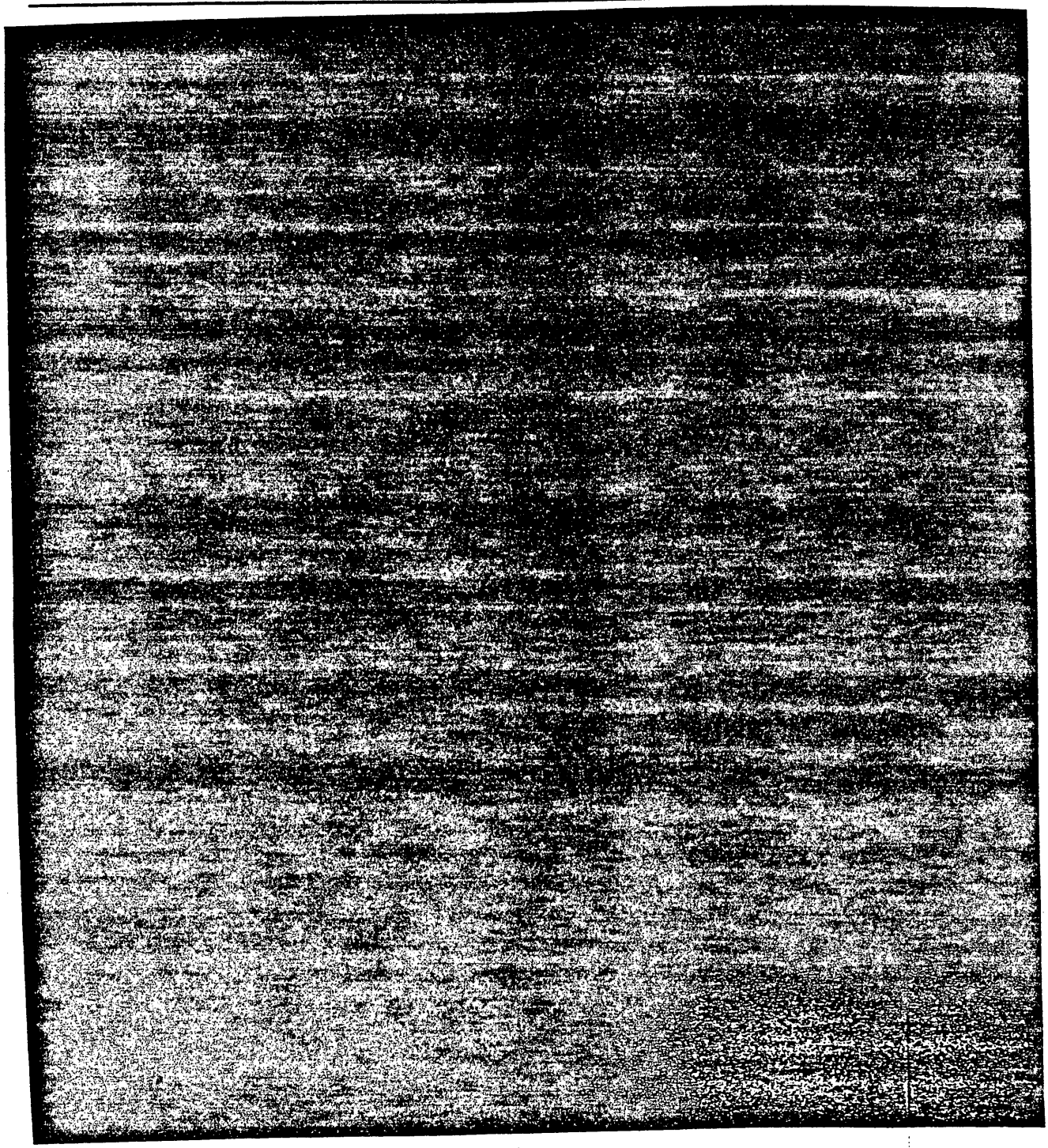

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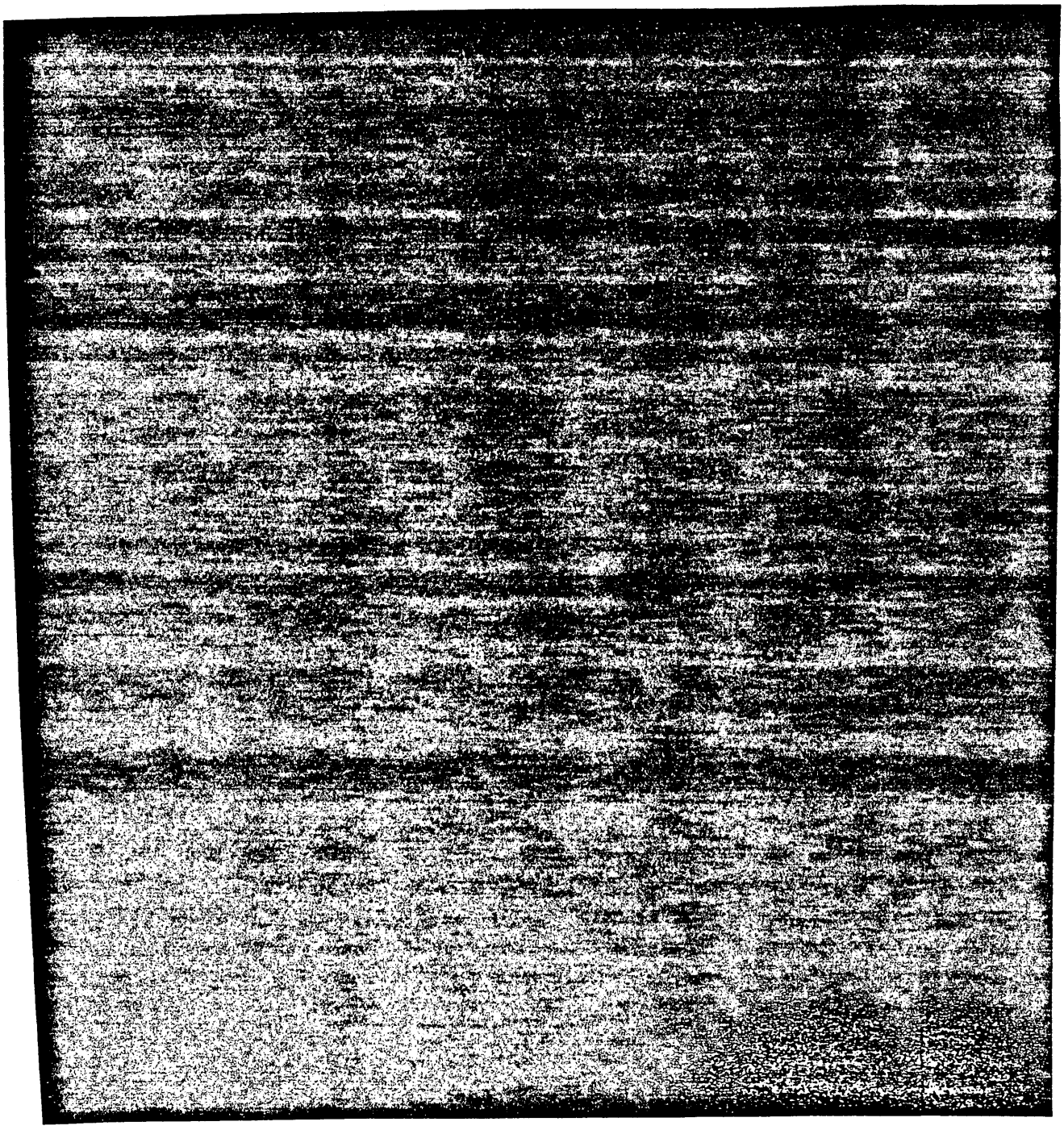

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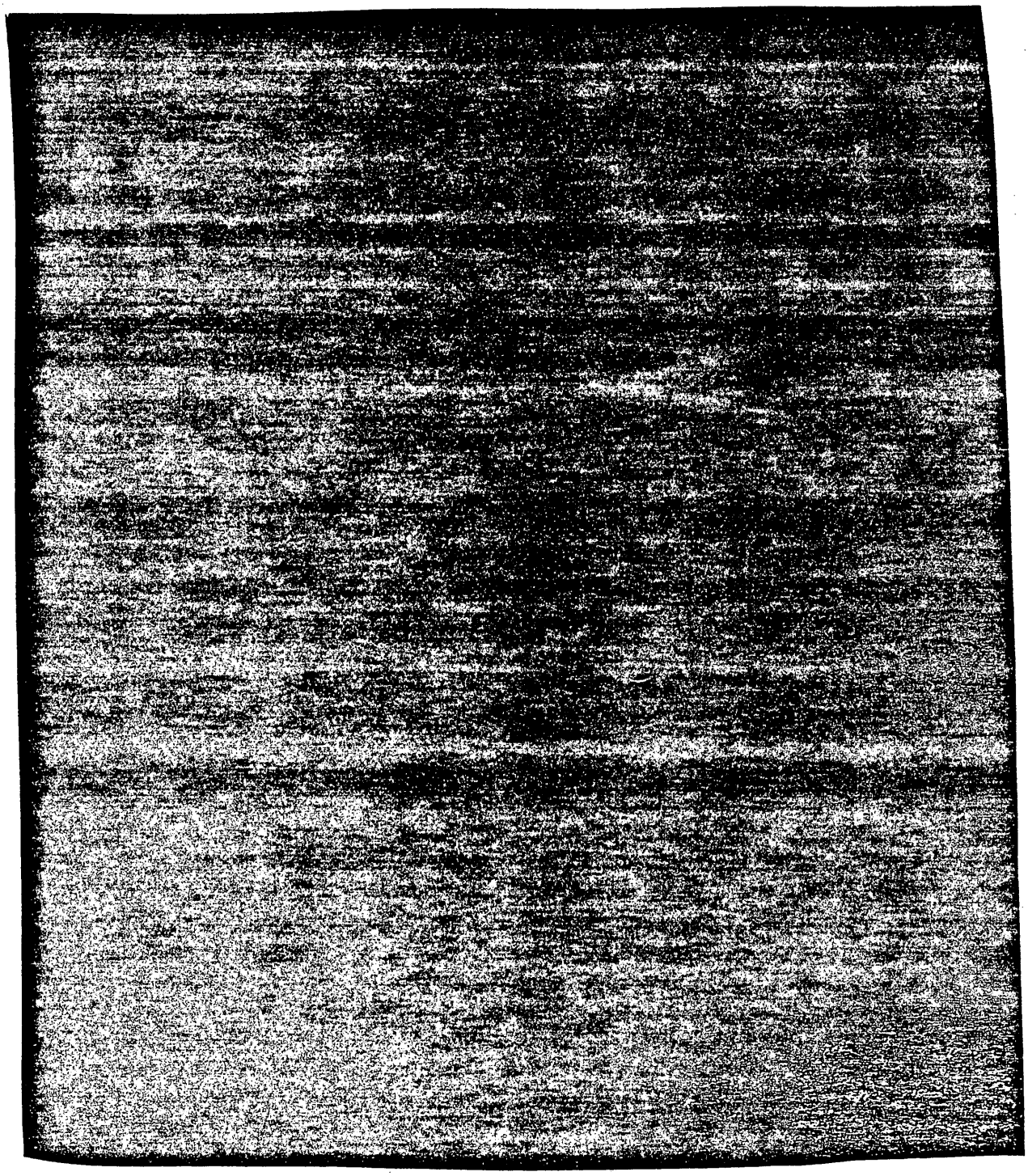

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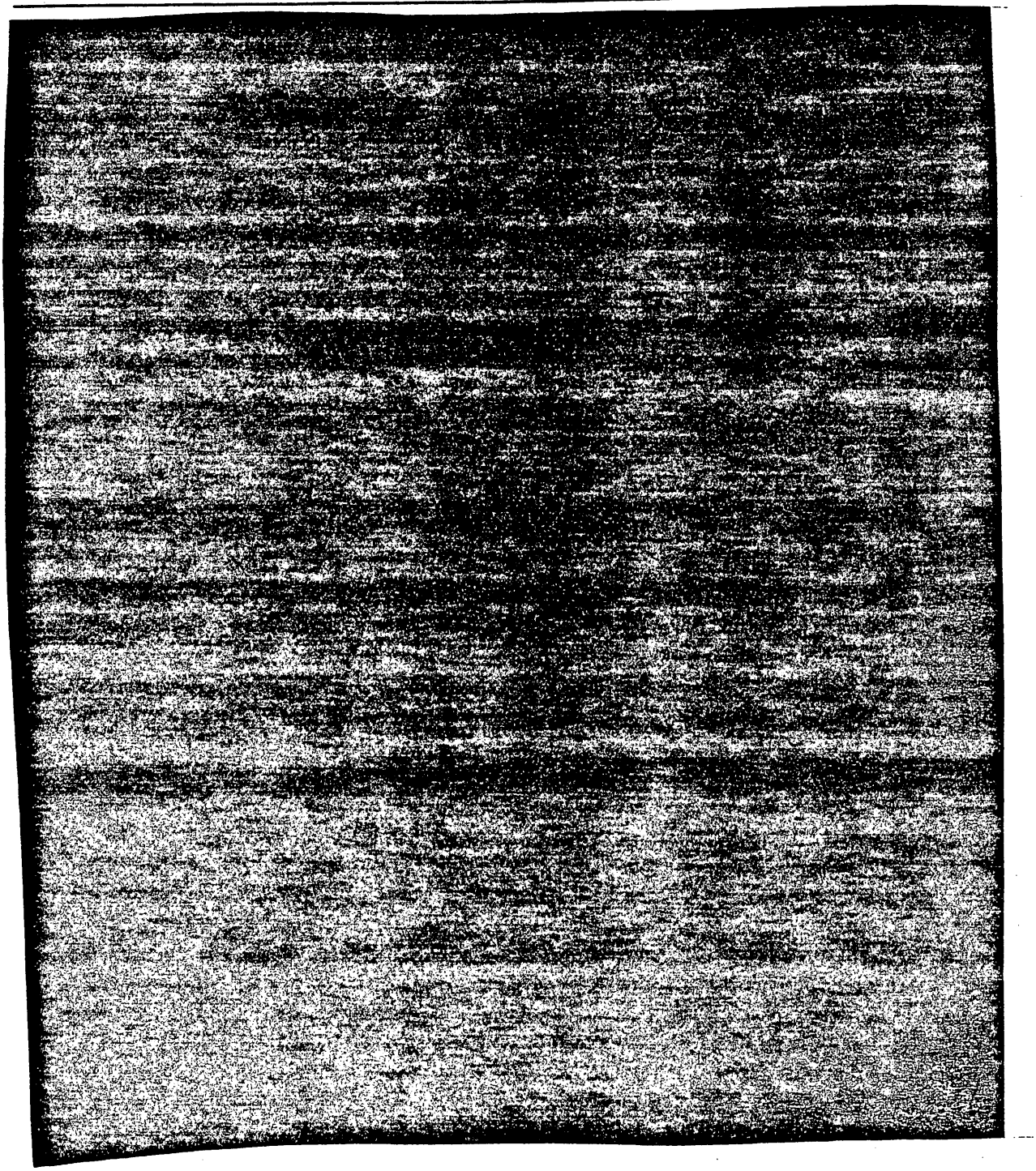

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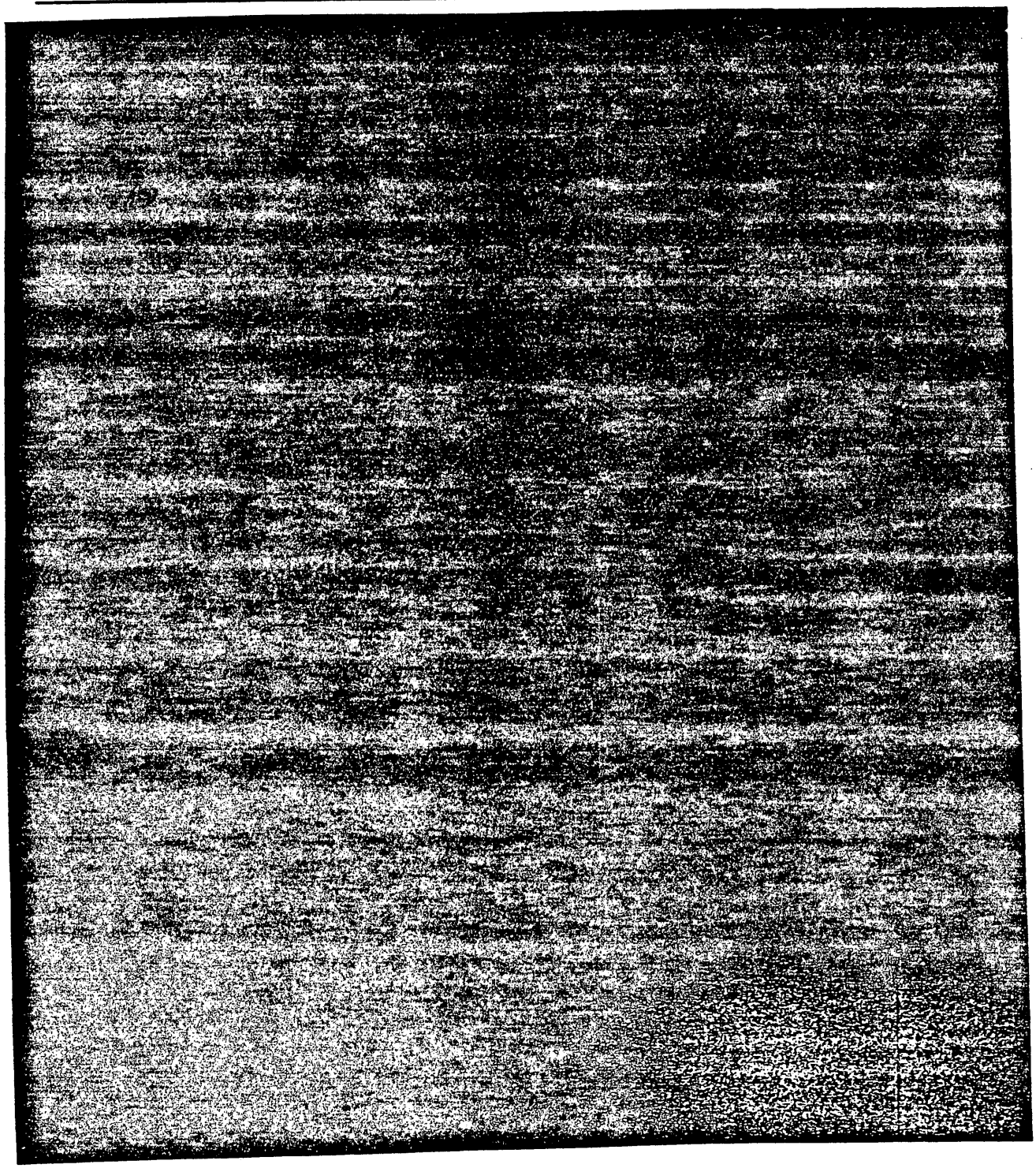


DATE	TITLE	SPONSOR/BRIEFER/ LOCATION
4 Oct 91	Tamper Detection Technology	Sandia Nat'l Labs Albuquerque, NM
4 Oct 91	Threat Definition	National Security Agency (NSA)
13 Feb 92	ICBM Command and Control	National Security Agency (NSA)
1 Nov 91	Unauthorized Launch Analysis (ULA) Methodology/Results	Air Force Directorate of Nuclear Surety (AFDNS)
1 Nov 91	Unauthorized Launch Analysis (ULA) Methodology/Results	Cruise Missile Program Office (CMPO)
1 Nov 91	Unauthorized Launch Analysis (ULA) Methodology/Results	Strategic Systems Program Office (SSPO)
4 Oct 91	Misc. Navy Nuclear Weapon System Studies	Sandia Nat'l Labs Albuquerque, NM
4 Oct 91	Stockpile Improvement Studies	Sandia Nat'l Labs Albuquerque, NM

Fail Safe Working Group:

Weapons System Review Study Group (WSRSG):

ACTIVITIES VISITED: BRIEFINGS

DATE	TITLE	SPONSOR/BRIEFER/ LOCATION
17 Jun 91	Unauthorized Launch Analysis (ULA) Methodology, Site Security Survey Results & Nuclear Safety Program Overview	Army Nuclear and Chemical Agency, Fort Belvoir, VA

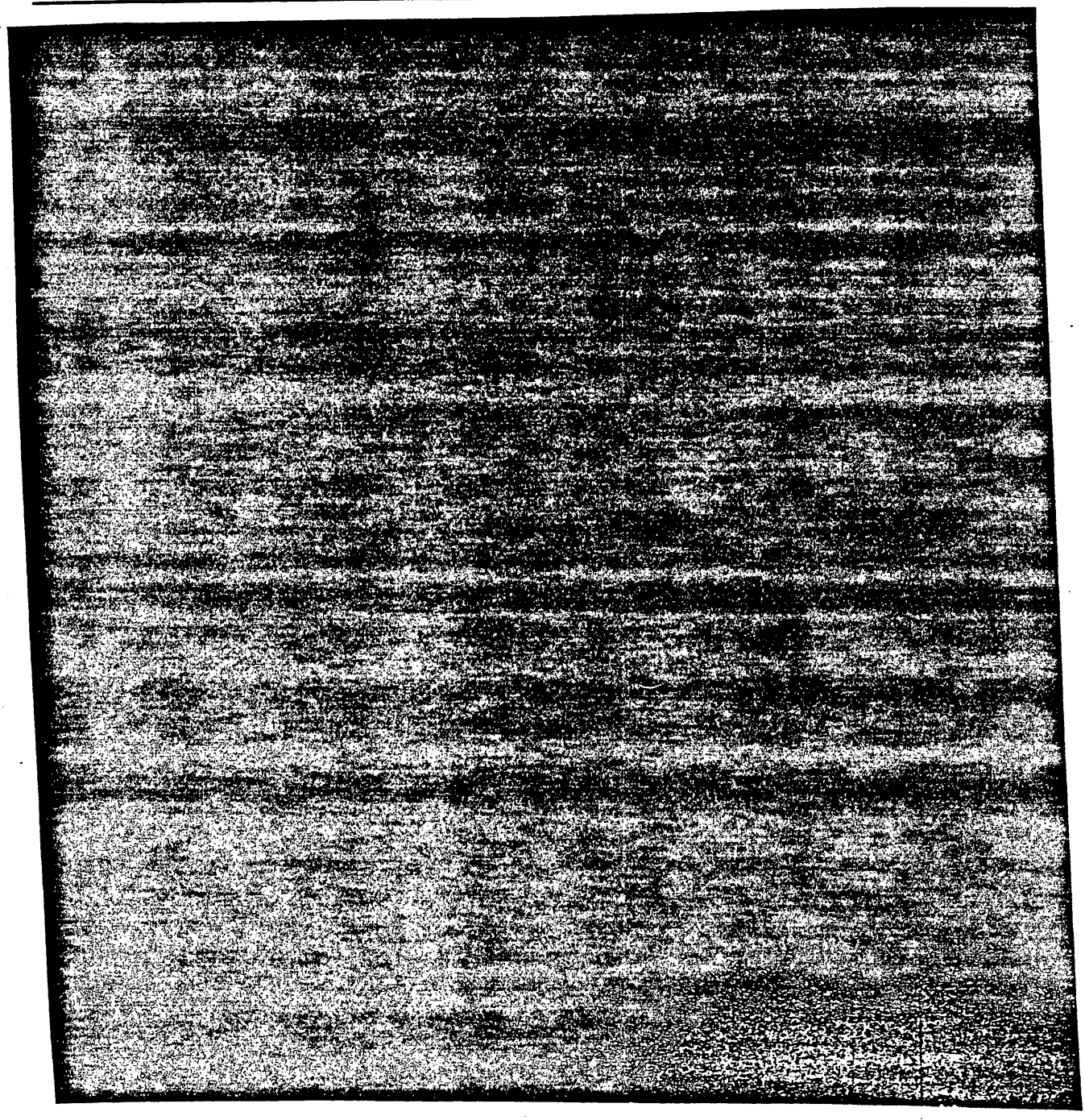
DATE	TITLE	SPONSOR/BRIEFER/ LOCATION
21 Jun 91 - 22 Jun 91	Air Force Nuclear Safety Program Overview	Air Force Safety Agency, Det 1, Kirtland AFB, NM
25 Jun 91	Nuclear Weapon Stockpile Characteristics	Defense Nuclear Agency, Alexandria, VA
25 Jun 91	JCS NC2 Study Relative to WSRSG Charter	Nuclear Command & Control System Support Staff, Washington, DC
17 Sep 91	Navy Nuclear Weapons Safety Program Overview & TLAM-N ILA Methodology	Naval Weapons Evaluation Facility, Kirtland AFB, NM
18 Sep 91 - 19 Sep 91	Inadvertent Launch Analysis (ILA) results on ICBMs & Air Force Bombs; & TLAM-N Unauthorized Launch Analysis (ULA) methodology	Air Force Safety Agency, Det 1 Kirtland AFB, NM
6 Nov 91	Tamper-Indicator Vulnerabilities & Evolving Technologies	Army Armament R&D Engineering Center, Dover NJ
13 Nov 91	Fleet Operations Overview	Commander in Chief, Atlantic, Norfolk, VA
12 Dec 92	Weapon Vulnerabilities	National Laboratories Complex, Livermore, CA
21 Jan 92	DOE's One-Point Safety Certification Program & New Diagnostic Tools	Los Alamos National Laboratory, Los Alamos, NM

