

## CHAPTER 2

### DOD NUCLEAR WEAPON SYSTEM SAFETY STANDARDS, POLICY, AND CRITERIA

#### A. GENERAL

Directive 3150.2 (reference (c))' establishes DoD nuclear weapon system safety standards and safety policy. This Chapter elaborates on the policy and provides additional guidance and criteria.

#### B. DOD NUCLEAR WEAPON SYSTEM SAFETY STANDARDS

Four DoD Nuclear Weapon System Safety Standards shall serve as the foundation for all nuclear weapons safety matters, as follows:

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

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

4. There shall be positive measures to ensure adequate security of nuclear weapons, under DoD Directive 5210.41 (reference (b)).

#### C. DOD NUCLEAR WEAPON SYSTEM SAFETY POLICY

It is DoD policy that:

1. Nuclear weapon systems shall require special consideration because of their political and military importance, their destructive power, and the potential consequences of an accident or unauthorized act.

2. Nuclear weapon systems shall be evaluated throughout their DoD life-cycles for compliance with the four DoD Nuclear Weapon System Safety Standards, through a formal studies and review process.

a. Formal safety evaluation programs shall be established by the Military Department(s), which include comprehensive and thorough safety studies and reviews by Nuclear Weapon System Safety Groups (NWSSG), to ensure that design features and procedural safeguards meet the four DoD nuclear weapon system safety standards. (See Chapter 5.)

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'Extracts from reference (c) are denoted in bold type.

**b. Nuclear weapon systems shall be evaluated to ensure procedural safeguards minimize exposure of nuclear weapons to credible abnormal environments during the STS.**

**3. Nuclear weapon systems shall be designed or improved to the maximum extent practical with current and approved advanced safety technologies, consistent with cost and operational feasibility.**

**a. Quantifiable design criteria will be applied for one-point safety and premature detonation.**

**b. Stockpile improvement initiatives will evaluate the feasibility of incorporating current safety technologies in existing nuclear weapon systems.**

**4. Nuclear weapons systems shall be designed, maintained, transported, stored, and employed to incorporate maximum safety consistent, with operational requirements.**

**5. Procedures, personnel, equipment, facilities, and organizations shall be certified before conducting operations with nuclear weapons or nuclear weapon systems.**

**a. Certification will be in accordance with Service standards and procedures.**

**b. Personnel certification will be accomplished through training and an evaluation of individual technical proficiency and implementation of the requirements in Personnel Reliability Program (PRP) directives. (See Chapter 7.)**

**c. Certification of equipment, including computer hardware, firmware, and software, will verify that the design and operation of the equipment enables safe operation of the nuclear weapon system.**

**d. Certification of nuclear weapon facilities and organizations will include successful completion of a Nuclear Weapons Technical Inspection (NWTI). ( See Chapter 12.)**

**e. Re-certification of procedures, equipment, or facilities will be required before operations can resume if significant modifications are made to the procedures, equipment or facilities. This requirement extends to operations with U.S. nuclear weapons or U.S. nuclear weapon systems when used by North Atlantic Treaty Organization (NATO) allies.**

**6. Safety rules, technical and operational procedures, and other positive measures shall be developed and approved for each nuclear weapon system, through a formal approval process, and shall apply to each nuclear weapon or nuclear weapon system in the custody of the Department of Defense.**

**a. Safety rules, drafted by Military Department NWSSGS and formally proposed by the Military Department, shall be reviewed through a coordination process and approved by the Secretary of Defense. Approved safety rules are required for all operations in the STS of each nuclear weapon system, including operations by Allied forces with U.S. nuclear weapons. Safety rules do not in themselves provide the authority to conduct operations but comprise the framework and constraints for conducting operations. The adherence to approved safety rules is mandatory during all weapon system operations, except in the event of an emergency. The**

**Military Department shall incorporate approved safety rules in applicable directives or TPs. (See Chapter 5.)**

**(1) Safety rules must be in effect before the Military Department accepts custody of the nuclear weapon from the DoE.**

**(2) New or revised operations or procedures, governed by safety rules, shall not be used before approval of applicable safety rules.**

**(3) The Military Departments may impose restrictions that are more strict than those contained in safety rules, but may not unilaterally change the safety rules.**