DATE	TITLE	SPONSOR/BRIEFER/ LOCATION
22 Jan 92	Air-launched Cruise Missile ILA methodology & results	Air Force Safety Agency, Det 1 Kirtland AFB, NM
10 Feb 92	Trident ULA Methodology	Strategic Systems Program Office, Arlington, VA
14 Feb 92	TLAM-N ULA results	Cruise Missile Program Office, Arlington, VA
7 Apr 92	Nuclear Safety Program Overview	Field Command, DNA, Albuquerque, NM
8 Apr 92	Remote Destruct Options & Use Control Overview	Sandia Nat'l Labs, Albuquerque, NM
1 May 92	Trident ULA & ILA Results	Strategic Systems Program Office, Arlington, VA
12 May 92	Software Security Program & Planning	Defense Information Systems Security Program, Washington, DC
14 May 92	Procedures & Systems for Locating Lost/Stolen	DOE, Nevada Operations Office, Las Vegas, NV
21 May 92	Navy Weapon Storage Site Security Program & Problems	Marine Corps Security Force, Norfolk, VA
28 Jul 92	Site Security Folders & Contingency Planning	Defense Nuclear Agency, Alexandria, VA

ACTIVITIES VISITED: DEMONSTRATIONS/TOURS

12 Aug 91 - 18 Aug 91	Nuclear Weapons Recovery Exercise	Anderson AFB Guam, MI

DATE	TITLE	SPONSOR/BRIEFER/ LOCATION



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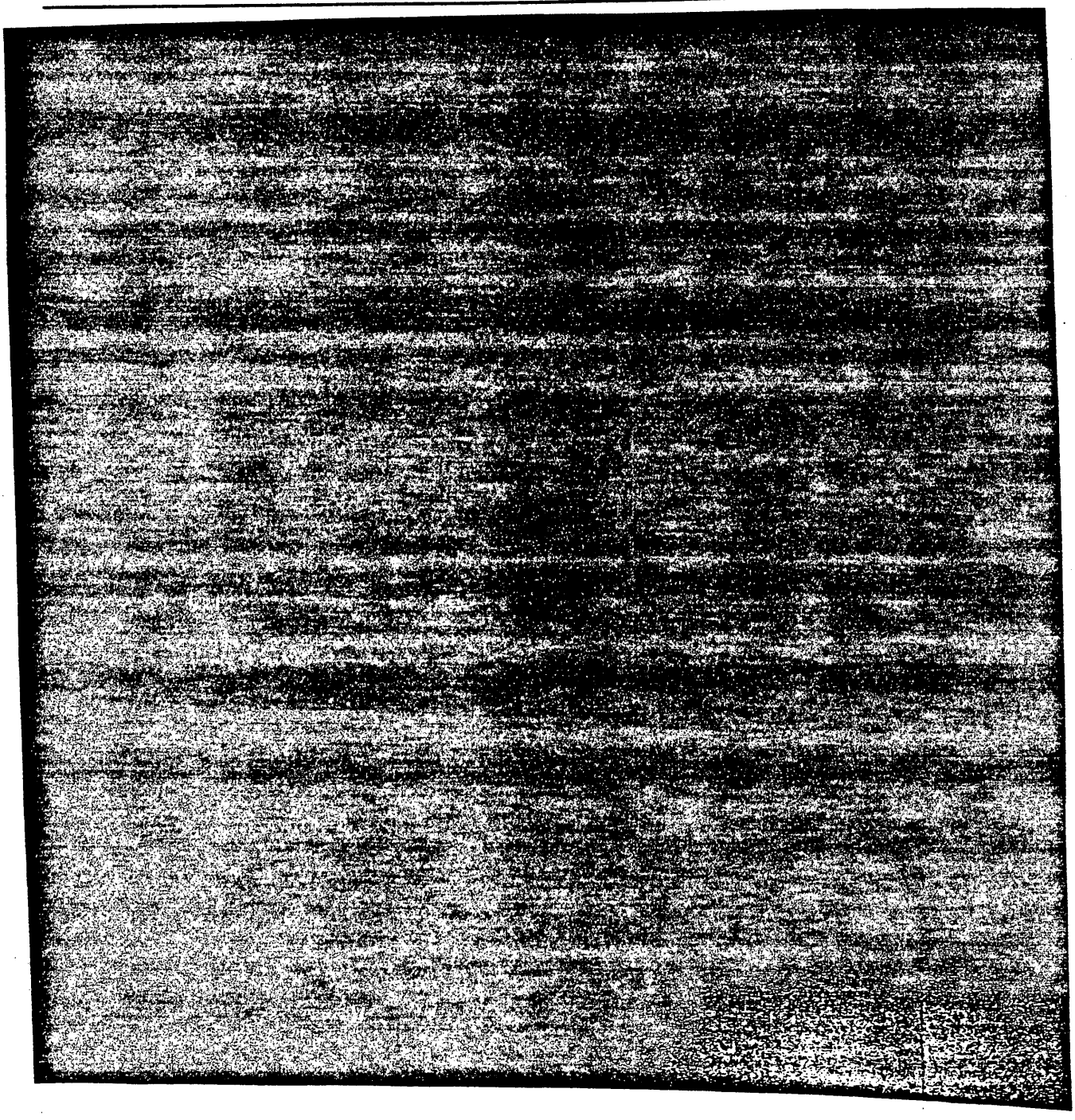

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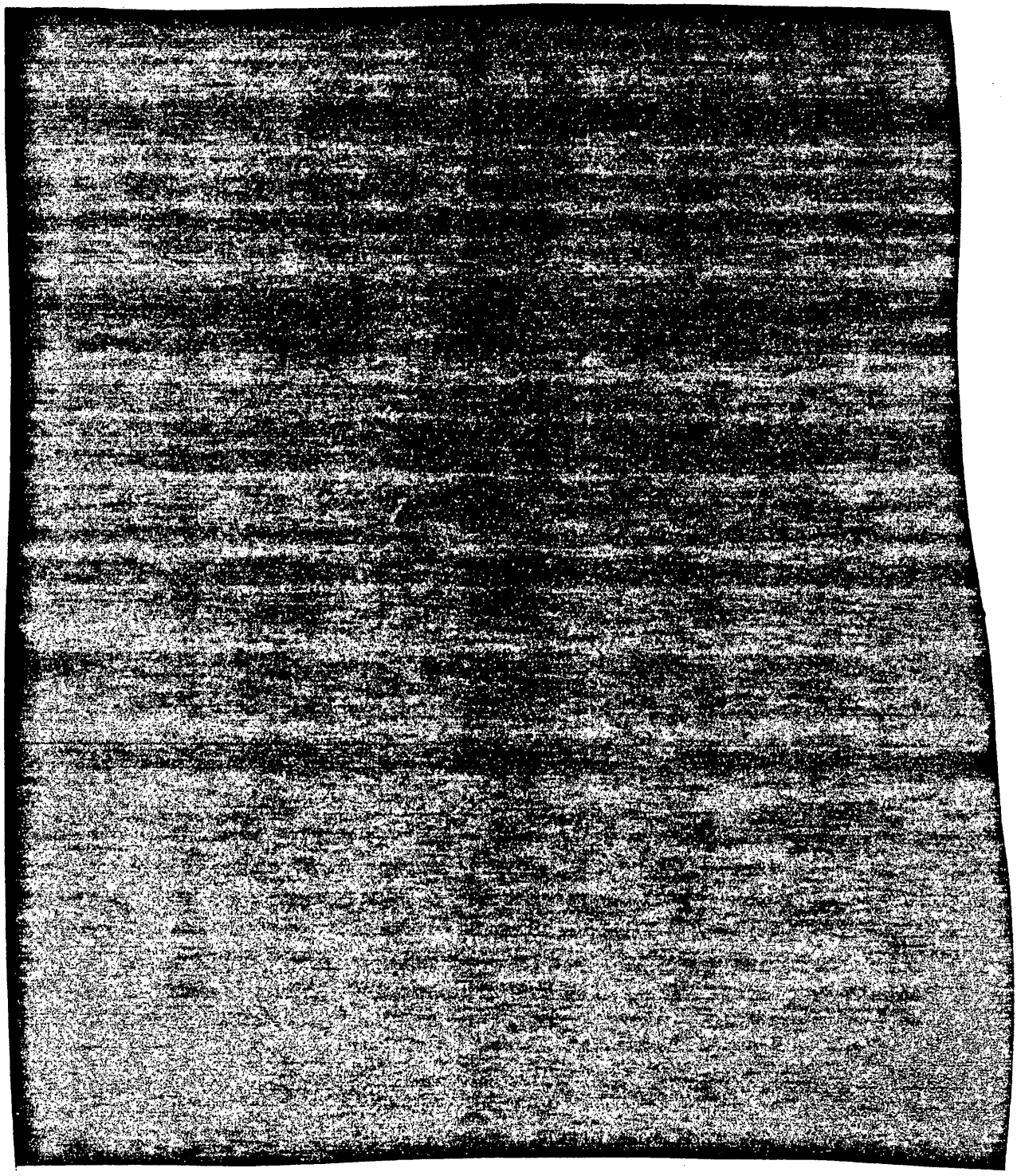

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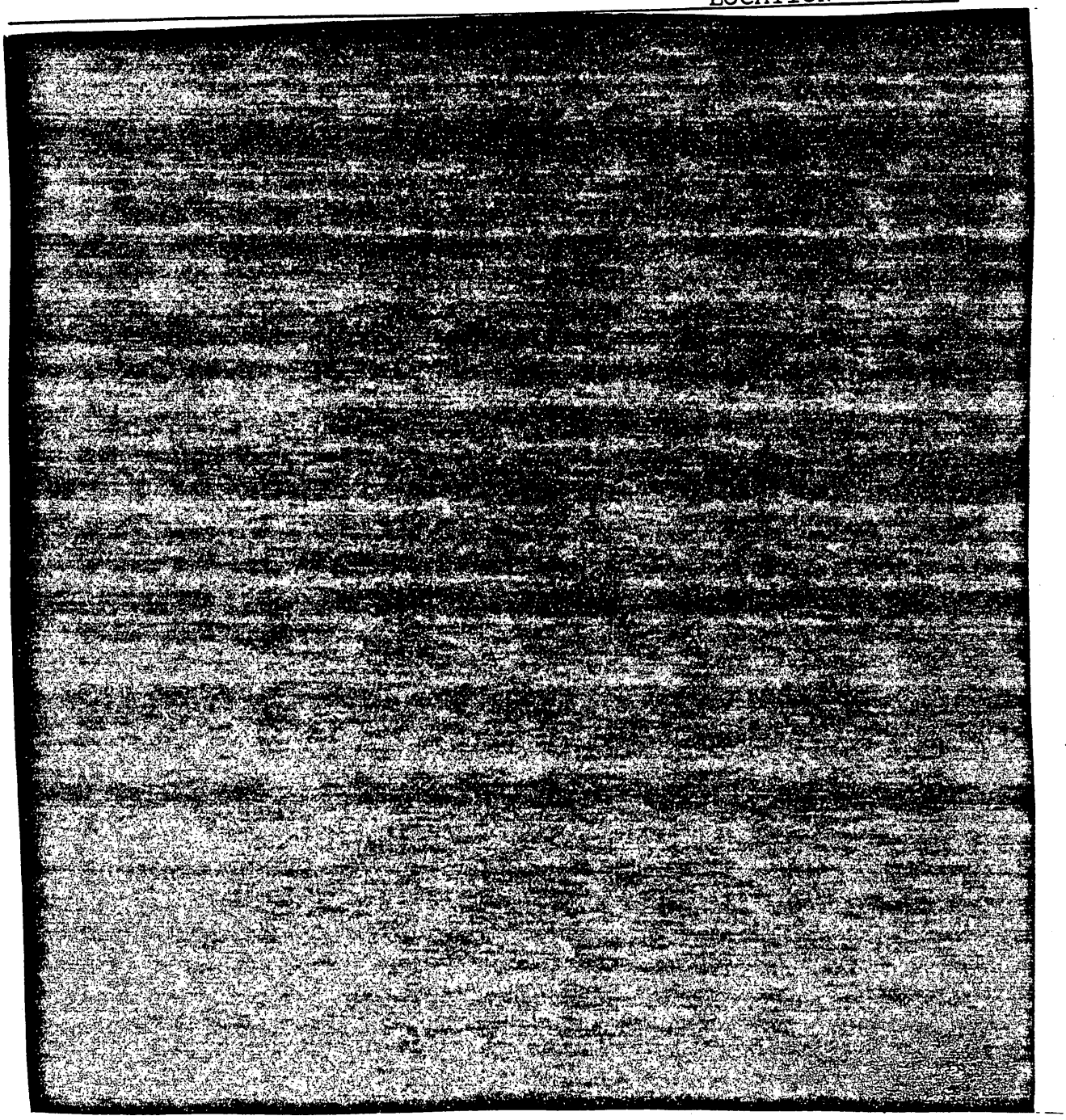

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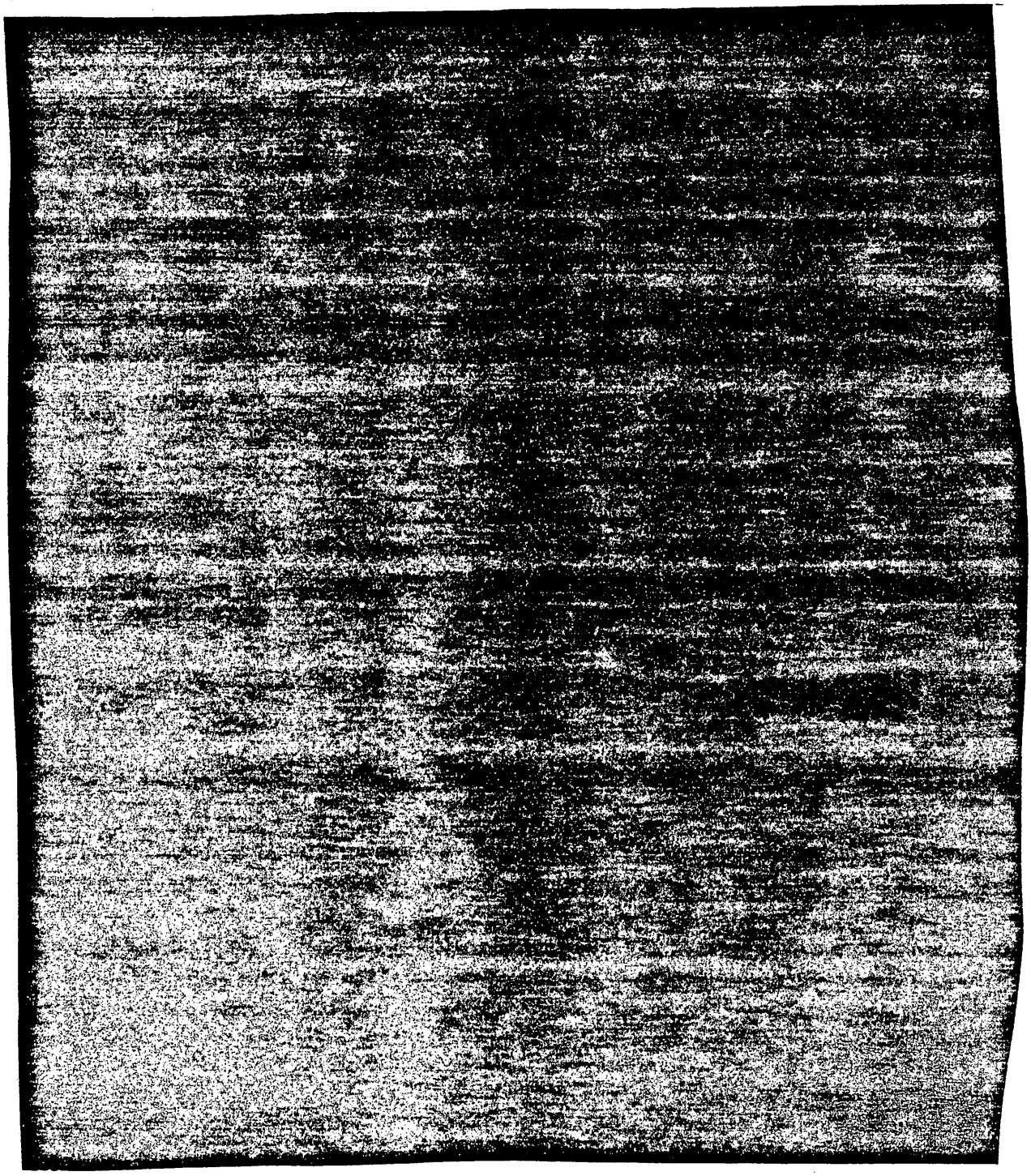

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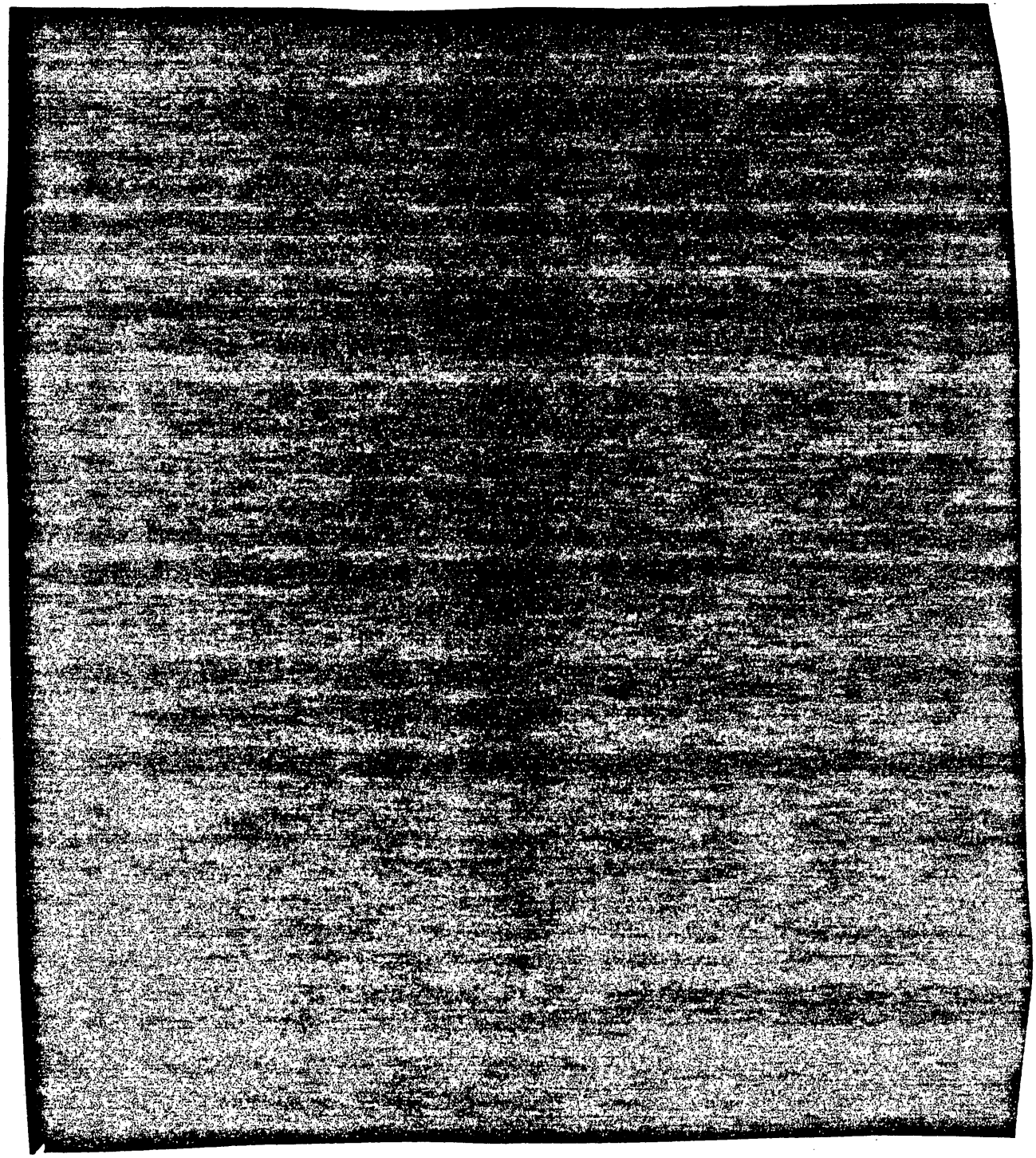

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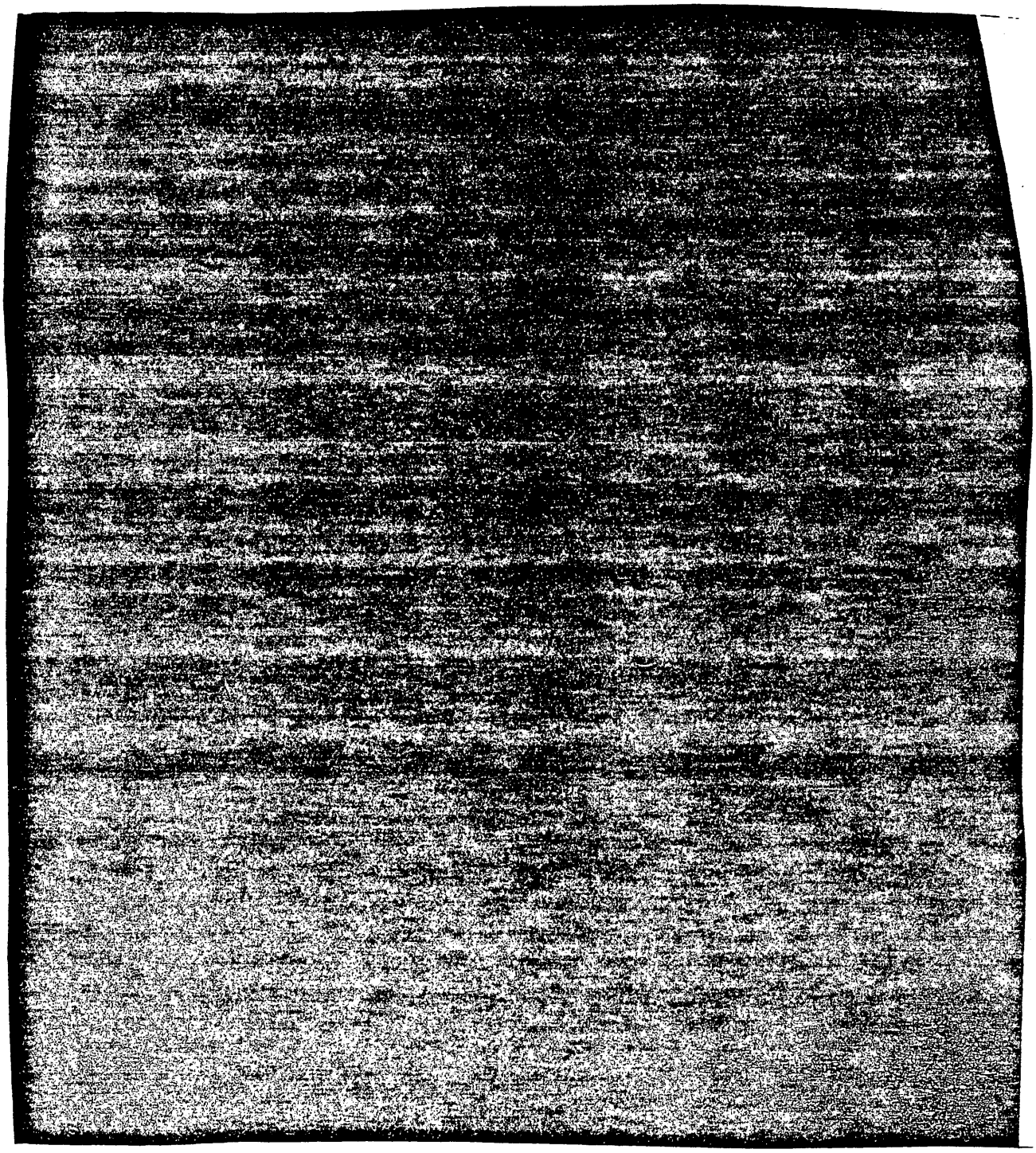

DATE	TITLE	SPONSOR/BRIEFER/ LOCATION
2 Mar 92	NMCC Operations	Joint Staff Pentagon
20 Apr 92	Joint Staff Review of Briefing	DISA at Pentagon

Risk Reduction Working Group (RRWG):

DATE	TITLE	SPONSOR/BRIEFER/ LOCATION
23 Sep 91	Security of Soviet Nuclear Weapon Storage Sites Security of Soviet Nuclear Weapon Units Soviet Nuclear Command and Control Safeguards	DIA
26 Sep 91	Third-world Countries and Nuclear Proliferation	DIA
10 Oct 91	PRC Nuclear Command and Control Terrorism	DIA
21 Nov 91	Preliminary Failsafe & Risk Reduction Options of Farr Technology Working Group	NSS
12 Dec 91	Nuclear Proliferating States	NIO/DIA
10 Jan 92	Chinese Nuclear Command and Control Issues	Los Alamos Nat'l Labs (DOE)

Excerpt from the FY 91 DoD Authorization Act (P.L. 101-510):

"Sec 1441. SENSE OF CONGRESS ON ADDITIONAL NUCLEAR RISK REDUCTION MEASURES

(a) FINDINGS. -- Congress makes the following findings:

(1) On June 1, 1990, the President of the United States and the President of the Soviet Union signed a document entitled "Joint Statement on Future Negotiations on Nuclear and Space Arms and Further Enhancing Strategic Stability".

(2) In that document, the two nations pledged to pursue additional confidence-building and predictability measures "that would reduce the possibility of an outbreak of nuclear war as a result of accident, miscalculation, terrorism, or unexpected technological breakthrough, and would prevent possible incidents between them".

(3) As a result of the recent increase in ethnic, national, economic and political tensions within the Soviet Union, concern has heightened regarding the possible unauthorized or accidental use of Soviet nuclear weapons.

(4) It has been four years since the Department of Defense conducted a comprehensive review of its nuclear control procedures and failsafe mechanisms.

(5) The Joint Chiefs of Staff, in its 1990 Joint Military Net Assessment, concluded that with the recent changes in the global security environment "the risk of nuclear deterrence failing is assessed to be low and at this moment to be decreasing".

(6) While Congress is concerned about continued strategic offensive and defensive modernization by the Soviet Union and the unpredictable status of the domestic situation in the Soviet Union, at this stage the lessened prospects that nuclear weapons of the United States might have to be employed may afford an opportunity to reconsider past reluctance to use certain positive control measures, such as the installation of permissive action links (PALs) on nuclear weapons deployed at sea by the United States and the installation of post-launch destruct mechanisms on intercontinental ballistic missiles (ICBMs) and submarine launched ballistic missiles (SLBMs) deployed by the United States, as long as appropriate security measures can be developed to protect the integrity of such destruct mechanisms.

(7) On September 15, 1987 the Untied States and the Soviet Union agreed to establish Nuclear Rick Reduction Centers (NRRCs) in Washington and Moscow.

(8) The NRRCs have made a useful contribution to lowering the risks of accidental or inadvertent nuclear war and are capable of taking on expanded roles.

(b) SENSE OF CONGRESS. -- It is the sense of Congress --

(1) that the President of the United States and the President of the Union of Soviet Socialist Republics are to be commended for their June 1, 1990, joint statement to pursue

additional nuclear confidence-building measures; and

(2) that, in keeping with that joint statement, the President --

(A) should invite the Soviet Union to join with the United States in conducting separate but parallel, comprehensive reviews of each nation's own nuclear control procedures and failsafe mechanisms; and

(B) should propose to the Soviet Union that representatives of the two nations engage in discussions with the objective of agreeing on additional roles and functions that could be assigned to the Nuclear Risk Reduction Centers to further lessen the risks of the outbreak of nuclear war as the result of misinterpretation, miscalculation, or accident.

(c) REPORT ON ADDITIONAL MEASURES. -- Not later that March 1, 1991 the President shall submit to Congress a report (in both classified and unclassified form) assessing additional nuclear risk reduction measures which could be implemented pursuant to the joint statement of June 1, 1990, referred to in subsection (b), including the following:

(1) Assigning to the Nuclear Risk Reduction Centers (NRRCs) such expanded roles as the following:

(A) Serving as a forum for discussions between the two nations on responding to possible nuclear terrorism.

(B) Transmitting notifications that may be required under future arms control treaties.

(C) Transmitting non-urgent notifications and information requests required under Article 5 of the 1971 Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War Between the United States and the Union of Soviet Socialist Republics.

(D) Providing a forum for discussions between the United States and the Soviet Union on restricting nuclear, chemical and missile proliferation.

(E) Serving as a meeting place for high-level military discussions on nuclear doctrines, forces and activities, and regional security concerns.

(2) Installation of post-launch destruct mechanisms on all intercontinental ballistic missiles (ICBMs) and submarine launched ballistic missiles (SLBMs) deployed by the United States.

(3) Installation by the Untied States of permissive action links (PALs) on all nuclear weapons at sea."

UNCLASSIFIED WITH
SECRET ATTACHMENTS

[redacted]

THE WHITE HOUSE

WASHINGTON

June 12, 1991

Dear Mr. President:

Enclosed are copies of the unclassified report assessing possible additional nuclear risk reduction measures requested by the Congress in section 1441 of the National Defense Authorization Act for Fiscal Year 1991 (Public Law 101-510). Also enclosed is a classified annex to the report.

The Administration is actively engaged in a variety of efforts to reduce further the risk of conflict between the United States and the U.S.S.R. After careful review of the measures specified by the Congress, the report has concluded that effective bilateral mechanisms are in place to address concerns such as nuclear terrorism and nuclear, chemical, and missile proliferation. Similarly, U.S. initiatives already have resulted in expanded use of the Nuclear Risk Reduction Centers (NRRCs) to transmit information required under additional arms control agreements.

At the same time, our report has identified possible steps that were not mentioned in section 1441. These steps -- expanding the conference facility available to the U.S. NRRC and establishing a government-to-government video conferencing facility located in the NRRCs -- both require further internal review.

Sincerely,

George Bush

The Honorable Dan Quayle
President of the Senate
Washington, D.C. 20510

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SECRET ATTACHMENTS

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WASHINGTON

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Sincerely,

George Bush

The Honorable Thomas S. Foley
Speaker of the
House of Representatives
Washington, D.C. 20515

UNCLASSIFIED WITH
SECRET ATTACHMENTS

SECRET

ASSESSMENT OF POSSIBLE ADDITIONAL NUCLEAR RISK REDUCTION MEASURES

Section 1441 of the National Defense Authorization Act for Fiscal Year 1991 (P.L. 101-510) requests the President to "submit to Congress a report (in classified and unclassified form) assessing additional nuclear risk reduction measures which could be implemented pursuant to the (U.S.-USSR) joint statement of June 1, 1990...including the following:

"(1) Assigning the Nuclear Risk Reduction Centers (NRRCs) such expanded roles as the following:

"(A) Serving as a forum for discussions between the two nations on responding to possible nuclear terrorism.

"(B) Transmitting notifications that may be required under future arms control treaties.

"(C) Transmitting notifications and information requests required under Article 5 of the 1971 Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War Between the United States and the Union of Soviet Socialist Republics ("Accidents Measures" Agreement).

"(D) Providing a forum for discussions between the United States and the Soviet Union on restricting nuclear, chemical, and missile proliferation.

"(E) Serving as a meeting place for high-level military discussions on nuclear doctrines, forces and activities, and regional security concerns.

"(2) Installation of post-launch destruct mechanisms on all intercontinental ballistic missiles (ICBMs) and submarine launched ballistic missiles (SLBMs) deployed by the United States.

"(3) Installation by the United States of permissive action links (PALs) on all nuclear weapons at sea."

This report, prepared by the Secretary of Defense in coordination with the Joint Staff, Department of State, Arms Control and Disarmament Agency, Department of Energy, Director of Central Intelligence, and Director of the NRRC, responds to the Congressional request. Part I addresses questions related to possible additional roles for NRRCs. Part II addresses questions related to post-launch destruct mechanisms and PALs. Part III is a classified annex to the report.

PART I:

BACKGROUND

As a result of an initiative by the United States, President Reagan and General Secretary Gorbachev agreed at the November 1985 Summit in Geneva to explore the possibility of establishing centers to reduce the risk of conflict between the United States and the USSR -- in particular, the risk of nuclear war as a result of misinterpretation, miscalculation, or accident. Following a series of expert meetings and formal negotiations, the Agreement Between the United States of America and the Union of Soviet Socialist Republics on the Establishment of Nuclear Risk Reduction Centers (and Protocols thereto) was signed in Washington on September 15, 1987, by Secretary of State Shultz and Foreign Minister Shevardnadze.

Under the Agreement, which is of unlimited duration, each Party agreed to establish a Nuclear Risk Reduction Center (NRRC) in its capital and to establish a special facsimile link between these centers. NRRCs became operational on April 1, 1988. The U.S. NRRC is located in the Department of State and staffed by U.S. personnel. The Soviet NRRC is located in the Soviet Ministry of Defense and staffed by Soviet personnel. The Soviet NRRC operates as a counterpart to both the U.S. NRRC and the U.S. On-Site Inspection Agency.

NRRCs are intended to complement existing means of communication and provide direct, reliable, high-speed systems for transmitting notifications and communications at the Government-to-Government level. NRRCs can rapidly transmit full text and graphics in a disk-to-disk or facsimile format by direct satellite link. In this respect, NRRCs have a communications capability very similar to -- but separate from -- the modernized Direct Communications Link (Hot Line), which is reserved for communications at the Head of Government level, i.e., between the President of the United States and his Soviet counterpart.

It is important to note that NRRCs do not replace normal diplomatic channels of communication or the Hot Line; nor are they intended to have a crisis management role. The principal function of NRRCs is to exchange information and notifications as required under certain existing and possible future arms control and confidence-building agreements.

There are two Protocols to the Agreement. Protocol I identifies notifications that the Parties agreed to exchange on NRRC satellite links. These include ballistic missile launch notifications required under Article 4 of the 1971 Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War ("Accidents Measures"

Agreement) and under paragraph 1 of Article VI of the 1972 Agreement on the Prevention of Incidents on and over the High Seas. The Agreement also provides that the list of notifications transmitted through NRRCs may be altered by the Parties as relevant new agreements are reached. (Alterations to the list of notifications made since September 1987, and the prospects for future alterations, are are discussed below -- see section on "Transmitting notifications that may be required under future arms control treaties.") The Parties may use NRRCS to transmit communications other than those specified under the Agreement "as a display of good will and with a view toward building confidence."

Finally, to help ensure the smooth operation of NRRCs, the Agreement calls for regular meetings at least once a year between representatives of the two national centers to discuss operation of the system.

ASSESSMENT OF ADDITIONAL ROLES FOR THE NRRCS

The Administration has reviewed carefully the five possible additional NRRC roles specified in Section 1441. Our analysis and conclusions with regard to each of those five possibilities is explained below. In addition, the Administration has identified certain possible steps with regard to NRRCs that were not identified in Section 1441. These steps merit further study by the Administration, and no final decisions have been made.

(1) Using NRRCs "as a forum for discussions between the two nations on responding to possible nuclear terrorism."

The United States has a longstanding and continuing commitment to prevent further spread of nuclear weapons, including their acquisition, fabrication, or possible use by subnational groups or terrorist organizations.

Internal U.S. efforts in this regard involve a broad spectrum of physical security, technological safeguards, personnel screening procedures, and emergency response measures designed to minimize absolutely the risks of any successful terrorist action directed against nuclear-related facilities in the United States or U.S. nuclear weapon-related activities (e.g., stockpiles or transshipment) overseas. These efforts are supported by a variety of programs aimed at identifying, at the earliest possible time, any potential terrorist-related activity directed against U.S. or foreign nuclear-related assets. In addition, the United States participates in bilateral and multilateral arrangements -- for example, within NATO -- designed to maintain the highest possible safety and security standards for U.S. nuclear weapon-related activities overseas, and to respond in a timely and effective manner in the event of a nuclear-related accident or incident, including potential terrorist-related activity. It is clear, however, that details of such arrangements and contingency plans can involve extremely

sensitive information, protection of which is of critical importance to the national security of the United States and that of our closest friends and allies.

Bilateral exchanges with the USSR on issues related to nuclear non-proliferation, nuclear-weapons security, and international terrorism have taken place and will continue to take place in a variety of fora and locations (often outside national capitals), and at different levels -- including ministerial-level discussions involving the Secretary of State, Secretary of Defense, and their respective Soviet counterparts. Frequently, these exchanges include various types of experts from several U.S. agencies, and take place within the context of meetings covering a much broader agenda of bilateral issues. In addition, steps have been taken in recent years to facilitate direct communications between the sides in the event of certain nuclear incidents (see (3) below). Thus, while a U.S. NRRC conference facility could serve as one of many possible venues for discussions with the USSR on issues related to nuclear terrorism (see section below on "Other possibilities under consideration") and the NRRC staff could provide administrative support for such a meeting, it would not be appropriate to make the NRRC facility a principal or standing "forum" for such discussions, or involve the NRRC in substantive preparations for such discussions.

In this context, the Administration believes that it would be inappropriate to expand the role of NRRCs to include substantive functions such as U.S.-Soviet coordination or crisis management involving possible nuclear terrorism. Such a role was never contemplated by the sides during negotiation of the NRRC Agreement, and would run counter to deliberate U.S. policy decisions on the appropriate functions, staffing, and technical capabilities of the U.S. NRRC. The underlying rationale for these policy decisions is straightforward: transforming the NRRC into a substantive coordination or crisis management mechanism (e.g., for nuclear terrorism) could seriously jeopardize U.S. ability to protect sensitive information, conduct thorough internal analysis and evaluation of any potential threat, reach policy decisions through existing and effective crisis-management mechanisms, and implement necessary countermeasures in coordination, as appropriate, with our friends and allies.

(2) Transmitting notifications that may be required under future arms control treaties

Since signature of the NRRC Agreement in September 1987, the United States and USSR have agreed to use the NRRC to transmit information required under four additional arms control-related agreements:

-- Notifications required under the 1987 INF Treaty. These include, for example, data updates, inspection-related notices, requests for cooperative measures, and proposed meetings of the Special Verification Commission. As of February 1, 1991, a total of 5,348 such notifications have been exchanged through NRRCs.

-- Notifications under the 1988 Ballistic Missile Launch Notification Agreement, which provides that each side will notify the other, no less than 24 hours in advance, of the planned date, launch area, and area of impact for any launch of an ICBM or SLBM. As of February 1, 1991, a total of 225 such notifications have been exchanged through NRRCs.

-- Notifications under the Threshold Test Ban Treaty (TTBT) and Peaceful Nuclear Explosions Treaty (PNET) and their new verification protocols, which were ratified and entered into force in 1990. These include advance notice of certain planned nuclear tests, information on test conditions, notices of movement of inspection personnel and their on-site monitoring equipment, and requests for meetings of the Bilateral and Joint Consultative Commissions. As of February 1, 1991, a total of 20 such notifications have been exchanged through NRRCs.

-- Notifications under the 1990 U.S.-USSR Bilateral Chemical Weapons Destruction Agreement. These include notifications regarding inspectors, aircrew members, and aircraft flight plans of the Inspecting Party. Information exchanged also will include notification of the intent to carry out an inspection and notifications regarding the transfer of chemical weapons pursuant to the Agreement.

Although the START treaty has not yet been completed, it is anticipated that several types of notifications -- including data updates, notices of movement of certain START-accountable systems, inspection-related information, cooperative measures, and proposed meetings of the Joint Compliance and Inspection Commission -- will be handled by the NRRCs.[1] This would increase significantly the volume of message traffic processed through NRRCs.

By providing a direct, rapid, and reliable government-to-government communications link for transmitting such notifications (and clarifications of notifications, when necessary), NRRCs have contributed to U.S. efforts to verify Soviet compliance with and effectively implement new arms control agreements. In addition, NRRCs have been very useful in other instances. For example, pursuant to the Agreement's provision for "good will" notifications,

[1] See Part III annex

the sides have used NRRCs to transmit information on deorbiting satellites. Similarly, in the context of the 1989 agreement between the U.S. and USSR to exchange advance notifications of certain strategic military exercises, which resulted from Secretary of Defense Carlucci's proposal to Minister of Defense Yazov, the sides agreed to provide such notifications through NRRCs.

Possible additional notification responsibilities for NRRCs will depend on the nature of new arms control and confidence-building measures agreements. In the case of the 1990 Conventional Forces in Europe (CFE) Treaty and Vienna Document on Confidence and Security Building Measures (CSBMs) Agreement, for example, the multilateral nature of the agreements and the notifications required therein means that the NRRC, a strictly bilateral link, cannot be the sole mechanism for the United States and USSR to provide necessary notifications. It may be advisable, however, to use the NRRC as a "back-up" link to ensure timely transmittal of CFE and CSBMs notifications between Washington and Moscow, while using other means -- e.g., existing diplomatic channels or a new, dedicated multilateral communications system under consideration among the parties to the Vienna Document -- to provide notifications to other treaty signatories. A multilateral CFE Communications Center, under the supervision of the Director of the NRRC, is currently being established within the Department of State.

Of course, any expansion of the list of notifications provided through NRRCs must be agreed between the sides. The United States, for example, has responded positively to a Soviet suggestion to use NRRCs in the event time-urgent communications between capitals to help complement communications procedures established under the 1989 Agreement on the Prevention of Dangerous Military Activities. The USSR, however, has not followed through on the U.S. response.

(3) Transmitting non-urgent notifications and information requests required under Article 5 of the 1971 "Accidents Measures" Agreement.

As a result of a U.S. initiative, the United States and USSR signed a Common Understanding to the "Accidents Measures" Agreement in June 1985. The Common Understanding clarifies their obligations to consult in the event of a nuclear incident involving unknown or unauthorized parties.[2]

Article 6 of the "Accidents Measures" Agreement specifies that the sides "shall make primary use" of the Hot line for "transmission of urgent information, notifications, and requests for information in situations requiring prompt clarification."

[2] See PART III annex

While the United States does not exclude the possibility of using NRRCs for notifications required under Article 5, the United States sees no benefit in seeking an explicit agreement with the USSR -- i.e., a change to the "Accidents Measures" or NRRC Agreements -- for this purpose. Moreover, given the critical national security concerns that possibly would be raised with any nuclear incident relevant to the "Accidents Measures" Agreement, use of the Hot line -- which remains, of course, a Presidential prerogative -- may be advisable for both policy and operational reasons.

(4) Providing a forum for U.S.-USSR discussions on restricting nuclear, chemical, and missile proliferation.

As mentioned in (1) above, bilateral exchanges with the USSR on issues related to nuclear non-proliferation have taken place, and will continue to take place, in a variety of fora and locations (often outside national capitals), and at different levels. The same is true for exchanges on restricting chemical weapons and missile proliferation. Frequently, these exchanges include experts from several U.S. agencies, and take place within the context of meetings covering a much broader agenda of bilateral issues. Thus, while a NRRC conference facility could serve as one of many possible venues for discussions with the USSR on proliferation issues, and the NRRC staff could provide administrative support for such discussions, lack of a forum has not been an impediment to such discussions. It would not be appropriate to make the NRRC facility a principal or standing "forum" for such discussions, or involve the NRRC in substantive preparations for such discussions.

(5) Serving as a meeting place for high-level military discussions on nuclear doctrines, forces, activities, and regional security concerns.

High-level defense official contacts and discussions involving the United States and USSR, including military-to-military contacts, have increased significantly in recent years. Examples of substantive meetings in 1990 included the following:

-- In January, the Chairman of the Joint Chiefs of Staff met with the Chief of the General Staff of the Soviet Armed Forces at the Vienna CSBM Conference discussions on military doctrine.

-- In March, the first meeting of the Joint Military Commission (established by the Agreement on the Prevention of Dangerous Military Activities) met at MacDill AFB, Florida.

-- In May, the U.S. Delegation for the Incidents at Sea Agreement visited the USSR, as did the Assistant Secretary of the Air Force.

-- In June, the Principal Deputy Under Secretary of Defense for Policy met in Moscow with the Chairman of the Supreme Soviet Committee on Defense and State Security, as well as a senior military adviser to President Gorbachev.

-- In September, the Chief of the General Staff of the Soviet Armed Forces visited the United States.

-- In October, the Secretary of Defense visited the USSR for meetings with the Soviet defense and political leadership, including unprecedented visits to Soviet military facilities.

-- In November, the Chief of Staff of the U.S. Army visited the USSR.

-- In December, members of the Joint Staff and Soviet General Staff conducted staff talks at the Pentagon.

In addition, senior U.S. defense and military representatives participate actively on U.S. delegations to a range of high-level bilateral meetings, including summits, ministerials, and arms control negotiation, implementation and compliance fora. In fulfilling their roles on such delegations, they frequently interact with counterparts in the Soviet defense establishment.

Topics raised by both sides during such exchanges often include, but are not limited to, nuclear-related and doctrine issues. In addition, the substantive and confidence-building value of discussions between senior defense and military officials clearly has been enhanced by conducting such discussions in a wide variety of locations, including the Pentagon, U.S. and Soviet military bases, and other defense-related facilities. For these reasons, it would be inappropriate, and in some cases counterproductive, to seek to use NRRCs as a focal point for such discussions.

OTHER POSSIBILITIES UNDER CONSIDERATION

In reviewing the possible future role of the NRRCs, the Administration tentatively has identified two areas for further consideration. Both require further internal review of their practicability, cost effectiveness, and security implications.

One possibility would be to expand the conference facility available to the U.S. NRRC, which currently consists of a single conference room adjacent to the NRRC communications office in the Department of State. The purpose of this conference facility would be to provide a venue for the increasing number of U.S.-Soviet meetings of officials and experts working on implementation and

compliance of arms control treaties. While the United States can find suitable meeting places, a NRRC facility might offer an economical and politically symbolic alternative. For example, an expanded NRRC conference facility could provide the administrative setting for meetings of the U.S.-USSR Coordinating Group (a subgroup of the Bilateral Consultative Commission established by the TTBT), which must meet in Washington to coordinate U.S. and Soviet activities regarding Soviet in-country monitoring of U.S. nuclear tests. Similarly, such a facility could provide a setting for appropriate meetings under the auspices of the Special Verification Commission established by the INF Treaty, or the Joint Compliance and Inspection Commission to be established under START. The meetings held in the NRRC conference facility would complement, not replace, meetings of such arms-control implementation and compliance-related bodies or components thereof that are more appropriately held in Geneva. Establishment of such a conference facility in the U.S. NRRC would not require agreement with the USSR.

The second possibility would be to consider establishing a government-to-government video conferencing facility that would be located, for administrative purposes, in NRRCs. One purpose of such a facility would be to allow the sides to exchange views directly -- for example, on issues that likely would not require protracted discussion and negotiation -- without always necessitating time-consuming travel to the other's capital. Further technical analysis is required to determine the feasibility of this concept from the U.S. perspective.[3] If, after further analysis, such a concept were judged to be worthwhile from policy, security, technology transfer, and cost perspectives, the United States could discuss it with the USSR at the appropriate time.

PART II:

BACKGROUND:

Prevention of deliberate or inadvertent use of a nuclear weapon without proper authorization by the President has always been a high priority for the federal agencies responsible to the President for nuclear weapon command, control, and safety. Since the inception of nuclear weapons, a wide range of positive measures to control their use has evolved. These positive measures include physical security, procedural control, design safety features, and electromechanical control systems. A major challenge in the application of positive measures is to "assure authorized use and assure against unauthorized use" of a nuclear weapon. Maintaining the necessary balance between these requirements involves detailed assessments of each weapon system. The most recent comprehensive review of nuclear control procedures and the positive measure to

[3] See PART III annex

ensure their safety was completed in 1986. That study concluded that the strengths and capabilities of the current system were appropriate, although some potential deficiencies could not be completely excluded. Since 1986, however, the international security environment has changed, possibly altering this balance and suggesting that a review of controls may be appropriate. In addition, advanced technology may have overcome the undesirable characteristics of older systems for command, control, and safety of nuclear weapons.

(1) Installing Post-Launch Destruct Mechanisms on all U.S. deployed ICBMs and SLBMs

A preliminary examination of the issue of installation of post launch destruct mechanisms on intercontinental ballistic missiles (ICBMs) and submarine launched ballistic missiles (SLBMs) has been conducted. Installation of a post launch destruct system could provide an additional safeguard against unauthorized or accidental launch of a nuclear weapon. However, such a system could also introduce unacceptable vulnerabilities into the US Nuclear Command and Control System to include: enemy penetration of the safeguards; unintentional or accidental activation of the system by the operators; or a system malfunction that could disrupt an authorized missile launch. These vulnerabilities may seriously affect the ability of the United States to employ these strategic systems, which would undermine their deterrent value.