**(4) Safety rules remain in effect until rescinded by the Chairman of the Joint Chiefs of Staff. A copy of the rescission notice shall be provided to the Secretary of Defense.**

**a. Technical and operational procedures, and other positive measures, recommended by findings of a NWSSG in a safety study or review, shall be formally reviewed by the Military Department.**

**b. Technical and operational procedures and other positive measures, developed independently by the Military Department, will be evaluated for their impact on safety through a formal approval process.**

**c. Technical and operational procedures will be certified periodically for all operations throughout the STS.**

**d. Nuclear weapon systems shall meet the DoD Nuclear Weapon System Safety Standards or positive measures shall be implemented to permit continued safe operations, consistent with operational requirements.**

**7. Personnel involved in nuclear operations shall receive appropriate training and will be continually evaluated, as required by DoD 5210.42 (reference (d)).**

**8. Nuclear weapon system safety, security, survivability, and use control are inter-related. Decisions concerning one shall not be made without consideration of the effect of those decisions on the others. (See Chapters 7 and 8.)**

**a. Security procedures for nuclear weapon systems shall be maintained to assure the system meets the requirements of the fourth safety standard.**

**b. Survivability design features and procedures, used to ensure that nuclear weapon systems endure and perform assigned missions, shall also assure the systems continue to meet the four DoD Nuclear Weapon System Safety Standards.**

**c. Use control design features and procedures must ensure positive control of the nuclear weapon system without the degradation of safety, to ensure that the system continues to meet the four DoD Nuclear Weapon System Safety Standards.**

**9. Nuclear weapons and nuclear weapon systems shall not be intentionally exposed to abnormal environments, and there shall be no deviation from established procedures,**

except in an emergency. That policy does not abrogate nor abridge the authority and responsibility of commanders and custodial personnel to deviate from standards set forth herein during actual emergencies as necessary to ensure the safety, security, control, or custody of nuclear weapons.

#### **D. DOD NUCLEAR WEAPON SAFETY CRITERIA**

1. Quantitative one-point safety criteria for warhead design specifications, normally included in nuclear weapon MCS, are summarized as follows:

a. The probability of achieving a nuclear yield greater than 4 pounds TNT equivalent shall not exceed one in  $10^6$  in the event of a detonation initiated at any one point in the high explosive system.

b. One-point safety shall be inherent in the nuclear system design and shall be obtained without the use of a nuclear safing device.

2. Quantitative premature detonation probability criteria for safe warheads state:

a. The probability of a premature nuclear detonation of a warhead due to warhead component malfunctions, in a mated or unmated condition, in the absence of any input signals except for specified signals (e.g., monitoring and control), shall not exceed:

(1) Prior to launch, for the normal storage and operational environments described in the STS, 1 in  $10^9$  per warhead lifetime.

(2) Prior to launch, for the abnormal environments described in the STS, 1 in  $10^6$  per warhead exposure or accident.

b. The probability of a premature nuclear detonation of a warhead due to warhead component malfunctions after launch and prior to the receipt of the final warhead arming signal shall not exceed 1 in  $10^4$ . (That is a generalized, minimum standard that may require amplification when applied to a specific weapon. Additional premature probability criteria may be included for the after launch situation depending on the various degrees of safety required for the specific employment concepts.)

3. Quantitative premature detonation probability criteria for safe bombs state the following:

a. The probability of a premature nuclear detonation of a bomb due to bomb component malfunctions, in the absence of any input signals except for specified signals (e.g., monitoring and control), shall not exceed:

(1) Prior to receipt of the pre-arm signal, for normal storage and operational environments described in the STS, 1 in  $10^9$  per bomb lifetime.

(2) Prior to receipt of the pre-arm signal, for the abnormal environments described in the STS, 1 in  $10^6$  per bomb exposure or accident.

b. The probability of a premature nuclear detonation of a bomb due to bomb component malfunctions, after the receipt of the pre-arm signal, which will endanger the delivery

aircraft, shall not exceed 1 in 103. (Other detailed criteria for this operational environment depend on the specific bomb and its method of employment and therefore must be evaluated for the MCS for that particular weapon.)