Post-launch destruct devices provide only one means of mitigating the consequences of an unauthorized or inadvertent launch. Another candidate for reducing this risk would be a ballistic missile defense system. Indeed, the President has directed that the Strategic Defense Initiative program be refocused on accomplishing a revised set of mission objectives for an initial U.S. Strategic Defense System. Such a system, known as Global Protection Against Limited Strikes (GPALS) will have as its objective the protection of the United States, our forward deployed and power projection forces, and our friends and allies, from limited ballistic missile attacks, irrespective of their source.

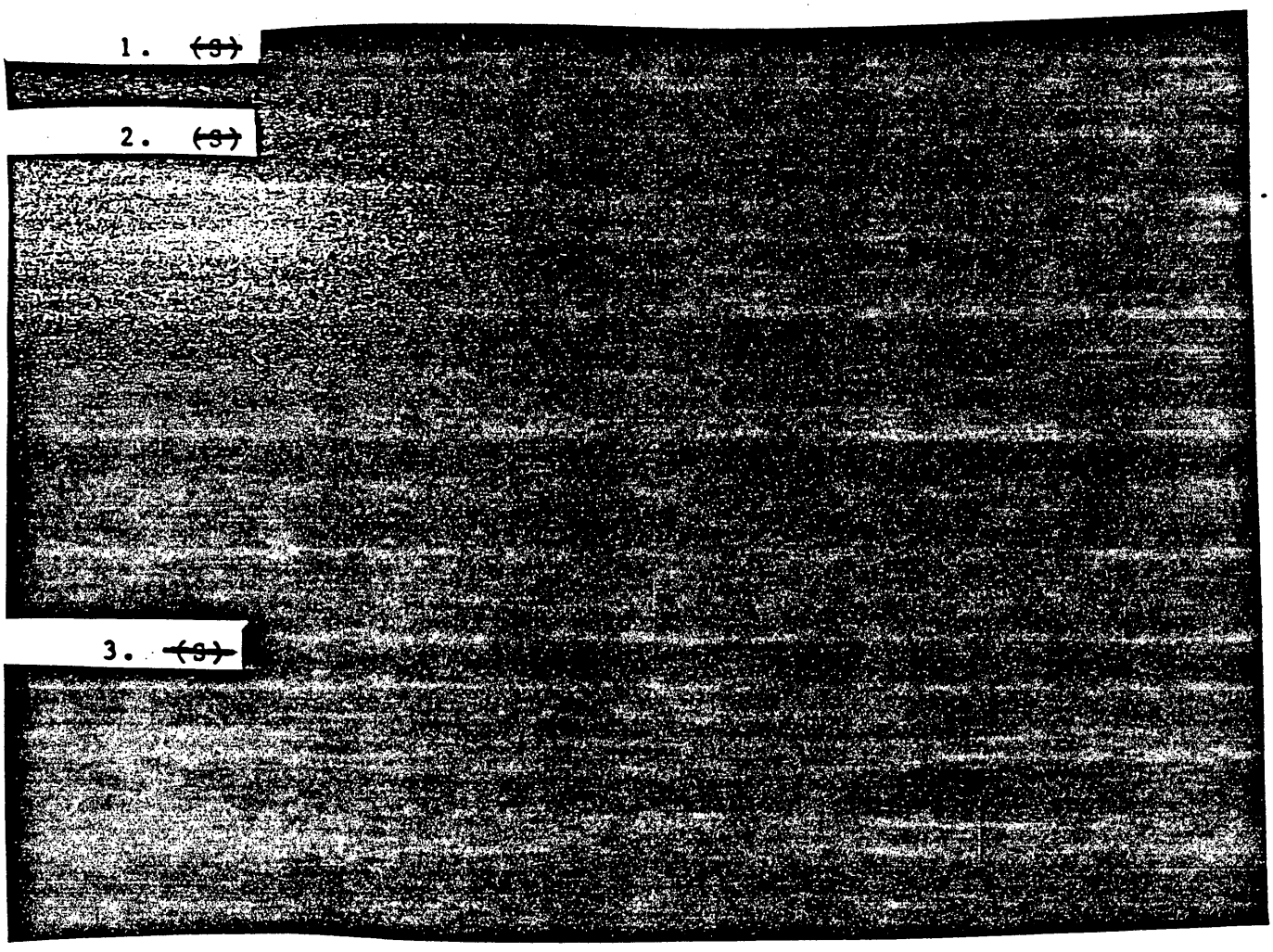
PART III:

(U) This section contains additional information of a classified nature. The numbered paragraphs correspond to footnoted references in the unclassified text.

1. ~~(S)~~

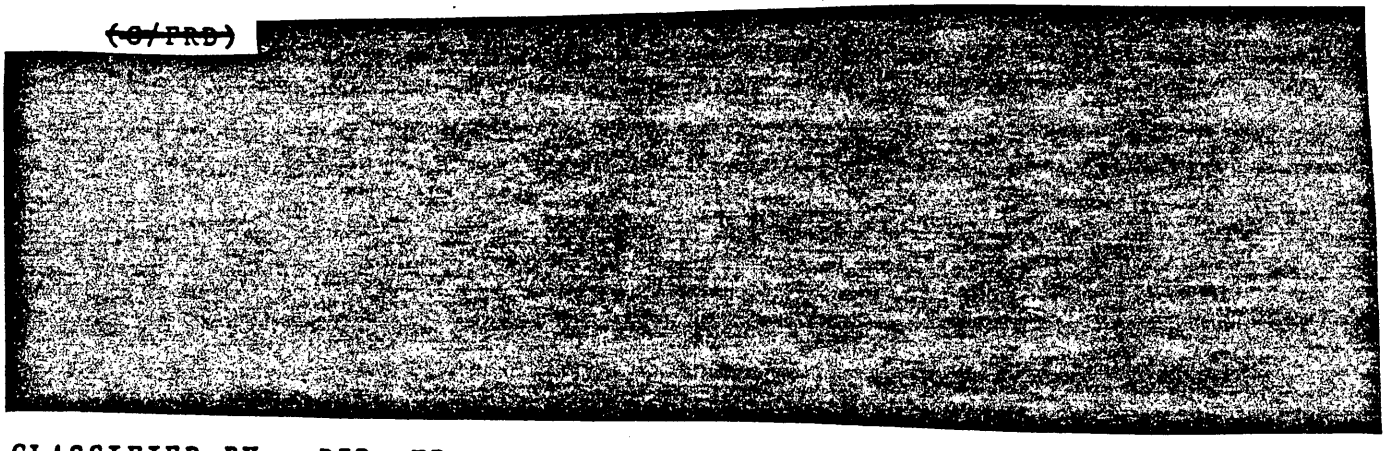
2. ~~(S)~~

3. ~~(S)~~



4. (U) Installing Permissive Action Links (PALs) on all U.S. Nuclear Weapons at Sea.

~~(S/FRD)~~



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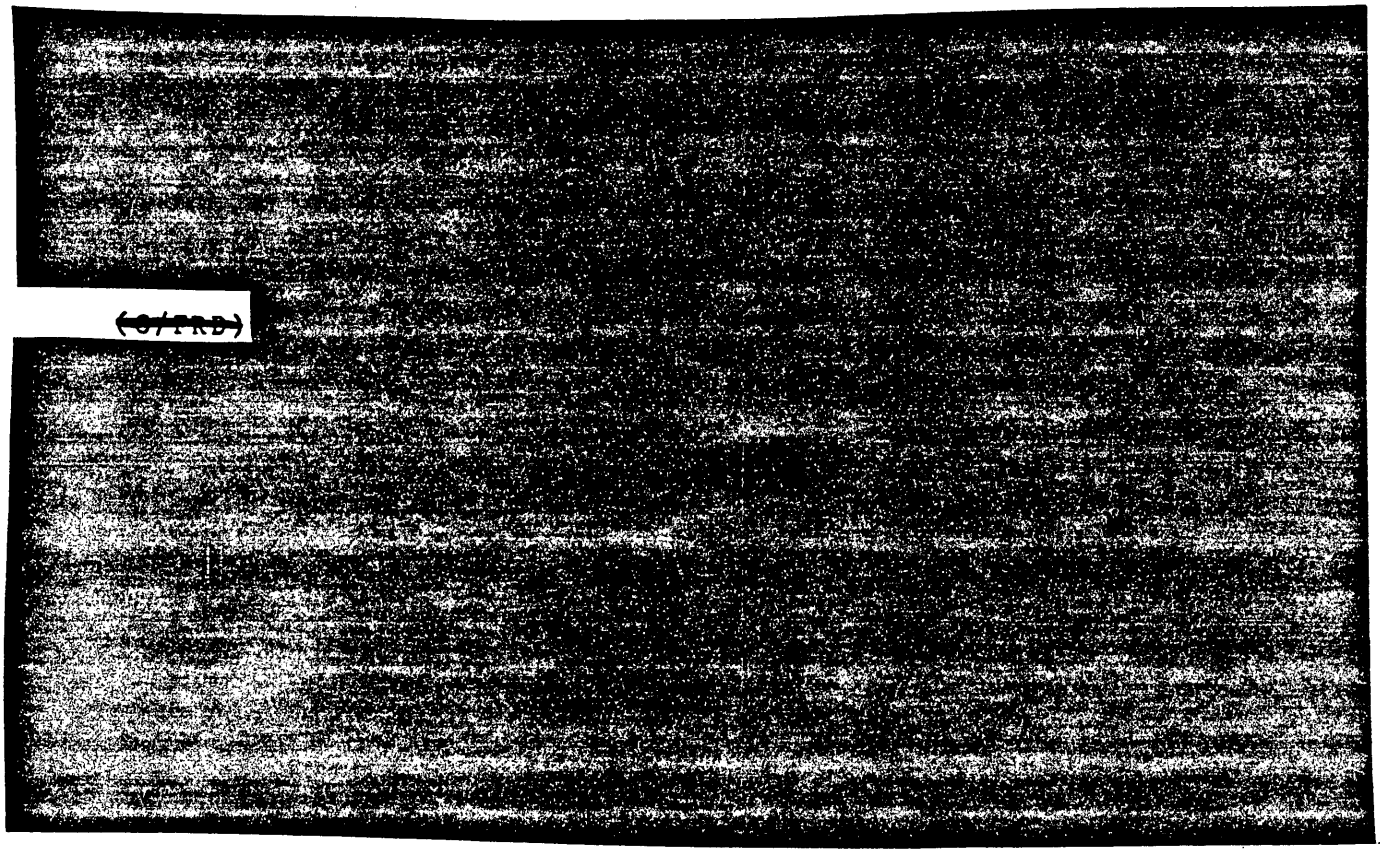

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APPENDIX E

LISTING OF OUTSIDE VIEWS AND STUDIES

Outside Views

3 Sep 91	Permissive Action Links on SLBMs and TLAM(N)s (Woolsey Report) Briefing	Amb James Woolsey
	Views on Nuclear Failsafe and Risk Reduction	Dr. Richard Brody
18 Oct 91	Views on Soviet NC2	Dr. Bruce Blair
5 Nov 91	Nuclear Weapons Safety	Dr. John Foster
	Views on Remote Destruct of Nuclear Missiles	Dr. Sherman Frankel
19 Nov 91	Views on Nuclear Failsafe and Risk Reduction	Dr. A. Wohlstetter
2 Dec 91	Nuclear Weapons Safety Study	Dr. Sidney Drell
2 Apr 92	Views on Post Launch Destruct	Dr. Kosta Tsipis
30 Apr 92	Views on Post Launch Destruct	Dr. Richard Garwin
15 May 92	Views on Post Launch Destruct	Dr. Sherman Frankel
2 Jul 92	Views on Failsafe and Risk Reduction	Dr. Fred Ikle

Previous Outside Studies Reviewed

- President's Blue Ribbon Task Group on Nuclear Weapons Program Management (Clark) Report - July 1985
- Nuclear Weapons Safety Management Process Review (Moe), February 1990
- House Armed Services Committee Panel on Nuclear Weapons Safety (Drell) Report, December 1990

Abnormal Environments (U) Environments in which a weapon system and warhead are not expected to retain full operational reliability, but must maintain the standards of safety set forth in the applicable requirements documents. Abnormal environments are those outside the levels specified for normal environments in the stockpile-to-target sequence document. They may occur either singly or in credible combinations.

Access (Classified Information) (U) The ability and opportunity to obtain knowledge of classified information. An individual, in fact, may have access to classified information by being in a place where such information is kept, if the security measures that are in force do not prevent him from gaining knowledge of such information.

Access (NC2 Materials) (U) The capability and opportunity to handle or control positive control material or to obtain prior to an authorized procedure, alter, or substitute the internal values of positive control material used in the execution and release of nuclear or chemical weapons. (See "unauthorized access.")

Access (Nuclear Weapons) (U) Close physical or electrical proximity to a nuclear weapon in such a manner as to allow the opportunity to tamper with or damage a nuclear weapon. For example, a person would not be considered to have access if an escort or a guard were provided for either the person or the weapon when the person is in close proximity to the weapon.

Access Control (U) Use of procedures and/or physical devices to permit authorized access and deny unauthorized access to a nuclear weapon.

Accident (U) Any unplanned occurrence involving loss or destruction of, or serious damage to, nuclear weapon systems, nuclear weapons, or nuclear components that results in an actual or potential threat to national security or to life and property.

Accident Response Group (ARG) (U) The Department of Energy (DOE) Accident Response Group consists of qualified scientific, medical, and technical personnel and specialized equipment designated to execute DOE's response operations upon notification of a nuclear accident/incident.

Accountability (U) The property that enables activities on an Automated Information Systems to be traced to individuals who may then be held responsible for their actions.

Accreditation (U) A formal declaration by the DAA that the Automated Information System is approved to operate in a particular security mode using a prescribed set of safeguards. Accreditation is the official management authorization for operation of an AIS and is based on the certification process as well as other management consideration. The accreditation statement affixes security responsibility with the Designated Approving Authority (DAA) and shows that due care has been taken for security.

Active Protection (U) Concept of a use control system that senses attempts to gain unauthorized access to weapon components, with option to respond with a "penalty" of some sort, e.g., disablement.

Active Protection System (U) A permissive action link (PAL) system that senses and responds to unauthorized intrusions with an appropriate penalty, usually weapon disablement.

Active Protection System (APS) State ~~(CFRD)~~

Adversary (U) An individual(s) who deliberately plans a malevolent act(s) involving a nuclear weapon or nuclear explosive device.

Adverse Action (U) A removal from employment, suspension from employment of more than 14 days, reduction in grade, reduction in pay, or furlough of 30 days or less.

Air Force Radiation Assessment Team (AFRAT) (U) A field qualified team of health physicists and health physics technicians established at the USAF Occupational and Environmental Health Laboratory (USAF OEHL). The team is capable of responding worldwide with air transportable equipment to radiation accidents/incidents, providing on-site health physics consultation and instrumentation for the detection, identification, and quantification of any possible radiation hazard.

Air Transportable RADIAC Package (ATRAP) (U) A collection of RADIAC equipment, spare parts, and trained instrument repair technicians maintained in an alert status by the Air Force Materiel Command for airlift to the scene of a nuclear weapon accident/incident to supplement the local RADIAC equipment and repair capability.

Alarm Center (U) A specified area, physically located within the boundaries of designated areas where nuclear weapons are stored, maintained, or on alert, in which the master site intrusion detection alarm, perimeter, structure, and facility alarm annunciators are located. (See Site Security Control Center.)

Alcohol Abuse (U) Any irresponsible use of an alcoholic beverage causing misconduct or unacceptable social behavior, or impairing work performance, physical or mental health, financial responsibility, or personal relationships.

Alert Area (U) A designated permanent land-based area where delivery systems containing nuclear weapons are located and are postured for immediate reaction.

Alpha Team (U) An Army team possessing an alpha radiation monitoring capability. The team is identified usually as part of a Nuclear Accident and Incident Control (NAIC) Team

Ancillary Equipment (U) Items especially constructed or procured for the handling, transport, storage, etc., of nuclear weapons or their parts.

Appeal Board (U) A panel designated by the General Counsel, DOD, or designee to make final determinations in cases which are appealed.

Applicant (U) A person in industry who requires a security clearance for access to classified information and any U.S. citizen who is a direct-hire employee or selectee for a position with NATO and who requires NATO certificates of Security Clearance, security assurances for access to U.S. or foreign classified information, or Red Cross or USO personnel nominated for assignment with the Military Services overseas. The term applicant does not apply to those U.S. citizens who are seconded to NATO by U.S. Departments and Agencies or to U.S. citizens recruited through such agencies in response to a request from NATO.

Area Commander (U) A Military Service-designated commander with authority in a specific geographical area.

Area Custodian (U) A COMSEC custodian within a command who receives packages of positive control material for follow-on delivery to designated using custodians or who, when tasked, places such material in storage.

Armed (U) The configuration of a nuclear weapon in which a single signal initiates the action for a nuclear detonation.

Arming (U) Readying a nuclear weapon so that a fuzing signal will operate the firing system; includes operation or reversal of safing items.

Assessment (U) Process by which the National Command Authority is provided, with high confidence, information on the nature of the event that has occurred (authorized or unauthorized, nuclear or conventional, multiple or single events). (Note: This definition applies specifically to the Remote Destruct process.)

Assurance (U) A measure of confidence that the security features and architecture of an Automated Information System (AIS) accurately mediate and enforce the security policy. If the security features of an AIS are relied on to protect classified or sensitive unclassified information and restrict user access, the features must be tested to ensure that the security policy is enforced and may not be circumvented during AIS operation.

Atomic Energy Defense Programs

(U) Activities, equipment, and facilities of the Department of Defense used or engaged in support of the following:

- (U) Development, production, testing, sampling, maintenance, repair, modification, assembly, utilization, transportation, or retirement of nuclear weapons or nuclear weapon components.
- (U) Production, utilization, or transportation of DoD SNM for military applications.
- (U) Safeguarding of activities, equipment, or facilities that support the functions in definitions above, including the protection of nuclear weapons, nuclear weapon components, or DoD SNM for military applications at a fixed facility or in transit.

Audit

(U) An independent review and examination of system records and activities to test for adequacy of system controls, to ensure compliance with established policy and operational procedures, and to recommend any indicated changes in controls, policy, or procedures.

Augmentation Force (AF)

(U) Additional military personnel (or units) trained, equipped, and capable of augmenting a security force as required.

Authentication

(U) (DoD) A security measure designed to protect a communications system against a fraudulent transmission or simulation by establishing the validity of a transmission, message, or originator.

Authentication System

(U) A cryptosystem or a cryptographic process used for authentication.

Authenticator

(U) **DoD:** A symbol or group of symbols, or a series of bits, selected or derived in a prearranged manner and usually inserted at a predetermined point within a message or transmission for the purpose of attesting to the validity of the message or transmission.

(U) **NATO:** A letter, numeral, or group of letters or numerals, or both, attesting to the authenticity of a message or transmission.

Authenticator Values

—(C)— [redacted]

Authorized Individual

(U) A person who is properly cleared, trained, and screened for the Nuclear or Chemical Weapons Personnel Reliability Program in accordance with DoD Directives 5210.42 or 5210.65 and who has formal authorization in writing, granted by the PRP certifying authority, for access to positive control material used in the control of nuclear and chemical weapons.

Automated Information Systems (AIS)

(U) An assembly of computer hardware, software, and/or firmware configured to collect, create, communicate, compute, disseminate, process, store, and/or control data or information.

Automated Information Systems (AIS) Security

(U) Measures and controls that safeguard or protect an AIS against unauthorized (accidental or intentional) disclosure, modification, or destruction of AIS and data, and denial of service. AIS security includes consideration of all hardware and/or software functions, characteristics, and/or features; operational procedures, accountability procedures, and access controls at the central computer facility, remote computer, and terminal facilities; management constraints; physical structures and devices; and personnel and communication controls needed to provide an acceptable level of risk for the AIS and for the data and information contained in the AIS. It includes the totality of security safeguards needed to provide an acceptable protection level for an AIS and for data handled by AIS.

Automated PAL Controller

(U) A programmable microprocessor used for PAL recode, code check, lock, unlock, and APS operations in support of PAL devices.

Back Door

(U) A hidden means of accessing software/firmware that permits the program originator/other person to gain access to the program without doing so through the normal means. Also see Trap Door and Trojan Horse.

Background Count

(U) (In connection with health protection). The background count includes radiation produced by naturally occurring radioactivity and cosmic rays.

Background Investigation (BI)

(U) A personnel security investigation consisting of both record reviews and interviews with sources of information as prescribed in paragraph 3, Appendix B, this Regulation, covering the most recent 5 years of an individual's life or since the 18th birthday, whichever is shorter, provided that at least the last 2 years are covered and that no investigation will be conducted prior to an individual's 16th birthday.

Background Radiation

(U) Radiation arising from radioactive material other than the one under consideration. Background radiation due to cosmic rays and natural radioactivity is always present.

Barrier

(U) A coordinated series of obstacles designed or employed to canalize, direct, restrict, delay, or stop the movement of an intruding force.

BENT SPEAR (Nuclear Weapon Incident)

(U) A CJCS term used in the DoD to identify and report a nuclear incident involving a nuclear weapon/warhead, nuclear components or vehicle when nuclear loaded. In the Army and Air Force, this term includes a "significant incident" as defined in DoD Directive 5100.52. See nuclear weapon incident.

BROKEN ARROW (Nuclear Weapon Accident)

(U) A CJCS term to identify and report an accident involving a nuclear weapon/warhead or nuclear component. See nuclear weapon(s) accident.

Bulk Reserve

(U) Material not designated EFFECTIVE or RESERVE.

Bypass

(U) Circumvention of a PAL or disablement system; does not include obtaining unauthorized access to control codes.

Cancellation (U) Withdrawing a nuclear control order not yet acted upon.

Category (U) A grouping of classified or sensitive unclassified information to which an additional restrictive label is applied for signifying that personnel are grated access to the information only if they have formal access approval or other applicable authorization (e.g., proprietary information, for official use only, compartmented information).

Certification (U) A determination by the applicable Service that a unit is capable of performing its assigned nuclear mission. Army accomplishes this by Nuclear Surety Inspection; Navy by Nuclear Weapons Acceptance Inspection; and Air Force by Nuclear Surety Inspection.

Certification (U) The technical evaluation of an Automated Information Systems security features and other safeguards, made in support of the accreditation process, which established the extent that a particular Automated Information Systems design and implementation meet a set of specified security requirements.

Certifying Official (U) For military and DoD civilian personnel, the commander, or designee, responsible for the operation or security, or both, of nuclear weapons, in a PRP position allowing sufficient personal contact with all personnel to permit continual evaluation. For DoD contractor personnel, the DoD official designated in the contract.

Classified Information (U) Official information or material that requires protection in the interests of national security and that is classified for such purpose by appropriate classifying authority in accordance with the provisions of Executive Order 12356 (reference (j)).

Classified Logistic Shipment Code (U) A split-knowledge S-FRD code placed in the PAL of a nuclear weapon during shipment. Classified logistic codes are obtained from NSA-produced numerical master lists, or memory phrases, PROMs, SDMs, and PDMs for recode operations. Such codes are controlled by DNA with special guidance published in TP 50-2.

Classified National Security Information (U) Information or material subject to the control of the US Government encompassing both US national defense and foreign relations that has been determined pursuant to Executive Order 12356 (reference (c)) to require protection against unauthorized disclosure, and that is so designated.

Code Activated Processor (U) A microprocessor-based coded PAL device with the capability of either plain text or encrypted code operations.

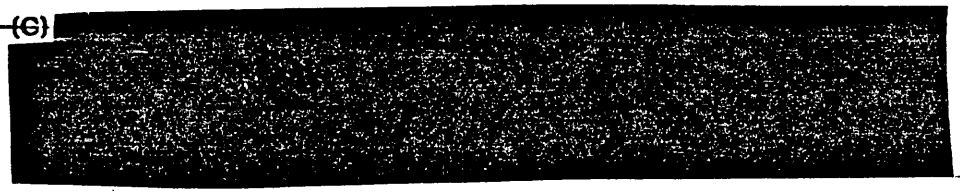
Code Identifier (U) An unclassified alphanumeric sequence, consisting of two letters and three digits, corresponding to the PAL code.

Coded Control Device (CCD) (U) A device, subsystem, or system included in or attached to a warhead, weapon, or weapon system to preclude or delay arming, launching, release, or nuclear detonation until after insertion of a discrete code or combination.

Coded Switch Management Team

(U) A team composed of four HQ STRATCOM custodian personnel who are responsible for management of coded-switch operation. The team will be divided into A and B sections, with a minimum of two persons (E-7 or above) in each section.

Coded Switch Masters (Part A and Part B)

(S) 

Coded Switch System

(S)

Coded Use Control

(U) A command and control concept in which the discrete code or combination required to operate a coded control device is held at an echelon above the delivery unit until after nuclear release or unlock has been directed by competent authority.

Coding Equipment

(U) All equipment and related peripheral equipment (i.e., cable, connectors, power supplies, etc.) whose main purpose is to process, transfer, temporarily store, or verify operational code values in nuclear weapons. Two classes of this equipment are recoders and decoders.

Cognizant Agent

(U) A person who, by reason of official duties, has been authorized access to nuclear command and control communications or would have the opportunity, by any means, to gain access to nuclear command and control communications security material.

Cognizant Federal Agency (CFA)

(U) The Cognizant Federal Agency is that Federal agency having custody of the weapon at the time of the accident. The CFA is responsible to:

- (U) Conduct and manage Federal on-site actions.
- (U) Develop or evaluate recommendations for public protective action measures off site.
- (U) Present recommendations for off-site protective action measures, in accordance with FEMA, to the appropriate State and/or local officials of Foreign government.
- (U) Coordinate initially the release of information to the public, Congress, and the White House until transferred to FEMA by mutual agreement.

Command Approving Authority

(U) The unified, specified, theater, or Service component major command responsible for determining and coordinating the requirements of subordinate forces to hold two-person material controlled by another authority or command. The command approving authority approves all two-person control systems used, possessed, or controlled by forces within a command.

Command Unlock Values

—(S) [redacted]

Communicate

(U) The ability to alert higher authority that an event has occurred, facilitate assessment of that event, transmit a decision to destroy or not destroy, and provide verification of destruction. (Note: This definition applies specifically to the Remote Destruct process.)

Communications Security (COMSEC)

(U) Measures taken to deny unauthorized persons information derived from telecommunications of the United States Government concerning national security and to ensure the authenticity of such telecommunications. Note: Communications security includes crypto-security, transmission security, emission security, and physical security of COMSEC material and COMSEC information.

Community Emergency Action Team (CEAT)

(U) A team of response and local experts that operates out of the Joint Information Center (JIC) and is available to assist the local community.

Competent Medical Authority

(U) A US military medical officer or a US civilian physician employed by the the US Government, responsible for providing medial services or clinical evaluations as specified by the Certifying Official and, when appropriate, the Reviewing Official.

Component Commands

(U) The component commander and all individuals, units, detachments, organizations, or installations under his operational command that have been assigned to the operational command of the commander of a unified or combined command.

Compromise

—(S) [redacted]

Compromise

(U) A violation of the security system such that an unauthorized disclosure of sensitive information has occurred.

Computer

(U) A machine capable of accepting, performing calculations on, or otherwise manipulating or storing data. It usually consists of arithmetic and logical units and a control unit, and may have input and output devices and storage devices.

Computer

(U) **Code:** Frequently a synonym for a computer program; also part of a program.

(U) **Program:** A compilation of coded instructions for performing a sequence of tasks on a computer.

(U) **Subprogram:** Part of a computer program; usually the calculation of one aspect of a more complex routine.

Configuration Control

(U) Management of changes made to a system's hardware, software, firmware, documentation, and/or facilities throughout the development and operational life of the system. For FARR purposes, configuration control is not concerned with the development plans.

Confirm Destruction

(U) Provide a distinct signature that a destruction mechanism has functioned that can be verified by both the US and other parties. (Note: This definition applies specifically to the Remote Destruct process.)

Container

(U) A box or enclosure capable of containing radiation.

Contamination

(U) The deposit and/or absorption of radioactive material, biological, or chemical agents or hazardous materials on, and by, structures, areas, personnel, or objects.

Contamination Control

(U) Procedures to avoid, reduce, remove, or render harmless, temporarily or permanently, nuclear, biological, chemical agents and hazardous materials contamination.

Contamination Control Line (CCL)

(U) A control line surrounding the radiological control area. Initially, the contamination control line extends 100 meters beyond the known/suspected radiological contamination to provide a measure of safety. Once the contamination control station is operational, this line is the outer boundary that separates the reduced hazard area from the clean area.

Contamination Control Station (CCS)

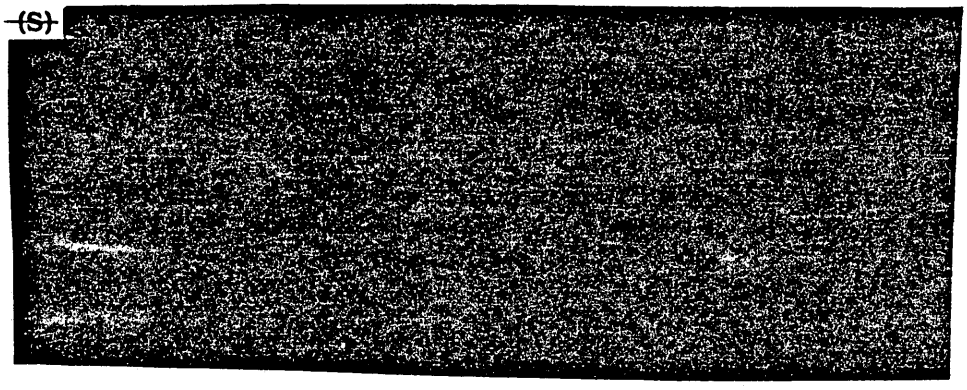
(U) An area (tent or facility) specifically designated for controlling ingress and egress of personnel and equipment to/from the radiation control area. The outer boundary of the Contamination Control Station is the contamination control line, and the inner boundary is the line segment labeled the hot line.

Contemporary Risk Reduction Measures

(U) General categories of activities that are currently used a confidence building measures between potential adversaries: communications, consultations, "rules of the road" for military activities, and predictability measures.

Contingency PAL System

(S)



Controlled Position

(U) A position whose incumbent, because of assigned nuclear duties:

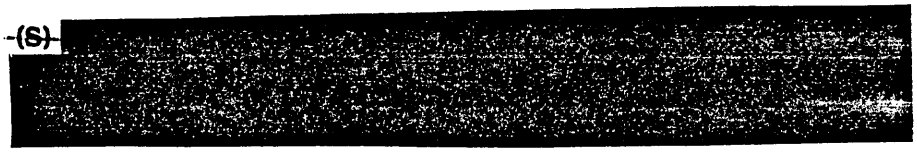
(U) Has access but not technical knowledge, as defined herein; or

(U) Controls entry into an Exclusion Area (see definition) but does not have access or technical knowledge, as defined herein; or

(U) Is armed, assigned duties relating to nuclear security, and in a direct line of sight to a nuclear weapon and could inflict damage upon the weapon or, when joined, to its delivery system, or

(U) Has been designated as a Certifying Official at operational unit level or first level Certifying Official in staff activities with identified PRP positions at the Controlled level only.

Controlling Authority

(S) 

Counterintelligence

(U) Information gathered and activities conducted to protect against espionage and other clandestine intelligence activities, sabotage, international terrorist activities, or assassinations conducted for or on behalf of foreign powers, organizations, or persons.

Countermeasures

(U) Actions taken to defeat or degrade performance of a nuclear weapon on its way to the target. In the SAF&F context, concern is normally with electrical or electronic countermeasures or jamming.

Critical Communications Facility

(U) A communications facility that is essential to the continuity of operations of the National Command Authority (NCA) during national emergencies, and other nodal points or elements designated as crucial to mission accomplishment.

Critical Equipment

(U) Specifically designated equipment, including software, used to build, encode, decode, transmit, or receive emergency action messages; that identify nuclear targets, select nuclear weapons to be used against specific targets, and route nuclear-weapons-carrying platforms to appropriate launch points; support or inhibit delivery, arming, fuzing, and firing of the nuclear weapons themselves; positive control material and devices; and nuclear weapons hardware.

Critical Facilities

(U) Specifically designated facilities provided for principal NC2 decision-makers, and key personnel and/or functions in the chain of command, from which, by acting in concert, all essential NC2 functions can be performed expeditiously throughout all phases of nuclear conflict.

Critical NC2 Component

(U) A network, facility, system, node, or services that are of such importance that total loss, disruption, or severe damage could result in loss of function or unacceptable impairment of: integrated tactical warning and attack assessment system (including emergency conferencing); high-level decision disseminating means (including terrestrial, radio frequency or satellite means); SIOP force tracking (including world-wide Military Command & Control System (WWMCCS) and Nuclear Planning and Execution System (NPES)); and nuclear weapon components, nuclear weapons, and nuclear weapon systems, including associated control, control equipment and materials, facilities, and transportation means.

Critical Nuclear Weapon Design Information (CNWDI)

(U) TOP SECRET RESTRICTED DATA or SECRET RESTRICTED DATA revealing the theory of operation or design of the components of a thermonuclear or implosion-type fission bomb, warhead, demolition munition, or test device. Specifically excluded is information concerning arming, fuzing, and firing systems, limited life components, and totally contained quantities of fissionable, fussionable, and high explosive materials by type. Among excluded items are the components which Service personnel set, maintain, operate, test, or replace.

Critical Position

(U) A position whose incumbent, because of assigned nuclear duties:

- (U) Has access and technical knowledge as defined herein; or
- (U) Can, at battalion, squadron, ship level, or below, either directly or indirectly cause the launch or use of a nuclear weapon; or
- (U) Controls or uses sealed authenticators, permissive action link (PAL) materials, related codes, strategic missile computer tapes, emergency action messages, or release procedures for nuclear weapons; or
- (U) Has been designated as a Certifying Official at operational unit level or first level Certifying Official in staff activities with identified Critical PRP positions.

Cross-Reference Sheets

(U) A printed product relating the short titles of encrypted combinations contained on a specific APC PROM to the identifying data needed to retrieve those combinations.

Cryptographic Information

(U) All information significantly descriptive of cryptographic techniques and processes or of cryptographic systems and equipment, or their functions and capabilities, and all cryptomaterial. ("Significantly descriptive" means that the information could, if made known to unauthorized persons, permit recovery of specific cryptographic features of classified crypto-equipment, reveal weaknesses of associated equipment that would allow recovery of plain text or of key, aid materially in the cryptoanalysis of a general or specific cryptosystem, or lead to the cryptoanalysis of an individual message, command, or authentication.)

Cumulative Dose (Radiation) (U) The total dose resulting from repeated exposure to radiation in the same region, or of the whole body.

Custodial Commander (U) A commander responsible for maintaining custody, guardianship, and safekeeping of nuclear weapons and their components and of source and special nuclear materials.

Custodial Detachment (U) A United States (US) unit which maintains custody of nuclear weapons for use by a non-US delivery unit and acts in support of that unit. A custodial detachment may also maintain accountability for nuclear weapons in its custody.

Custodial Facilities (U) Those structures or rooms utilized by on-duty US personnel responsible for the custody of nuclear weapons.

Custodial Unit (U) A US forces unit responsible for the control of, transfer and movement of, and access to, nuclear and chemical weapons and components.

Custodian (U) He who has:

- (U) Responsibility for the control of, transfer and movement of, and access to nuclear weapons and nuclear components;
- (U) Responsibility for the control, certification, modification, and/or application of a trusted computing base of related codes;
- (U) Responsibility for certification, movement, repair, and/or modification of NC2 systems/facilities.

Custody (U) The responsibility for the control of, transfer and movement of, and access to nuclear weapons and nuclear components.

Data (U) A representation of facts, concepts, information, or instructions suitable for communication, interpretation, or processing by humans or by an Automated Information Systems.

Data Integrity (U) The state that exists when data is unchanged from its source and accidentally or maliciously has not been modified, altered, or destroyed.

Data Transport Device (DTD) (C)

Debris (U) Residue from detonation of a weapon, plus radioactive materials from its environment.

Decoder (U) A type of controller; e.g., the T1535 decoder, which is capable of generating the appropriate coded switch message to cause unlocking or locking, and for Active Protective System state control.

Decontamination (U) The process of making any person, object, or area safe by absorbing, destroying, neutralizing, making harmless, or removing hazardous materials clinging to or around it.

Decontamination Station	(U) A building or location equipped and organized to cleanse personnel and material of chemical, biological, or radiological contaminants.
Dedicated Security Mode	(U) A mode of operation wherein all users have the clearance or authorization and need-to-know for all data handled by the Automated Information Systems. If the Automated Information Systems processes special access information, all users require formal access approval. In the dedicated mode, an Automated Information Systems may handle a single classification level and/or category of information or a range of classification levels and/or categories.
Defeat / Circumvention	(U) Actions taken overtly or covertly to overcome the (1) use control system of a nuclear weapon or weapon system, (2) processing of NC2-critical information, or (3) physical security of an NC2 system/facility.
Defense Courier Service Couriers	(U) TOP SECRET-cleared personnel of the US Armed Forces assigned to a courier station to perform DCS duties and identified by possession of a DCS identification card.
Defense Nuclear Agency (DNA) Surveillance Inspections	(U) DNA inspections which consist of the observation and evaluation of Service inspection teams while they are performing the NWTI portion of Service inspections.
Deficiency	(U) A variance from procedures or criteria prescribed in pertinent technical publications or other Service publications which directly implement DoD requirements.
Delay	(U) The effect achieved by physical features, technical devices, or security measures and forces that impedes an adversary from gaining access to a nuclear weapon. Normally expressed as a function of time, it is a major consideration in the design and development of nuclear weapon security systems.
Deliberate Unauthorized Launch Analysis	(U) See Unauthorized Use Analysis (UUA).
Delivery Unit	(U) A unit with the weapon system, command and control, logistics, and security to cause a weapon to be fired or launched at a target.
Delivery Vehicle	(U) The portion of a weapon system that delivers a nuclear weapon to its target; usually a missile or aircraft.
Denial of Service	Action or actions that result in the inability of an Automated Information Systems or any essential part to perform its designated mission, either by loss or degradation of operational capability.
Deployment	(U) Moving nuclear or chemical weapons, or nuclear- or chemical-equipped delivery systems to designated areas in order to achieve a better posture.

Depot Storage Code

(U) A split-knowledge classified code placed in the PAL of a nuclear weapon during temporary storage where operational codes are not required. Depot codes are either (1) locally developed numerical codes or combinations, (2) obtained from NSA-produced numerical master lists, or (3) memory phrases used with NSA-provided PROMS, SDMs, or PDMs. Depot storage codes are controlled by DNA.

Designated Approving Authority (DAA)

(U) The official who has the authority to decide on accepting the security safeguards prescribed for an Automated Information Systems or the official who may be responsible for issuing an accreditation statement that records the decision to accept those safeguards. The DAA must be at an organizational level, have authority to evaluate the overall mission requirements of the Automated Information Systems, and to provide definitive directions to Automated Information Systems developers or owners relative to the risk in the security posture of the Automated Information Systems.

Designated Couriers

(U) Properly cleared and briefed commissioned, warrant, and noncommissioned officers of the US Armed Forces in travel status who are designated by DCS personnel acting for the Commander, DCS, to act as couriers to deliver classified material between a DCS station and an addressee or another DCS station.

Designated Nuclear Command and Control Personnel

(U) These include, but are not necessarily limited to, those personnel with access to the NC2 coding and authentication processes and a communications medium necessary to transmit release, execution, or termination orders; those personnel involved in the preparation and production of NC2 coding and authentication documents and equipment, those personnel involved in preparation and production of nuclear weapons targeting tapes and materials; and those maintenance and security personnel who could have adverse impact on system performance for nodes and equipment that represent near-single-point-failure elements for the NC2 system.

Destroy

(U) See Remote Destruct.

Destruction

(U) Physically destroying SAS, PAL, CSS, or PES material. Violent destruction (i.e., one-point detonation of the weapon's high explosive) of nuclear weapons and/or nuclear components to render the weapon useless.

Detection

(U) Process that determines that the launch or release of a nuclear-capable system or a nuclear-armed weapon has occurred. (Note: This definition applies specifically to the Remote Destruct process.)

Detonation

(U) A stable explosive process characterized by the existence of a shock-initiated chemical reaction that, in turn, supplies the energy to support the shock.

Detonator

(U) In this guide, an electroexplosive device designed to produce a detonation in response to an applied electric current.

Dial-A-Yield (DAY) —(CFRD)— [redacted]

Disablement (U) An action, such as damaging a component, that prevents a nuclear weapon from achieving a significant yield unless it is renovated.

Disassociation (U) The act of rendering a nuclear weapon incapable of achieving a nuclear yield by removing critical components for storage elsewhere. The act is reversible.

Disaster Control (U) Measures taken before, during, or after hostile action, natural or man-made disasters, to reduce the probability of damage, minimize its effects, and initiate recovery.

Disaster Control Officer (DCO) (U) The DCO is the DoD point of contact with FEMA at the disaster scene for providing DoD support to disaster recovery operations.

Disaster Cordon (U) A physical barrier surrounding the accident scene where control is established to preclude unauthorized entry.

Disaster Preparedness (U) That series of actions to control and manage nuclear incidents and bring them to a practicable conclusion within the established security, response, and recovery framework. These actions include initial and subsequent reporting response, Explosive Ordnance Disposal procedural action on the weapon(s), appropriate security, legal and medical aspects, public information, and control of hazards caused by the accident. Control of the accident caused hazards include: survey of the incident/accident area to establish isodose lines and all types of monitoring; personnel and area decontamination; disposition of nuclear, high explosive, and contamination items.

Disaster Response Force (DRF) (U) The USAF base level organization which responds to disasters/accidents, responsible for establishing command and control, and to support disaster operations.

Dispersal —(C)— [redacted]

Dispersal Site (U) An area or installation used by forces during periods of alert, mobilization, or armed conflict to diminish vulnerability of units to detection and attack.

DoD Component (U) Includes the Office of the Secretary of Defense; the Military Departments, Organization of the Joint Chiefs of Staff; Directors of Defense Agencies and the Unified and Specified Commands.

DoD Personnel (U) Active duty military personnel, active civil service employees of the Department of Defense, or DoD contractors and their employees.

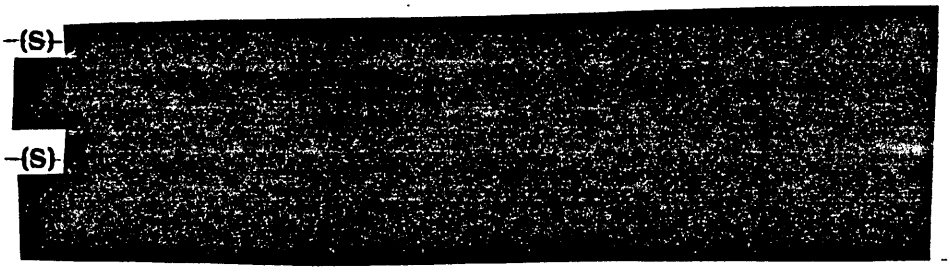
Dose Rate Contour Line (U) A line on a map, diagram, or overlay joining all points at which the radiation dose rate at a given time is the same.

Drug Abuse (U) The illegal, wrongful, or improper use of any narcotic substance, cannabis, or other controlled substance or the illegal or wrongful possession, transfer, or sale of same.

DT (U) Deuterium, tritium, or a mixture of the two.

Duress System (U) A method by which personnel authorized entry into Exclusion Areas, and those who authorize entry into, or escort visitors into Limited or Exclusion Areas, can covertly communicate a situation of duress to a security control center or other operating or security personnel who will notify a security control center.

Edition (S)



(S)

Effective Edition (U) An edition of sealed authenticators, PAL, CSS, or PES material that a controlling authority has designated to be used in authentication of nuclear or chemical control orders or unlock of nuclear weapon systems.

Effects (U) All phenomena resulting from the energy outputs of a nuclear explosion.

Electromagnetic Pulse (EMP) (U) A strong pulse of electromagnetic radiation (EMR), with a rise time of about 10^{-8} second, resulting from a nuclear explosion.

Electronic Security Systems (ESS) (U) That part of physical security concerned with the safeguarding of personnel and property by use of electronic systems. These systems include, but are not limited to, intrusion detections systems (IDS), automated entry control systems (AECS), and video assessment systems.

Emergency (U) An unexpected occurrence or set of unexpected circumstances in which personnel or equipment unavailability, due to accident, natural event, or combat, may demand immediate action that may require extraordinary measures to protect, handle, service, transport, or employ a nuclear weapon.

Emergency Destruction (U) The destruction of nuclear munitions, components, and associated classified material, without significant nuclear yield, to render a weapon tactically useless.

Emergency Security Forces (U) Those designated reinforcing security personnel to include all response forces.

Entrance National Agency Check (ENTNAC) (U) A personnel security investigation scoped and conducted in the same manner as a National Agency Check except that a technical fingerprint search of the files of the Federal Bureau of Investigation is not conducted.

Escalation Control

(U) The concept of limiting the level, scope, or intensity of a conflict to reduce the probability of a massive USSR response. The objective of escalation control is prompt war termination at the lowest level of conflict possible on terms favorable to the Unites States.

Evaluated Products List (EPL)

(U) A documented inventory of equipments, hardware, software, and/or firmware that have been evaluated against the evaluation criteria found in DoDD 5200.28-STD.

Evaluation Authority

(U) The controlling authority or the NSA, as applicable, who has responsibility for evaluating possible compromises.

Exception

(U) An approved permanent deviation from the provisions of this manual (DoDD 5210.41M, Sep 87) that creates a security vulnerability.

Exclusion Area

(U) A designated area immediately surrounding one or more nuclear weapons/systems. Normally, the boundaries of the area are the walls, floors, and ceiling of a structure or are delineated by a permanent or temporary barrier. In the absence of positive preventative measures, access to the Exclusion Area constitutes access to the nuclear weapon(s)/systems.

Exercise SAS, PAL, CSS, or PES

(U) A system, bearing the short title USCXS-, that parallels its operational counterpart and is used in exercises as directed by the controlling authority.

Explosive Ordnance

(U) All munitions containing explosives, nuclear fission, or fusion materials and biological and chemical agents. This ordnance includes bombs and warheads, guided and ballistic missiles; artillery, mortar, rocket, and small arms ammunition. Also, ordnance includes all mines, torpedoes, and depth charges; pyrotechnics; clusters and dispensers; cartridges and propellant actuated devices; electro-explosive devices; clandestine and improvised explosive devices; and all similar or related items or components explosive in nature.

Explosive Ordnance Disposal (EOD)

(U) The detection, identification, field evaluation, rendering-safe, and/or disposal of explosive ordnance which has become hazardous by damage or deterioration when the disposal of such explosive ordnance is beyond the capabilities of personnel assigned to routine disposal.

Explosive Ordnance Disposal Incident

(U) The suspected or detected presence of unexploded ordnance, or damaged explosive ordnance, which constitutes a hazard to operations, installation, personnel, or material. Not included in this definition are the accidental arming or other conditions that develop during the manufacture of high explosive material, technical service assembly operations, or the laying of mines and demolition charges.

Explosive Ordnance Disposal Procedures

(U) Those particular courses or modes of action for access to, recover, rendering-safe, and final disposal of explosive ordnance or any hazardous material associated with an explosive ordnance disposal incident.

(U) Access Procedures. Those actions to locate exactly and to gain access to unexploded ordnance.

(U) Recovery Procedures. Those actions to recover unexploded ordnance.

(U) Render Safe Procedures. The portion of the explosive ordnance disposal procedures involving the application of special explosive ordnance disposal methods and told to provide the interruption of functions or separation of essential components of unexploded ordnance to prevent an unacceptable detonation.

(U) Final Disposal Procedures. The final disposal of explosive ordnance by explosive ordnance disposal personnel, which may include demolition or burning in place, removal to a disposal area, or other appropriate means.

Explosive Ordnance Disposal Unit

(U) Personnel with special training and equipment who render explosive ordnance (such as bombs, mines, projectiles, and booby traps) safe, make intelligence reports on such ordnance, and supervise the safe removal thereof.

Explosive Ordnance Reconnaissance

(U) Reconnaissance involving the investigation, detection, location, marking, initial identification, and reporting of suspected unexploded ordnance, by explosive ordnance reconnaissance agents, to determine further action.

Exposure

(U) The exposure at a given point is a measurement of radiation in relation to its ability to produce ionization.

Facility

(U) A physical plant, such as real estate and improvements thereto, including buildings and equipment.

Failsafe

(U) Feature of a system or device which automatically activates an alarm in the event a component part of the system is removed or when a component part or portion of the circuit malfunctions or loses power. Restoration to normal operation is not possible until the fault is corrected.

Failsafe Measures

(U) That combination of safety, security, and control procedures and equipment intended to prevent mistaken authorized use, unauthorized use, inadvertent use, or loss of nuclear weapons or to interrupt, terminate or mitigate the results of such action should one occur. These are unilateral actions that need not/should not be communicated to others to be effective.

False Alarm

(U) An alarm without a known cause.

Federal Coordinating Officer (FCO)

(U) The Federal official appointed by the President upon declaration of a major disaster or emergency under Public Law 93-288 to coordinate the overall Federal response.

Federal Emergency Management Agency (FEMA)

(U) This agency establishes Federal policies for and coordinates all civil defense and civil emergency planning, management, mitigation, and assistance functions of executive agencies. FEMA assists local and state agencies in their emergency planning. Its primary role in a nuclear weapon accident is one of coordinating Federal, state, local, and volunteer response actions.

(U) Emergency Information and Coordination Center (EICC): The EICC is located in FEMA Headquarters in Washington, D.C. and provides overall direction, control and coordination of Federal and state emergency services response/recovery to a radiological accident or emergency.

(U) Emergency Response Team (ERT): The FEMA team deployed to a radiological emergency scene by the FEMA Director to make an initial assessment of the situation and then provide FEMA's primary response capability.

(U) Emergency Support Team (EST): The FEMA Headquarters Team that carries out notification activation and coordination procedures from the FEMA EICC. The EST is responsible for Federal agency headquarters coordination, staff support of the FEMA Director, and support of the SFO.

Federal Radiological Emergency Response Plan (FRERP)

(U) The Federal plan to assist State and local government officials or other Federal agencies in the response to a radiological emergency in the US, its possessions and territories.

Federal Radiological Monitoring and Assessment Center (FRMAC)

(U) A center established near the scene of a radiological emergency responsible for off-site radiological response from which the FRMAC Director conducts FRMAP response. This center need not be located near the on-site or Federal-State operations centers as long as its operations can be coordinated with them. Staffed by DOE NV.

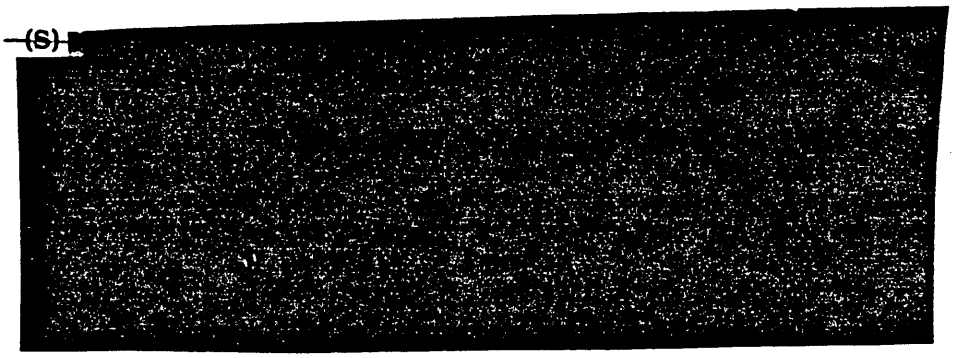
Federal Radiological Monitoring and Assessment Plan (FRMAP)

(U) A plan to provide coordinated radiological monitoring and assessment assistance to the State and local governments in response to radiological emergencies. This plan, authorized by 44 CFR Part 351, supersedes the Interagency Radiological Assistance Plan.

Federal Response Center (FRC)

(U) The on-site focal point established by the Senior FEMA Official (SFO), as required, for coordinating the Federal response to a nuclear weapon accident or significant incident. Representatives of other Federal, state, local, and volunteer agencies will be located in the center.

Firebreak (S)



Firing (U) Provision, normally by a firing set, of the proper electrical energy to fire a nuclear assembly's detonator system.

Fissile Fuel or Material (U) A heavy isotope capable of undergoing fission by neutrons of any energy; isotopes such as ^{233}U, ^{235}U, and ^{239}Pu.

Fissionable Fuel or Material (U) A heavy isotope capable of undergoing fission by some process; in a weapon context, materials such as ^{238}U that have a fission threshold above 1 MeV for neutrons.

Foreign Intelligence (U) Information relating to the capabilities, intentions, and activities of foreign powers, organizations, or persons.

Formal Access Approval (U) Documented approval by a data owner to allow access to a particular category of information.

Formal Authorization (U) Designation in writing by an appropriate PRP certifying authority or agency for access to handle SAS or PAL, CSS, or PES material.

Formerly Restricted Data (FRD) (U) Information removed from the Restricted Data category upon determination jointly by the Department of Energy and Department of Defense that such information relates primarily to the military utilization of atomic weapons and that such information can be safeguarded adequately as national security information (Section 142d, Atomic Energy Act of 1954, as amended).

Fuzing (U) Generating a signal that, in an armed nuclear weapon, will operate the firing system.

Handled By (U) The term "handled by" denotes the activities performed on data in an Automated Information Systems, such as collecting, processing, transferring, storing, retrieving, sorting, transmitting, disseminating, and controlling.

Handling (U) That phase of weapon logistics wherein weapons are physically manipulated directly or indirectly by people. (Characterized as lifting, sliding, hoisting, lowering, or moving an item on dollies or pallets over short distances through the use of manpower, tugs, cranes, forklifts, and hoists.)

Hardening (U) Measures taken in the design and fabrication of a weapon or its parts to reduce their vulnerability.

Hardness	(U) The degree of resistance of a weapon or its components to adverse environments, particularly the effects of a defensive nuclear burst.
Hazardous Materials	(U) Any material that is flammable, corrosive, an oxidizing agent, explosive, toxic, poisonous, etiological, radioactive, nuclear, unduly magnetic, a chemical agent, biological research material, compressed gases, or any other material that, because of its quantity, properties, or packaging, may endanger human life or property.
Hazards of Electromagnetic Radiation to Ordnance (HERO)	(U) Hazardous electromagnetic radiation to which a weapon system containing an electroexplosive device might by subjected and emanates from a source which is not an integral part of the weapon system.
Head of DoD Component	(U) The Secretary of Defense; the Secretaries of the Military Departments; the Chairman of the Joint Chiefs of Staff; and the Commanders of Unified and Specified Commands; and the Directors of Defense Agencies.
High-Altitude Bursts	(U) See Joint Pub. 1-02.
High-Altitude Phenomenology	(U) Effects of nuclear explosions that occur above 250,000 feet.
Hot Spot	(U) The region in a contaminated area in which the level of radioactive contamination is considerably greater than in neighboring regions in the area. "HOT SPOT" also refers to the DOE Accident Mobile Counting Laboratory and Mobile Support Equipment.
Implosion Detonation System	(U) A system that commences with circuits carrying electrical energy from the firing set and terminates with the units that detonate the main HE charge, including HE, air, or ring lenses.
Improvised Nuclear Device (IND) Incident	(U) Is an event resulting from a deliberate act, involving nuclear weapons or nuclear materials which include the sabotage, seizure, theft, or loss of a nuclear weapon or radiological nuclear weapon component or the fabrication and employment of an IND or a credible threat of either.
Inadvertent Use	(U) An individual or series of technical malfunctions, acts of God, or human errors, or combinations thereof, that result in an unplanned and unauthorized launch, release, firing, detonation, or jettison of a nuclear weapon.
Inadvertent Use Analysis	(U) Methodology for analyzing technical malfunctions, acts of God, and human errors that could result in an inadvertent use of a nuclear weapon. Usually based on a fault tree analysis or probabilistic risk analysis approach. May or may not be quantitative. Identifies what can go wrong, how likely is it to occur, and what will be the probable outcome.

Incident

(U) An unexpected event involving a nuclear weapon system, a nuclear weapon, or a nuclear component resulting in any of the following, but not constituting an accident:

- (U) An increase in the possibility of an explosion or radioactive contamination.
- (U) Errors committed in the assembly, testing, loading, or transportation of equipment, or the malfunctioning of equipment and material that could lead to an unintentional operation of the weapon arming and firing sequence.
- (U) Damage to the nuclear weapon or the nuclear component due to any natural occurrence, unfavorable environment, or other condition.

Independent Assessment

(U) An analysis of hardware, system, software, or firmware done by persons or organizations other than those who either (1) designed it, (2) are responsible for its day-to-day functioning, or (3) sponsor the effort that normally assesses it.

Independent Power Source

(U) A power source, normally battery, independent of any other source.

Indoctrinated

(U) Personnel cleared for Confidential access and briefed regarding the continuous handling and/or observation and recovery procedures specific to VCP.

Information

(U) Knowledge such as facts, data, or opinions, including numerical, graphic, or narrative forms, whether oral or maintained in any medium.

Information System Security Officer (ISSO)

(U) The person responsible to the DAA for ensuring the security is provided for and implemented throughout the life cycle of an Automated Information Systems from the beginning of the concept development phase through its design, development, operation, maintenance, and secure disposal.

Information Systems

(U) The organized collection, processing, transmission, and dissemination of information in accordance with defined procedures, whether automated or manual.

Initial Response Force (IRF)

(U) An element, whose capabilities are listed in the Nuclear Accident Response Capabilities Listing (NARCL), belonging to DoD or DOE installations, facilities, or activities, which would take emergency response actions necessary to maintain command and control on-site pending arrival of the Service or agency response force. Functions which the initial response force is tasked to perform (within its capabilities), are:

- Rescue operations
- Accident site security
- Firefighting
- Initiation of appropriate EOD procedures
- Radiation monitoring
- Establishment of command, control, and communications
- Public affairs activities

Insensitive High Explosive (IHE) (U) HE that requires a shock of more than usual strength to cause detonation; this relative insensitivity contributes to weapon safety.

Insider (U) A person who, by reason of official duties, has knowledge and/or position that would significantly enhance the likelihood of successful bypass or defeat of positive measures should that person attempt such an action. See also Cognizant Agent and Third Party Agent.

Installations (U) Real DoD properties including bases, stations, forts, depots, arsenals, plants (both contractor and Government operated), hospitals, terminals, and other special mission facilities, as well as those used primarily for military purposes.

Intelligent Terminal (U) A terminal that is programmable, able to accept peripheral devices, able to connect with other terminals or computers, able to accept additional memory, or which may be modified to have these characteristics.

Interim Security Clearance (U) A security clearance based on the completion of minimum investigative requirements, which is granted on a temporary basis, pending the completion of the full investigative requirements.

Intrinsic Radiation (INRAD) (U) Any radiation emitted through the outer surface of a nuclear weapon in its normal storage condition.

Intrusion Detection System (IDS) (U) An alarm system consisting of sensor(s) capable of detecting one or more types of phenomena, signal media, annunciator(s), and energy source, for signalling the entry or attempted entry of a person or other target into the area protected by the system.

Joint Communications Support Element (JCSE) (U) A communications element that provides high frequency, very high frequency, secure and super high frequency satellite terminals and other equipment.

Joint Communications Contingency Station Assets (U) The communications station provides high frequency radio, tropospheric scatter terminals, automatic digital network terminals, manual secure voice and other equipment.

Joint Hazard Evaluation Center (JHEC) (U) A facility, staffed by representatives from each of the agencies conducting hazard survey data and radiological safety/health physics matters on-site.

Joint Information Center (JIC) (U) A facility at the scene of a nuclear weapon accident or significant incident to coordinate all public affairs. The JIC includes representation from DOE, DoD, FEMA, DoS, and other Federal agencies, as well as state, local, and/or foreign governments.

Joint Nuclear Accident Coordinating Center (JNACC)

(U) The DoD and DOE operate coordinating centers for exchanging and maintaining information about radiological assistance capabilities and activities. These centers are separated geographically, but linked by direct communications networks.

Joint Nuclear Weapon Publication System (JNWPS)

(U) The JNWPS is a system of technical manuals on nuclear weapons and associated materiel and such supplemental information or data determined appropriate by either the DoD or the Department of Energy (DOE) in connection with the general field of nuclear weapons. The JNWPS exists as a means of providing to the DOE, DNA, and to the respective DoD military departments (Army, Navy and Air Force), authoritative instructions and procedural data on the technical aspects of nuclear weapons and associated equipment to supplement existing publication systems of the participating agencies/Services.

Joint Test Assembly (JTA)

(U) A DOE-developed configuration based on DOE-DoD requirements for use in a joint flight test program, composed of a joint-test subassembly and war reserve weapon components. The physical appearance and characteristics of a JTA will approximate a war reserve configuration to the extent practicable. JTAs are produced in two ways:

- (U) **Prebuild:** For weapon systems whose design requires the JTAs to be completely prebuilt as new production.

- (U) **Rebuild:** Using components from stockpiled war reserve weapons plus joint-test subassemblies from new production.

Kiloton (kt)

(U) Energy equivalent to that released by the explosion of 1000 tons of TNT, 10^{12} calories, or 4.18×10^{12} joules; a measure of yield.

Lateral Dispersal

(U) Movement of nuclear weapons and dual-capable aircraft from a main operating base to outlying, contingency operating bases; a method of enhancing survivability in the event of increased tension or hostilities.

Launching

(U) Propulsion of a missile with a nuclear warhead into controlled flight or uncontrolled flight beyond the immediate area of the launch site.

Licensed Material

(U) Source material, special nuclear material received, possessed, used, or transferred under a general or specific license issued by the Nuclear Regulatory Commission or a state.

Limited Access Authorization

(U) Authorization for access to CONFIDENTIAL or SECRET information granted to non-United States citizens and immigrant aliens, which is limited to only that information necessary to the successful accomplishment of their assigned duties and based on a background investigation scoped for 10 years.

Limited Area

(U) A designated area immediately surrounding one or more Exclusion Area(s) ; normally, this is between the boundaries of Exclusion Area(s) and the outer or inner barrier or boundary of the perimeter security system.

Limited-Life Component (LLC)

(U) A weapon component that deteriorates in some respect over time, and must be replaced periodically during weapon stockpile life; principal classes of LLCs are reservoirs, neutron generators, and parachutes.

Lock

(U) The act of rendering a nuclear weapon incapable of achieving a nuclear yield by the application or activation of a positive control device. The act is reversible.

Logistic Movement

(U) The transport of war reserve (WR) nuclear weapons by any appropriate noncombat delivery vehicle outside a permanent limited/exclusion area.

Logistic System

(U) The organizations, vehicles, and support equipment employed for the loading, movement and transfer of nuclear weapons and nuclear components (except limited life components (LLC's)), but explicitly excluding nuclear-capable combat delivery vehicles.

Maintenance Facilities

(U) Those buildings or structures in which nuclear weapon inspections, checkout, assembly, or maintenance operations are performed.

Maximum Permissible Dose

(U) That radiation dose which a military commander or other appropriate authority may prescribe as the limiting cumulative radiation dose to be received over a specific period of time by members of the command, consistent with operational military considerations.

Maximum Readiness

(S) [redacted]

Megaton (Mt)

(U) Energy equivalent to that released by the explosion of 1,000,000 tons of TNT, 10^{15} calories, or 4.18×10^{15} joules; a measure of yield.

Memory Phrase

(U) A split-knowledge classified phrase inserted into APC to access stored encrypted information contained in data files. Memory phrase use allows performance of code operations.

Memory Phrase Envelopes

(U) Printed products containing classified English-language phrases used as cryptograhic keying data by the APC's crypto logic. Two memory phrases are required for each APC PROM data file. MP envelopes are produced, handled, and used under two-person control, split-knowledge conditions.

Military Characteristics (MCs)

(U) A document, developed for each nuclear weapon, that states the performance requirements and physical characteristics for those parts of a nuclear weapon that are the sole responsibility of the DOE to design, develop, certify, and produce. They begin as a statement of desired DoD performance objectives and become design requirements only after formal acceptance by the DOE.

Mistaken Authorized Use

(U) A launch, release, or transfer for use of nuclear weapons, authorized by the National Command Authority, resulting from a decision based upon reporting of erroneous warning data, misinterpretation of warning data, or miscalculation of the intentions of a potentially hostile nation.

Modified Alert Force

(C) [redacted]

Monitoring

(U) The act of detecting the presence of radiation and the measurement thereof with radiation measuring instruments.

Multilevel Security Mode

(U) A mode of operation that allows two or more classification levels of information to be processed simultaneously within the same system when not all users have a clearance or formal access approval for all data handled by the Automated Information Systems.

Multiple-Code Coded Switch

(S) [redacted]

National Agency Check (NAC)

(U) A personnel security investigation consisting of a records review of certain national agencies as prescribed in paragraph 1, Appendix B, this Regulation, including a technical fingerprint search of the files of the Federal Bureau of Investigation (FBI).

National Command Authorities (NCA)

(U) See Joint Pub 1-02, 1 Dec 89

National Defense Area (NDA)

(U) An area established on non-Federal lands located within the United States, its possessions, or territories, for the purpose of safeguarding classified defense information, or protecting DoD equipment and/or material. Establishment of a National Defense Area temporarily places such non-Federal lands under the effective control of the DoD and results only from an emergency event. The senior DoD representative at the scene will define the boundary, mark it with a physical barrier, and post warning signs. The landowner's consent and cooperation will be obtained whenever possible; however, military necessity will dictate the final decision regarding location, shape, and size of the NDA.

National Military Command System (NMCS)

(U) Designed to support the President and the Secretary of Defense in exercising their responsibilities for the direction of US Armed Forces and the Chairman of the Joint Chiefs of Staff in executing his responsibilities. The NMCS consists of facilities including the National Military Command Center, the Alternate National Military Command Center, the National Emergency Airborne Command Post, and other command centers that may be designated by the Secretary of Defense. The NMCS also includes data processing systems and networks, display systems, communications systems, procedures and personnel.

National Security

(U) National security means the national defense and foreign relations of the United States.

National Security Area (NSA)

(U) An area established on non-Federal lands located within the United States, its possessions, or territories, for safeguarding classified information, and/or restricted data or equipment or material belonging to DOE. Establishment of an NSA temporarily places such non-Federal lands under the effective control of the DOE and results only from an emergency event. The senior DOE representative having custody of the material at the scene shall define the boundary, mark it with a physical barrier, and post warning signs. The landowner's consent and cooperation shall be obtained whenever possible; however, operational necessity shall dictate the final decision regarding location, shape and size of the NSA.

Need-to-Know

(U) A criterion in security procedures which requires the custodians of classified information to establish, prior to disclosure, that the intended recipient must have access to the information to perform his official duties.

Network

(U) A network is composed of a communications medium and all components attached to that medium whose responsibility is the transference of information. Such components may include Automated Information Systems, packet switches, telecommunications controllers, key distribution centers, and technical control devices.

No-Knowledge

(U) Cypher materials produced, controlled and stored so no individual is knowledgeable of the cypher values.

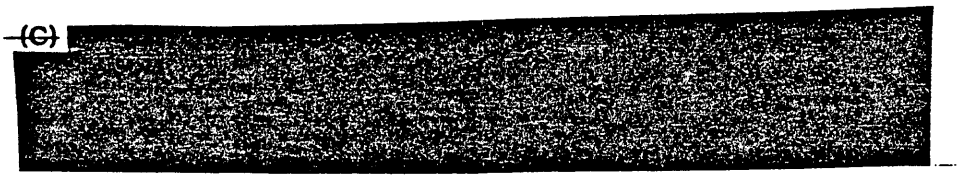
No-Knowledge Recode

(U) Changing the PAL codes by use of key split-knowledge memory phrases, APC, and PROM, SDM, or PDM files without operator knowledge of the codes being introduced into the PAL device.

Noncombat Delivery Vehicle

(U) Any vehicle used for the movement of nuclear weapons, but not the subject of specific nuclear safety rules approved by the Secretary of Defense in accordance with DoD Directive 3150.2, "Safety Studies and Reviews of Nuclear Weapons Systems."

Nonsealed Authentication System

(C) 

Nonstrategic Nuclear Forces (NSNF)

(U) Those nuclear-capable forces, located in an area of military operations, with a capability to employ nuclear weapons by land, sea, or air forces against opposing forces, supporting installations, or facilities. Such forces may be employed, when authorized by competent authority, to support operations that contribute to the accomplishment of the military commander's mission within the theater of operations. This term shall be used instead of the term "theater nuclear forces (TNF)."

Nonviolent Disablement (NVD)

(U) Nuclear weapon disablement which, through the destruction or disassociation of one or more key components, temporarily destroys a weapon's ability to be used in its intended mode. NVD may not preclude the weapon's ability to be used in other than its intended mode. The effects of NVD are confined to the weapon case or the weapon shipping and storage container. Methods of NVD include:

- Disassociation
- Destruction of components
- Command Disablement (CD)

Normal Environments

(U) The expected logistical and operational environments defined in the stockpile-to-target sequence document that the weapon system is required to survive without degradation in operational reliability.

NSNF Security

(U) The protection of all mission-essential NSNF assets to prevent the theft or diversion and/or the unauthorized detonation of a tactical nuclear weapon or component, and to prevent unauthorized access to and/or damage and/or sabotage to a tactical nuclear weapon or component.

NSNF Survivability

(U) The capability of NSNF and NSNF supporting systems and facilities to endure in order to maintain the ability to execute their assigned missions.

NSNF Survivability and Security (S2) Scope

(U) That scope applies to all of the following:

- (U) All Mission-Essential Assets. Personnel, equipment, facilities, nuclear and nonnuclear elements of weapon systems, and weapon systems support.

- (U) The Entire Threat Spectrum. Unconventional, conventional, chemical, and nuclear.

- (U) All Force Postures. Nondispersed and/or nondeployed, dispersing and/or deploying, and dispersed and/or deployed.

- (U) Doctrine, Organization, Procedures, Training, and Equipment.

NSNF Weapon Systems

(U) Includes the nuclear weapon, a means of delivering it to the target, associated support equipment (facilities, etc.), and personnel.

Nuclear Accident and Incident Control Team (NAIC)

(U) An Army team organized to minimize and prevent the loss of life, personal injury, hazardous effects, and destruction of property, to secure classified material, and to enhance and maintain the public's confidence in the Army's ability to respond effectively to a nuclear accident or incident.

Nuclear Accident Response Capabilities Listing (NARCL)

(U) A listing of DoD and DOE installations, facilities, or activities with nuclear accident/incident response and radiation detection capabilities.

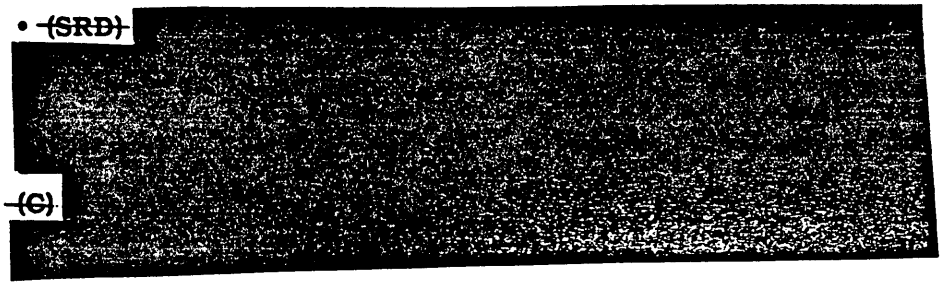
Nuclear Assembly System (NAS)

- (U) For implosion-assembled weapons: The HE, pit (including nuclear components and internal initiator, if present), nuclear safing system, and detonators, but not fuzing components, firing sets, cables, external initiators, or reservoirs.

- (U) For gun-assembled weapons: The gun barrel, propellant assembly and igniter, nuclear components, initiator, and tamper.

Nuclear Certified Computer Data

- ~~(SRD)~~



~~(C)~~

Nuclear Command and Control (NC2)

(U) The exercise of authority and direction by the President, as Commander in Chief, through established command lines, over nuclear weapon operations of military forces; as Chief Executive over all government activities that support those operations; and as Head of State over required multinational actions that support those operations.

Nuclear Command and Control System (NCCS)

(U) The designated combination of flexible and enduring elements including facilities, equipment, communications, procedures, personnel, and the structure in which these elements are integrated, all of which are essential for planning, directing, and controlling nuclear weapon operations of military forces and the activities that support those operations.

Nuclear Components

(U) Weapon components composed of fissionable or fusionable materials that contribute substantially to nuclear energy released during detonation. These include boosting materials but not initiator materials.

Nuclear Contribution

(U) Explosive energy released by nuclear fission or fusion reactions, as part of the total energy released by the accidental explosion of a nuclear weapon. Any nuclear contribution equivalent to four or more pounds of TNT is considered significant, and would add beta and gamma radiation hazards to other radiological and toxic hazards present at a nuclear weapon accident site.

Nuclear Control Order

(U) A decrypted emergency action message, in the proper format, properly authenticated, and containing information consistent with known preplanned data authorizing actions affecting nuclear weapons.

Nuclear Detonation (NUDET)

(U) A nuclear explosion resulting from fission of fusion reactions in nuclear materials, such as from a nuclear weapon.

Nuclear Emergency Search Team (NEST)

(U) The NEST is a DOE asset with specialized equipment for conducting radiation survey and detection, field communications, EOD support, bomb/weapon diagnostics, hazard prediction, damage mitigation, and decontamination.

Nuclear Radiation

(U) Particulate and electromagnetic radiation emitted from atomic nuclei in various nuclear process. The important nuclear radiations, from the weapons standpoint,are alpha and beta particles, gamma ray, and neutrons. All nuclear radiations are ionizing radiations, but the converse is not true.

Nuclear Safety

(U) Collection of measures to protect nuclear weapon systems against the risks and threats inherent in their environment.

Nuclear Safing

(U) The prevention of a nuclear yield in the event of accidental detonation of the HE of a high explosive assembly weapon or ignition of the propellant of a gun assembly weapon.

Nuclear Security

(U) Collection of measures taken to protect physical items and information and to prevent deliberate damage to, disruption of, or loss of any element of the nuclear command and control system or nuclear weapon program.

Nuclear Weapon

(U) A device in which the explosion results from the energy released by reactions involving atomic nuclei, either fission or fusion, or both.

Nuclear Weapon Accident

(U) An unexpected event involving nuclear weapons or nuclear components that results in any of the following:

- (U) Accidental or unauthorized launching, firing, or use by US forces or US supported allied forces of a nuclear capable weapons system.
- (U) An accidental, unauthorized, or unexplained nuclear detonation.
- (U) Non-nuclear detonation or burning of a nuclear weapon or nuclear component.
- (U) Radioactive contamination.
- (U) Jettisoning of a nuclear weapon or nuclear component.
- (U) Public hazard, actual or perceived.

Nuclear Weapon Incident

(U) An unexpected event involving a nuclear weapon, facility, or component resulting in any of the following, but not constituting a nuclear weapon(s) accident:

- (U) An increase in the possibility of explosion or radioactive contamination.

- (U) Errors committed in the assembly, testing, loading, or transportation of equipment, and/or the malfunctioning of equipment and material which could lead to an unintentional operation of all or part of the weapon arming and/or firing sequence, or which could lead to a substantial change in yield, or increased dud probability.

- (U) Any act of God, unfavorable environment, or condition resulting in damage to a weapon, facility, or component.

Nuclear Weapon Movement

(U) The transport of nuclear weapons by any appropriate noncombat delivery vehicle will be as follows:

- (U) Logistic Movement. All movement of nuclear weapons and nuclear components by a noncombat vehicle, from the secure environment of a storage or alert area, not conducted in response to an increased readiness condition or wartime emergency plan.

- (U) Tactical Movement. That movement of nuclear weapons or nuclear components made to support emergency plans or an alert posture during an increased readiness condition which authorizes a unit to remove nuclear weapons from their storage configuration in preparation for deployment to other locations.

Nuclear Weapon Personnel Reliability Program (PRP)

(U) The program which establishes personnel reliability standards for individuals performing duties associated with nuclear weapons.

Nuclear Weapon Safety Standards

(U) There shall be positive measures to prevent nuclear weapons involved in accidents or incidents, or jettisoned weapons from producing a nuclear yield.

(U) There shall be positive measures to prevent deliberate prearming, arming, launching, firing, or releasing of nuclear weapons, except upon execution of emergency war orders or when directed by competent authority.

(U) There shall be positive measures to prevent inadvertent prearming, arming, launching, firing or releasing of nuclear weapons in all normal and credible, abnormal environments.

(U) There shall be positive measures to ensure adequate security of nuclear weapons pursuant to DoDD 5210.41.

Nuclear Weapon Safety Study Group (NWSSG)

(U) Joint DoD-DOE study groups, chaired by a Military Service, that periodically analyze each nuclear weapon system to ensure it meets the four nuclear weapon safety standards.

Nuclear Weapon Significant Incident

(U) An unexpected event involving nuclear weapons or nuclear weapon components or a nuclear weapon transport or launch vehicle when a nuclear weapon is mated, loaded, or on board that does not fall in the nuclear weapon accident category but:

- (U) Results in evident damage to a nuclear weapon or radiological nuclear weapon component to me extent that major rework, complete replacement, or examination or recertification by the DOE is required.
- (U) Requires immediate action in the interest of safety or nuclear weapons security.
- (U) May result in adverse public reaction (national or international) or inadvertent release of classified information.
- (U) Could lead to a nuclear weapon accident and warrants that senior national officials or agencies be informed or take action.

Nuclear Weapon Surety

(U) Materiel, personnel, and procedures which contribute to the security, safety, and reliability of nuclear weapons and to the assurance that there will be no nuclear weapon accidents, incidents, unauthorized weapon detonations, or degradation in performance at the target.

Nuclear Weapon System

(U) A nuclear weapon and a means for delivering it to the target with associated support equipment, noncombat delivery vehicles, facilities, procedures, and personnel.

Nuclear Weapons Technical Inspection

(U) A Service or DNA inspection of a nuclear-capable unit conducted to examine nuclear weapons technical assembly, maintenance, storage functions, logistic movement, handling, and safety and security directly associated with these functions. The NWTI is encompassed within the following inspections:

- (U) Defense Nuclear Surety Inspection (DNSI) conducted by DNA.
- (U) Nuclear Surety Inspection (NSI) conducted by the Army.
- (U) Navy Technical Proficiency Inspection (NTPI) and Nuclear Weapons Acceptance Inspection (NWAI) conducted by the Navy.
- (U) Nuclear Surety Inspection (NSI) and Initial Nuclear Surety Inspection (INSI) conducted by the Air Force.

Nuclear Yield

(U) An energy release through nuclear fission or fusion equivalent to or greater than the energy released by detonation of 4 pounds (1.8 kilograms) of TNT. Also called nuclear detonation.

Nuclear-Capable Unit

(U) A unit or an activity assigned responsibilities for assembling, maintaining, transporting, or storing war reserve nuclear weapons, their associated components and ancillary equipment.

Nuclear-Capable Unit

(U) A military unit organized and trained to transport, store, maintain, provide security for, or employ nuclear weapon systems.

Nuisance Alarm

(U) Activation of an alarm sensor by some influence for which the sensor was designed but which is not related to an intrusion attempt.

Numerical Master List

(U) A master list, split into Parts A and B, containing all of the plain text operational PAL combinations within a command. NMLs are produced, handled, and used under strict two-person control, split-knowledge procedures.

On-Scene Commander (OSC)

(U) The Flag or General Officer designated to command the DoD response efforts at the accident site.

On-Site

(U) That area around the scene of a nuclear weapon accident or significant incident under the operational control of the installation commander, facility manager, DoD OSC, or DOE team leader. The on-site area includes any area which has been established as an NDA or NSA.

One-Point Detonation

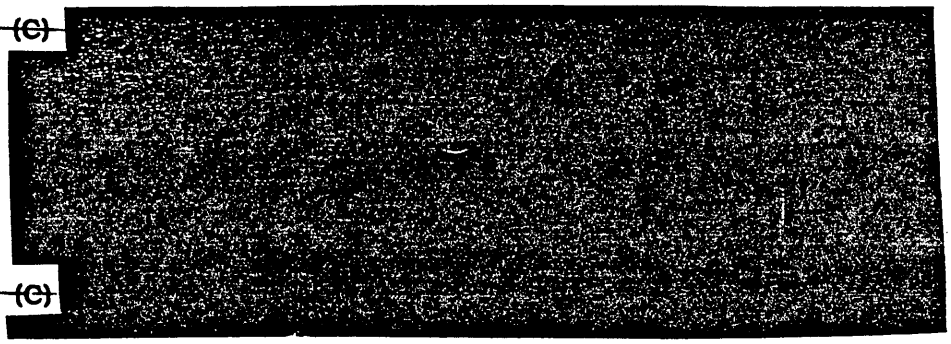
(U) A detonation of HE (High Explosives) initiated at a single point.

One-Point Safe

(U) The criterion for design safety that a weapon must have less than one chance in a million of producing a nuclear yield of more than four pounds of TNT (equivalent energy release) when the high explosive is initiated and detonated at any single point.

Operational Combination or Code

—(C)—



Operational Sealed Authenticator

—(C)—

Operations Center

(U) A facility from which operations are controlled or directed. These facilities include command centers, alternate command centers, command posts (mobile and fixed), emergency actions elements, combat alert or operations centers, airborne command posts, and similar facilities.

Operations Security

(U) The process of denying adversaries information about friendly capabilities and intentions by identifying, controlling, and protecting indicators associated with planning and conducting military operations and other activities.

Oralloy

(U) Enriched uranium. One of the primary fissionable materials in nuclear weapons.

Orange Book Terminology

(U) Reference (k), also called the Orange Book, classified Automated Information Systems (AIS) into four broad hierarchical divisions of security protection. Within divisions C and B there are further subdivisions called classes. These classes also are ordered in a hierarchical manner characterized by the set of computer security features they possess (see Security Features definition).

Outbreak of Nuclear War

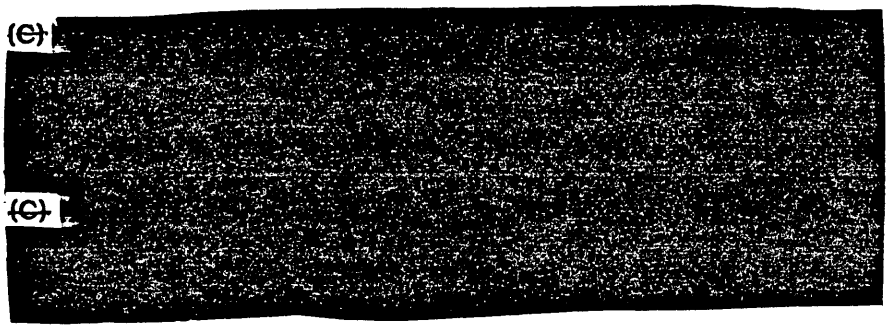
(U) The initiation of actual authorized or intended nuclear weapon use by one country against another, ranging in scope from use of a single weapon to a full-scale nuclear exchange.

Outsider

(U) See Third Party Agent.

PAL Material

(C)



PAL or CS System

(C)

PAL Recode Team

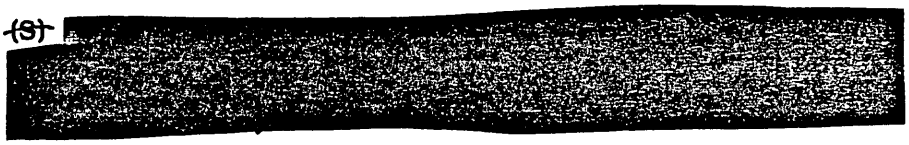
(U) A team composed of US commissioned officer, warrant officers, or noncommissioned officers in the grade of E-6 or above who insert numerical combinations into the PAL devices. At least one member of the team is a commissioned or warrant officer. Recoding with APCs on a no-knowledge basis may be accomplished by a recode team composed of noncommissioned officers in the grade of E-7 or higher. (Recoding operations and personnel requirements at a depot using CLS and/or Depot Storage Codes will be in accordance with the applicable Joint Nuclear Weapons Publication.)

PAL Unit Card

(U) See Unit Card.

PAL Unlock Value

(S)



Partitioned Security Mode

(U) A mode of operation wherein all personnel have the clearance, but not necessarily formal access approval and need-to-know for all information handled by the Automated Information Systems. This security mode encompasses the compartmented mode defined in DCID No. 1/6, reference (g).

Periodic Reinvestigation (PR)

(U) An investigation conducted every 5 years for the purpose of updating a previously completed background or special background investigation on persons occupying positions referred to in paragraphs 3-700 through 3-710. The scope will consist of a personal interview, NAC, LACs, credit bureau checks, employment records, employment references and developed character references and will normally not exceed the most recent 5 year period.

Permissive Action Link (PAL)

(U) A device included in or attached to a nuclear weapon system to preclude arming and/or launching until the insertion of a prescribed discrete code or combination. It may include equipment and cabling external to the weapon or weapon system to activate components within the weapon or weapon system.

Permissive Action Link (PAL) Command

(U) A code or other signal which will cause or permit operation of a permissive action link.

Permissive Action Link (PAL) Management Control Team

(U) A team composed of at least four US military personnel responsible for the management and control of the unified or specified command PAL program. The team is divided into A and B sections with a minimum of two persons in each section. At least one member of each section is a commissioned or warrant officer. Noncommissioned officers in grade E-7 and above may participate as one half of an A or B Team as required.

Permissive Action Link Codes

- (U) PAL-Classified Logistic Shipment Code: A PAL code used only during logistics shipment of nuclear weapons. See classified logistic shipment code.

- (U) PAL-Code Identifier: Unclassified alphanumeric sequence corresponding to the appropriate PAL code above. See code identifier.

- (U) PAL-Depot Storage Code: A PAL code used only during temporary storage of nuclear weapons when operational codes are not appropriate. See depot storage codes.

- (U) PAL-Operational Code: A PAL code used within a specified or unified command to lock or unlock nuclear weapons. See operational combination or code.

Personnel Reliability Program (PRP)

(U) A DoD program implemented for all personnel who control, handle, have access to, or control access to nuclear weapon systems. The program covers selection, screening, and continuous evaluation of the personnel assigned to various nuclear duties. The program seeks to ensure that personnel coming under its purview are mentally and emotionally stable and reliable.

Personnel Security Investigation (PSI)

(U) Any investigation required for the purpose of determining the eligibility of DoD military and civilian personnel, contractor employees, consultants, and other persons affiliated with the Department of Defense, for access to classified information, acceptance or retention in the Armed Forces, assignment or retention in sensitive duties, or other designated duties requiring such investigation. PSIs include investigations of affiliations with subversive organizations, suitability information, or hostage situations (see paragraph 2-403) conducted for the purpose of making personnel security determinations. They also include investigations of allegations that arise subsequent to adjudicative action and require resolution to determine an individual's current eligibility for access to classified information or assignment or retention in a sensitive position.

Physical Security (U) That part of security concerned with physical measures designed to safeguard personnel; to prevent or delay unauthorized access to equipment, installations, material and documents; and to safeguard them against espionage, sabotage, damage, and theft.

Physical Security Equipment (PSE) (U) A generic term encompassing any item, device, or system that is used primarily for the protection of Government property, including nuclear, chemical, and other munitions, personnel, installations, and in the safeguarding of national security information and material, including the destruction of such information and material both by routine means and by emergency destruct methods.

Pindown (U) A deliberate action taken by an adversary to disrupt the nuclear command and control system which precludes the intended authorized use of nuclear weapons. Pindown may be an intended or unintended byproduct of a separate, deliberate adversary action.

Plutonium (Pu) (U) An artificially produced fissile material. The Pu-239 is primarily used in nuclear weapons.

Plutonium Limit (U) The maximum amount of fissile materials, usually stated as kilograms of Pu, that may be contained among all nuclear weapons in a particular storage or transport volume or space.

PMCT One-Time Pad ~~(C)~~ [redacted]

[redacted]

Predictability Measures

(U) Actions, designed to increase openness and predictability, taken between parties to enhance mutual knowledge and understanding of both sides' military activities, to reduce the possibility of conflict occurring as the result of an accident, miscalculation, or misinterpretation of actions. Such actions may include notification, observation, forecasting, and/or inspection of military exercises.

President

(U) "President" as used in this directive, includes an official who succeeds to the Office of the Presidency under the Constitution and under 3.U.S.C. 19, as well.

Prevent

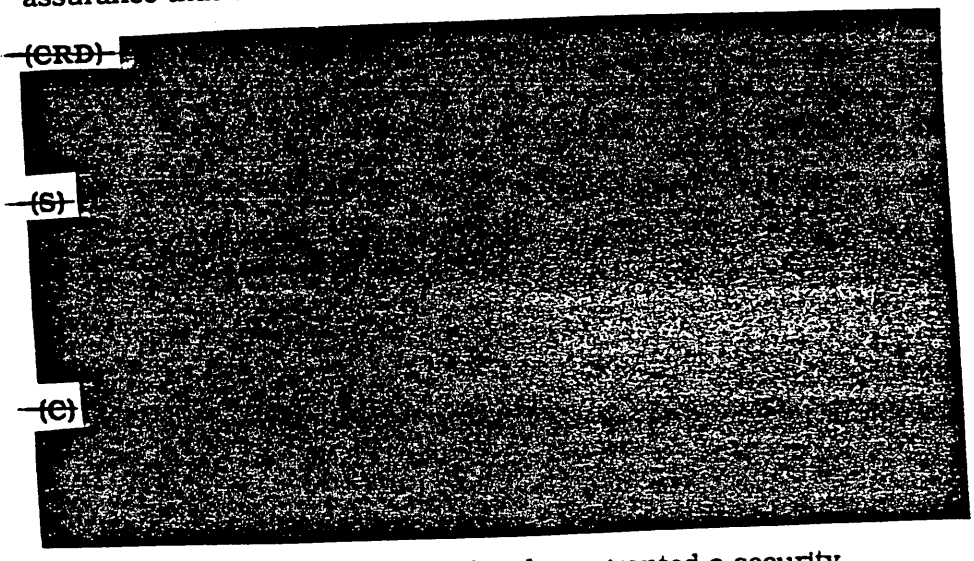
(U) As used in the DoD Nuclear Weapon System Safety Standards, "prevent" means to minimize the possibility of occurrence of the undesired event. It does not imply absolute assurance that the event will not occur.

Primary

~~(CRD)~~

Principal NC2 Decision Makers

~~(S)~~



Programmable Read-Only Memory

~~(C)~~

Properly Cleared

(U) The status of a person who has been granted a security clearance commensurate with the classification of the positive control material involved.

Purge

(U) Removal of sensitive data from an Automated Information Systems at the end of a period of processing, including from Automated Information Systems storage devices and other peripheral devices with storage capacity, in such a way that there is insurance proportional to the sensitivity of the data that the data may not be reconstructed. An Automated Information Systems must be disconnected from any external network before a purge.

Quantity / Distance (QD) Safety Standards

(U) Directives pertaining to the amounts and kinds of explosives that can be stored and the proximity of such storage to buildings, highways, railways, magazines, and other installations.

Radioactivity

(U) The spontaneous emission of radiation, generally alpha or beta particles, often accompanied by gamma rays from the nuclei of an unstable isotope.

Radiological Accident

(U) A loss of control over radiation or radioactive material that presents a hazard to life, health, or property or that may result in any member of the general population exceeding exposure limits for ionizing radiation.

Radiological Assistance

(U) That assistance provided after an accident involving radioactive materials to:

- (U) Evaluate the radiological hazard.
- (U) Accomplish emergency rescue and first aid.
- (U) Minimize safety hazards to the public.
- (U) Minimize exposure of personnel to radiation or radioactive material.
- (U) Minimize the spread or radioactive contamination.
- (U) Minimize damaging effects on property.
- (U) Disseminate technical information and medical advice to appropriate authorities.

Radiological Assistance Program Team (RAP Team)

(U) DOE teams available through DOE regional offices to assist in radiological emergencies.

Radiological Control (RADCON) Team

(U) Special radiological teams of the US Army and US Navy organized to provide technical assistance and advice in radiological emergencies.

Radiological Control Area (RCA)

(U) The control area encompassing all known, or suspected, radiological contamination at a nuclear weapon accident.

Radiological Survey

(U) The directed effort to determine the distribution of radiological material and dose rates in an area.

Re-entry Recommendation (RER)

Advice provided to the State concerning guidance that may be issued to members of the public on returning to an area affected by a radiological emergency, either permanently or for short-term emergency actions.

Real Time Assessment

(U) Instantaneous assessment of the actual cause for activation of the sensor alarm by either direct visual assessment or with the aid of electro-optical equipment, e.g., closed circuit television.

Reassociation

~~(C)~~ [redacted]

Recode (U) An operation changing a combination or code previously set into a PAL, CSS, or PES device so the device can be unlocked, locked, or recoded when the new combination or code is subsequently inserted.

Recovery Procedures (U) See Explosive Ordnance Disposal Procedures.

Release —(C)— [redacted]

Releasing (U) The separation of a missile or gravity bomb with a nuclear warhead from a delivery aircraft.

Reliability (U) The probability, without regard to countermeasures, that a nuclear weapon, sub-assembly, component, or other part will perform in accordance with its design intent or requirements. Statements of functionability, as well as dud or other failure probabilities, are included.

Remote Destruct (U) A device and/or system which precludes nuclear detonation of a launched nuclear weapon and may also terminate its flight.

Render Safe Procedures (U) See Explosive Ordnance Disposal Procedures.

Reserve Editions (U) Editions of sealed authentication or PAL, CSS, or PES material that have not been designated EFFECTIVE.

Residual Contamination (U) Contamination which remains after steps have been taken to remove it. These steps may consist of nothing more than allowing the contamination to decay naturally.

Residual Radiation (U) Fission products and radioactive debris from a nuclear explosion, including radioactivity induced in the surrounding environment.

Response Force (U) A security force of personnel (not including those on fixed guard posts), appropriately armed and equipped, whose primary duty is to provide initial or follow-up response to those situations which threaten or affect the security of the nuclear weapons concerned. Response forces and times for shipboard application shall be as set forth in Chapter XIII.

Restricted Area (U) An area to which entry is subject to special restrictions or control for security reasons, or to safeguard property or material. This does not include those designated areas restricting or prohibiting overflight by aircraft. Restricted areas may be of different types depending on the nature and varying degree of importance of the security interest, or other matter contained therein. Restricted areas must be authorized by the installation/activity commander, properly posted, and shall employ physical security measures.

Restricted Data	(U) All data (information) concerning (a) design, manufacture, or use of atomic weapons; (b) the production of special nuclear material; or (c) the use of special nuclear material in the production of energy. The term does not include data declassified or removed from the restricted data category pursuant to Section 142 of the Atomic Energy Act of 1954.
Retrofit Program	(U) A program to make approved specified changes to existing nuclear weapons or parts; may be carried out at production, assembly, storage, or deployment sites.
RF, Radio, or Radar Blackout	(U) Complete disruption of RF (radio frequency) signals over large areas caused by ionization from the radiative outputs of a high-altitude nuclear explosion.
Risk	(U) A combination of the likelihood that a threat shall occur, the likelihood that a threat occurrence shall result in an adverse impact, and the severity of the resulting adverse impact.
Risk Analysis	(U) An analysis of system assets and vulnerabilities to establish an expected loss from certain events based on estimated probabilities of occurrence.
Risk Index	(U) The disparity between the minimum clearance or authorization of Automated Information Systems' (AIS) users and the maximum sensitivity (e.g., classification and categories) of data handled by the AIS.
Risk Management	(U) The total process of identifying, measuring, and minimizing uncertain events affecting Automated Information Systems resources. It includes risk analysis, cost benefit analysis, safeguard selection, security test and evaluation, safeguard implementation, and systems review.
Risk Reduction Measures	(U) That combination of confidence building and predictability measures that would reduce the probability of outbreak of nuclear war as a result of accident, misinterpretation, miscalculation, terrorism, or unexpected technological breakthrough. These need not be unilateral steps and they require communication to others and/or participation by others to be effective.
Roentgen	(U) An obsolete unit of exposure of gamma (or X-ray) radiation in field dosimetry. One roentgen is essentially equal to one rad.
Roentgen Equivalent Man/ Mammal (rem)	(U) One rem is the quantity of ionizing radiation of any type which, when absorbed by man or other mammals, produces a physiological effect equivalent to that produced by the absorption of one (1) roentgen of X-ray or gamma radiation. The SI unit replaced the rem.
Safeguards	(U) An integrated system of physical protection, material accounting, and material control measures designed to deter, prevent, detect, and respond to unauthorized access, possession, use, or sabotage of nuclear weapons, NC2, and associated information and facilities.

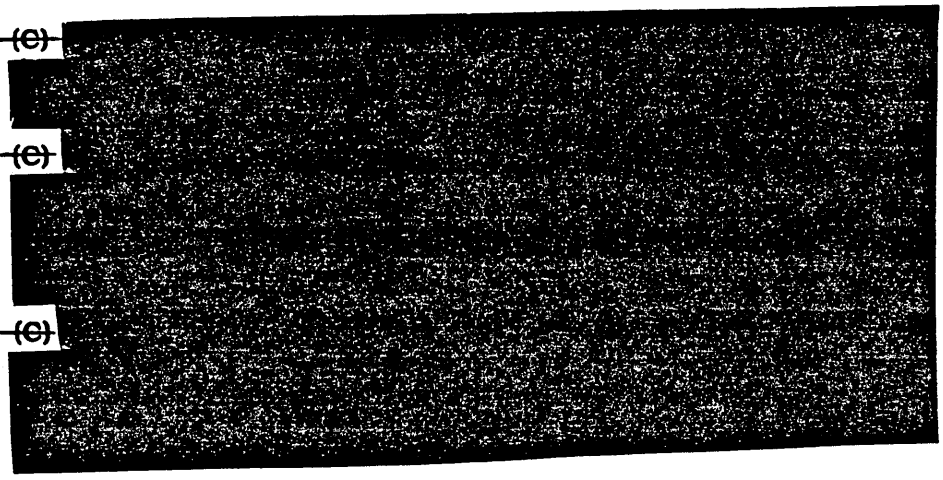
Safety Rules (U) Procedural safeguards for nuclear weapon systems that are derived from safety studies or operational safety reviews, are developed and processed under this Directive, and are approved by the Secretary of Defense.

Safing (U) As applied to weapons and ammunition, the changing from a state of readiness for initiation to a safe condition.

SAS Identifier ~~(C)~~

Sealed Authentication System (SAS) ~~(C)~~

Sealed Authenticator ~~(C)~~



Sealed Pit (U) One that is hermetically closed to protect nuclear materials from the external environment.

Secondary (U) A nuclear stage physically separate from the primary.

Security (U) The total spectrum of procedures, facilities, equipment, and personnel employed to provide a secure environment for nuclear weapons.

Security Area (U) The area surrounding the accident site in an overseas country where a two-person security policy is established to prevent unauthorized access to classified defense information, equipment or material. The cooperation by local authorities and host countries consent should be obtained prior through host nation agreements.

Security Clearance (U) A determination that a person is eligible under the standards of this Regulation for access to classified information.

Security Features (U) The security-relevant functions, mechanisms, and characteristics of Automated Information Systems hardware and software (e.g., identification, authentication, audit trail, access control).

Security Force (U) Those persons whose primary duties are to protect nuclear weapons.

Security Mode

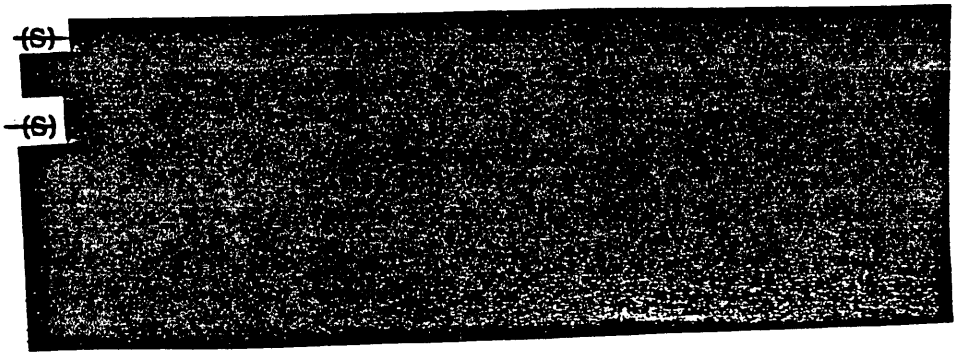
(U) A mode of operation in which the DAA accredits an Automated Information Systems to operate. Inherent with each of the four security modes (dedicated, system high, multilevel, and partitioned) are restrictions on the user clearance levels, formal access requirements, need-to-know requirements, and the range of sensitive information permitted on the Automated Information Systems.

Security Safeguards

(U) The protective measures and controls that are prescribed to meet the security requirements specified for an Automated Information Systems. These safeguards may include, but are not necessarily limited to, hardware and software security features; operation procedures; accountability procedures; access and distribution controls; management constraints; personnel security; and physical structures, areas, and devices.

Selective Release

Selective Unlock Value



Senior FEMA Official (SFO)

(U) A person appointed by the Director of FEMA to coordinate the Federal Response to a civil emergency.

Senior Officer of the Intelligence Community (SOIC)

(U) The DoD Senior Officers of the Intelligence Community include: the Director, National Security Agency/Central Security Service; Director, Defense Intelligence Agency; Assistant Chief of Staff for Intelligence, US Army; Assistant Chief of Staff for Intelligence, US Air Force, and the Director of Naval Intelligence, US Navy.

Sensitive Compartmented Information (SCI)

(U) Classified information about or derived from intelligence sources, methods, or analytical processes that is required to be handled exclusively within formal access control systems established by the Director, Central Intelligence.

Sensitive Function

(U) A function in support of atomic energy defense programs whose disruption could reasonably be expected to have a significant adverse effect on the health and safety of the public or the common defense and security (see definition of Atomic Energy Defense Programs).

Sensitive Information

(U) Any information, the loss, misuse, or unauthorized access to or modification of which could adversely affect the national interest or the conduct of the Federal programs, or the privacy to which individuals are entitled under Section 552a of U.S.C. (The Privacy Act) but which has not specifically been authorized under the criteria established by an Executive order or Act of Congress to be kept secret in the interest of national defense or foreign policy.

Sensitive Position

(U) Any position so designated within the Department of Defense, the occupant of which could bring about, by virtue of the nature of the position, a materially adverse effect on the national security. All civilian positions are either critical-sensitive, noncritical-sensitive, or nonsensitive as described in paragraph 3-101.

Sensitive Unclassified Information

(U) Any information which by loss, misuse, unauthorized access, or modification might adversely affect US national interest, the conduct of DoD programs, or the privacy of DoD personnel (e.g., FOIA exempt information and information whose distribution is limited by DoD Directive 5230.24

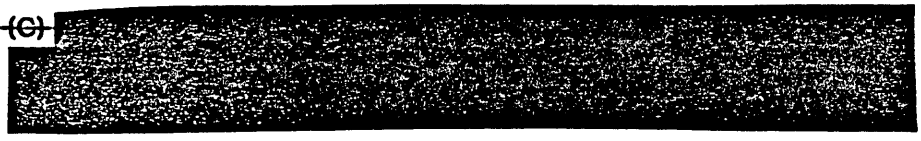
Service Cryptologistic Element

(U) The element or agency of each Military Department charged with accounting for PAL, CSS, or PES cipher system components and with distributing, storing, and accounting for other COMSEC material within the department.

Service Response Force (SRF)

(U) A DoD response force appropriately manned, equipped, and able to perform and coordinate all actions necessary to control and recover from an accident or significant incident. The specific purpose of a Service/agency response force is to provide nuclear weapon accident/significant incident assistance. Service/agency response forces are organized and maintained by those Services or agencies which have custody of nuclear weapons or radioactive nuclear weapon components.

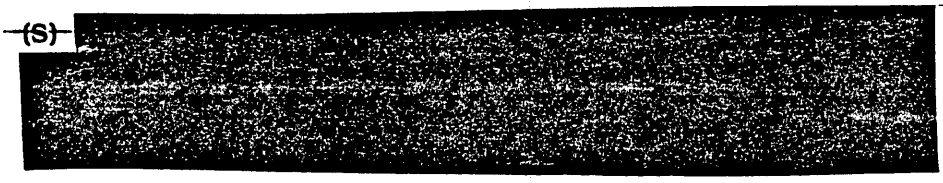
Set

(C) 

Significant Quantity of Special Nuclear Material

(U) Refers to uranium-235 (contained in uranium enriched 20 percent or more in the uranium-235 isotope) alone, or in combination with plutonium and/or uranium-233 when (multiplying the plutonium and/or uranium-233 content by 2-1/2) the total is 5,000 grams (5 kilograms) or more; and plutonium and/or uranium-233 when the plutonium and/or uranium-233 content is 2,000 grams (2 kilograms) or more.

SIOP Unlock Value

(S) 

SIOP-ESI

(U) An acronym for Single Integrated Operational Plan-Extremely Sensitive Information, a DoD Special Access Program.

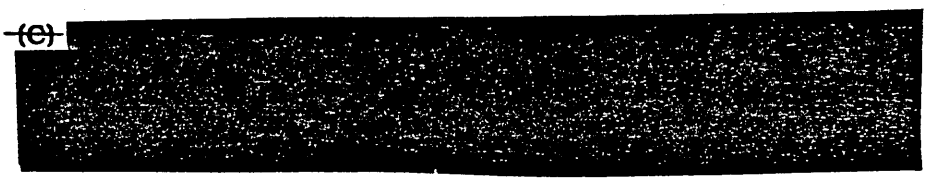
Site Security Control Center (SSCC)

(U) A facility from which control of site sentry and response forces is exercised. This facility may include the alarm center, the visual assessment facilities, and other appropriate security facilities.

Small Arms Fire

(U) Projectiles of the ball type with impact force up to that equal to a 7.62 mm bullet fired from an M-14 rifle or equivalent at its highest velocity using service ammunition.

Source Data Modules

~~(C)~~ 

Special Access Program (SAP)

(U) Any program imposing need-to-know or access controls beyond those normally required for access to CONFIDENTIAL, SECRET, or TOP SECRET information. Such a program includes, but is not limited to, special clearance of investigative requirements, special designation of officials authorized to determine need-to-know, or special access lists of persons determined to have a need-to-know.

Special Background Investigation (SBI)

(U) A personnel security investigation consisting of all of the components of a BI plus certain addition investigative requirements. The period of investigation for an SBI is the last 15 years or since the 18th birthday, whichever is shorter, provided that the last 2 full years are covered and that no investigation will be conducted prior to an individual's 16th birthday.

Special Nuclear Material

(U) Includes plutonium, uranium enriched in the isotope-233 or in the isotope-235, and any other material determined to be special nuclear material pursuant to the provisions of Section 51 of the Atomic Energy Act of 1954, as amended , but does not include source material; or any material artificially enriched by any of the foregoing, but does not include source material.

Special Nuclear Material Equipment

(U) Equipment, systems, or components whose failure or destruction would cause an impact on safeguarding DoD SNM resulting in an unacceptable interruption to a national security program or an unacceptable impact on the health and safety of the public.

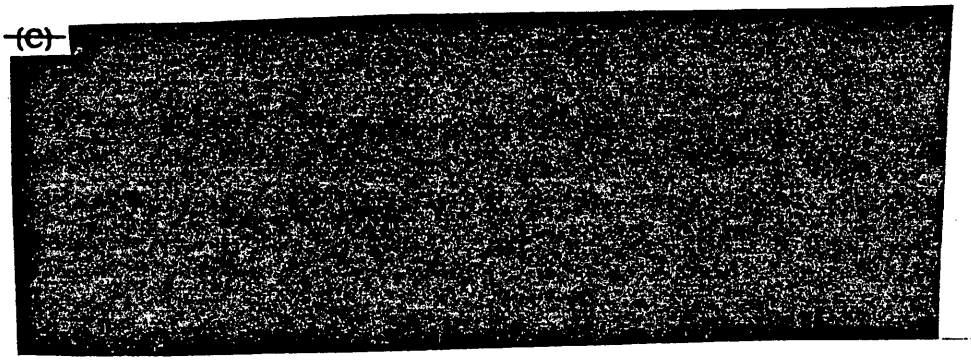
Special Nuclear Material Facility

(U) A DoD facility that performs a sensitive function (see definition of Sensitive Function).

Special Weapons Overflight Guide (SWOG)

(U) A US Air Force developed guide, applicable to all elements of the DoD, which delineates areas authorized for overflight by US aircraft carrying nuclear weapons, and the specific security classification for overflight of foreign countries.

Split Knowledge

~~(C)~~ 

Standby Emergency Power Source (U) A separate and distinct source of power, internal to the site and in addition to the site's primary electrical power source, normally an engine generator.

Stockpile-to-Target Sequence (STS) (U) A document, developed for each nuclear weapon, that supplements the Military Characteristics by describing the logistical and operational environments that the nuclear weapon can encounter. It is developed through an evolutionary process beginning in Phase 1 and is a "living" document that is reviewed continuously and revised as required throughout the life of a nuclear weapon project.

Storage Area (U) The areas within the boundary fence, or outer boundary fence where two are installed, where nuclear weapons are retained for use elsewhere.

Strategic Nuclear Forces (U) Weapon system (ICBM, SLBM, and aircraft) that possess intercontinental range (greater than 5,500 km) and are capable of striking one or more enemy targets to satisfy US nuclear employment objectives.

Strategic Warning (U) See Joint Pub 1-02.

Surety (U) The total spectrum of procedures, facilities, equipment, personnel and weapon design features that provide for the safety, security, use control and reliability of the nuclear weapons stockpile.

Survivability (U) The ability to withstand or repel attack, or other hostile action, to the extent that essential functions can continue or be resumed after onset of hostile action.

System High Security Mode (U) A mode of operation wherein all users having access to the Automated Information Systems possess a security clearance or authorization, but not necessarily a need-to-know, for all data handled by the Automated Information Systems. If the Automated Information Systems precesses special access information, all users must have formal access approval.

Systems Security Engineering (SSE) (U) A element of system engineering that applies scientific and engineering principles to identify security vulnerabilities and minimize or contain risks associated with these vulnerabilities. SSE uses mathematical, physical, and related scientific disciplines, and the principles and methods of engineering design and analysis to specify, predict, and evaluate the vulnerability of the system to security threats.

Tactical Ferry (C) [redacted]

Tactical Warning (U) See Joint Pub 1-02.

Tamper (U) To perform intentionally an incorrect or unauthorized act that could cause prearming, arming, launching, firing, releasing, or detonation of a nuclear weapon or degradation of weapon performance.

Tamper Device (U) Additional safeguards or protective mechanisms designed to prevent an intruder from circumventing or "tampering" with in-place security systems.

Technical Knowledge (U) Knowledge, however obtained, that would allow an individual to tamper with a nuclear weapon or nuclear component in a manner that such tampering would not be detected during normal prefire operations or weapon-monitoring inspections and could cause, then or later, unauthorized prearming, arming, launching, firing, releasing, or detonation of a nuclear weapon or degradation of weapon performance.

Technical Security Material (U) Equipment, components, devices, and associated documentation or other media that pertain to cryptography or to the securing of telecommunications and automated information systems.

Telecommunications (U) The preparation, transmission, communication, or related processing of information by electrical, electromagnetic, electromechanical, electro-optical, or electronic means.

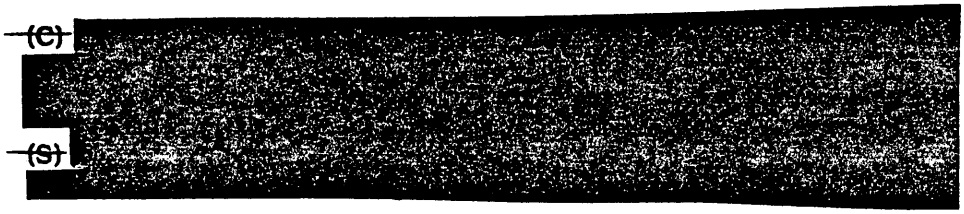
Termination (U) An action or order to terminate nuclear strikes previously authorized for execution. Inherent in the termination process is the relocking and/or recoding of applicable weapon systems by US weapon custodians at the earliest opportunity.

Terrorism/ Sabotage (U) An act falling short of a military operation, or an omission, intended to cause physical damage or disruption in order to further a subversive political aim or to achieve an objective of a foreign power. Sabotage is distinguished from malicious damage by its motive.

Third Party Agent (U) A person not included in the definition of cognizant agent. This may include persons in the personnel reliability program. This does not allow, however, for two agents to be working together under the two-person rule or two-person control provisions. Having both members of a two-person control team voluntarily cooperating as agents is considered improbable.

Transfer

Transfer of Nuclear or Chemical Weapons



Trap Door (U) A hidden software or hardware mechanism that permits system protection mechanisms to be circumvented. It is activated in some non-apparent manner, e.g., special "random" key sequence at a terminal. See also Back Door and Trap Door.

Tritium (U) Tritium is a radioactive isotope of hydrogen having one proton and two neutrons in the nucleus. Tritium is a beta emitter.

Trojan Horse (U) A computer program which contains hidden functions that surreptitiously exploit the legitimate functions of the program to the detriment of security. For example, making a "blind copy" of a sensitive file for the creator of the Trojan Horse. See also Back Door and Trap Door.

Trusted Agent (U) See cognizant agent and insider.

Trusted Computer System (U) A system with sufficient hardware and software integrity measures to allow its use for processing a range of sensitive or classified information.

Trusted Computing Base (TCB) (U) The totality of protection mechanisms within a computer system -- including hardware, firmware, and software -- the combination of which is responsible for enforcing a security policy. It creates a basic protection environment and provides additional user services required for a trusted computer system. The ability of a trusted computing base to correctly enforce a security policy depends solely on the mechanisms within the TCB and on the correct input by system administrative personnel of parameters (such as a user's security clearance) related to the security policy.

Trusted Functionality (U) That which is determined to be correct with respect to some criteria, e.g., as established by security policy. The functionality shall neither fall short of nor exceed the criteria.

Trusted Products (U) Products evaluated and approved for inclusion on the Evaluated Products List (EPL).

Trusted Software (U) The software portion of a trusted computer base.

Tuballoy (TU) (U) A term, of British origin, for uranium metal containing U-238 and U-235 in natural proportions, therefore, the term is considered ambiguous and its use is discouraged. This term is sometimes applied to depleted uranium. See uranium.

Two-Man Rule / Two-Person Rule (U) A system designed to prohibit access by an individual to nuclear weapons and certain designated components by requiring the presence at all times of at least two authorized persons, each capable of detecting incorrect or unauthorized procedures with respect to the task to be performed. Also referred to as the Two-Man Concept or the Two-Man Policy.

Two-Person Control (TPC) (U) The close surveillance and control of materials at all times by a minimum of two persons, each capable of detecting incorrect or unauthorized procedures with respect to the task to be performed and each familiar with established security requirements.

Two-Person Policy

(U) No lone individual shall have access to a nuclear weapon. During any operation that may require access to nuclear weapons, there shall be present a minimum of two authorized persons, each capable of detecting incorrect or unauthorized procedures with respect to the task to be performed and familiar with applicable safety and security requirements. Two authorized personnel shall be physically positioned where they can detect incorrect or unauthorized procedures with respect to the task or operation being performed.

When application of the two-person policy is required, it shall be enforced by the persons who constitute the team during the entire period they are accomplishing the task or operation assigned and until they leave the area within which the two-person policy is required.

Security procedures and equipment, intrusion detection systems, and security force personnel shall ensure positive identification and control of all persons entering Limited and Exclusion Areas. Entry control procedures shall ensure no lone individual is permitted in an Exclusion Area or to have access to a nuclear weapon.

The only exceptions to the two-person policy shall be those specifically prescribed in approved nuclear weapon systems safety rules established in accordance with DoD Directive 3150.2.

Unauthorized Access

(U) The capability and opportunity to obtain, alter, or substitute positive control material used in the execution or release of nuclear or chemical weapons or to obtain, alter, or substitute the internal values of such material. A person authorized to handle positive control material does not have access if the ability to obtain, alter, or substitute the internal values is prevented through observation by authorized individuals who are also authorized to handle positive control material, or by physical controls that prevent access. Physical control practices within the DCS and protective packaging methods employed by shippers prevent access to material by DCS and DCS-designated couriers and assistants.

Unauthorized Launch Analysis (ULA)

(U) Methodology for analyzing elements that can lead to an unauthorized use of a nuclear weapon. Identifies what a cognizant agent, outsiders, or combination of the two can do to bypass or defeat elements, components, subsystems, or systems to achieve a deliberate detonation, launch, release, transfer or termination. Methodology also applied to study of security of nuclear weapon storage sites. Not quantitative in nature because of inability to quantify human intent and actions.

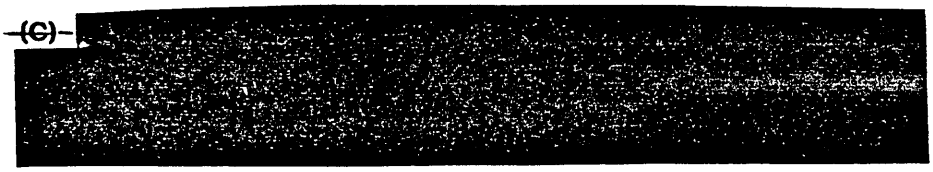
Unauthorized Use

(U) A detonation, launch, release, or transfer for use of nuclear weapons, or termination of nuclear operations, not authorized by the President, resulting from a deliberate attempt by one or more individuals to circumvent critical elements of the nuclear command and control process.

Unexpected Technological Breakthrough

(U) The achievement, by one nation, of a militarily significant technological capability which could materially alter the military balance with other nations resulting in an increased likelihood of the use of nuclear weapons.

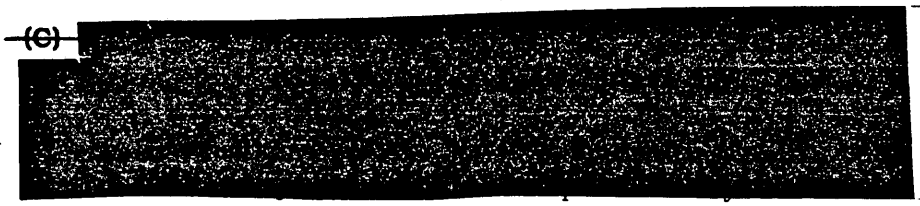
Unit Card

(C) 

Unlock

(U) The act of inserting a previously set combination or code into a positive control device so that arming, launching, or maintenance of a nuclear weapon or weapon system can occur. The act is reversible.

Unlock-Relock PAL Team

(C) 

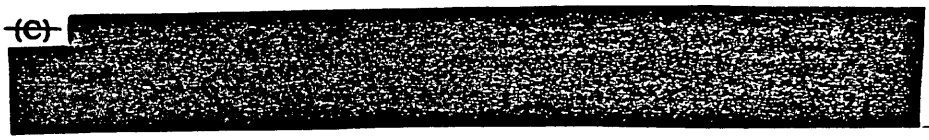
Uranium

(U) Uranium is a heavy, silvery white, radioactive metal. In air, the metal becomes coated with a layer of oxide that will make it appear from a golden-yellow color to almost black. Uranium is an alpha emitter.

US National

(U) A citizen of the United States or a person who, though not a US citizen, owes permanent allegiance to the United States. Title 8 U.S.C. 1408 provides detailed information as to identification of noncitizen US nationals.

Use

(C) 

Use Control

(U) The positive measures that, given access, allow the authorized use and prevent or delay unauthorized use of nuclear weapons, and is accomplished through a combination of weapon system design features, operational procedures, and system safety rules.

Use Control Measures

(U) Systems, devices, removeable components, and procedures which allow timely authorized use of a nuclear weapon while precluding or delaying unauthorized nuclear detonation. These measures are in addition to physical access controls which always apply to nuclear weapons.

Use Control Systems

(U) The total spectrum of devices, equipment, and procedures used to ensure authorized use, and to prevent unauthorized use, of nuclear weapons. Three principal methods of achieving use control have evolved over time:

- (U) Separate secure storage of critical components.
- (U) Permissive Action Links (PAL) for the nuclear weapon; or
- (U) Coded control that prevents weapon prearming or weapon launch.

(U) Stringent procedures play a fundamental role in each of these methods.

Use Denial Systems

(U) Components, subsystems, or systems and their implementing procedures that, in a nuclear warhead or nuclear weapon system, preclude or delay unauthorized nuclear detonation by:

- (U) Disablement of the warhead causing it to be incapable of producing a significant nuclear yield without extensive nuclear package disassembly and repair of critical components;
- (U) Removal and separate protection or destruction of components required to produce a nuclear detonation; and/or
- (U) Physical security measures that deny or delay unauthorized access.

Users

(U) People or processes accessing an Automated Information Systems either by direct connections (i.e., via terminal) or indirect connections (i.e., prepare input data or receive output that is not reviewed for content or classification by a responsible individual).

Users

(U) Personnel who employ positive control material to issue or respond to an actual or exercise nuclear or chemical control order.

Using custodians

(U) The COMSEC custodians responsible for the receipt, storage, accountability, and destruction of positive control material in direct support of the users. In small units, a using custodian may also be a user as long as the two-person control criterion is met. These personnel will be appointed in writing, in accordance with appropriate Service regulations.

Validity

(S) [redacted]

Variance

Verification Team	(U) A team, composed of two military members (one "A" team member and one "B" team member) that verifies the operational combination placed in PAL devices. At least one of the two is a commissioned or warrant officer; the other is grade E-7 or above. Verification is performed by personnel other than those who installed the combination or code and with equipment other than that used in the initial recode.
Viewing	(U) The opportunity to observe or identify, during the performance of assigned duties, the internal values of positive control material when the material is being used for an authorized procedure.
Visual Assessment Facility	(U) A facility where real time assessment information concerning the actual cause of activation of sensor alarms is collected and acted upon.
Vulnerability	(U) The susceptibility of a weapon or its components to degradation from adverse environments, particularly the effects of a defensive nuclear burst.
Waiver	(U) An approved temporary deviation from the provisions of this manual that creates a security vulnerability.
Warhead	(U) That part of a missile, projectile, torpedo, rocket, or other munition which contains either the nuclear or thermonuclear system, high explosive system, chemical or biological agents, or inert materials intended to inflict damage.
Warhead Section (WHS)	(U) A completely assembled warhead including appropriate skin sections and related components.
Weak-Link/ Strong-Link	(U) A safing design technique that electrically and physically isolates a weapon's firing circuits to ensure a predictable and desirable response of the electrical system in normal, abnormal, or accident environments.
Weapon Debris (nuclear)	(U) The residue of a nuclear weapon after it has exploded or burned; that is, the materials used for the casing, and other components of the weapon, plus unexpended plutonium or uranium, together with fission products, if any.
Weapons Recovery	(U) Includes a comprehensive assessment of the accident, neutralizing the weapon hazards, and removing, packaging, and shipping of the weapon hazards.
Weapons Recovery	(U) Pursuit and search for seized/stolen nuclear weapon(s) removed from site.