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USD(AT&L)

SUBJECT: DoD Nuclear Weapon System Safety Program Manual

References: See Enclosure 1

1. PURPOSE. This manual reissues DoD 3150.2-M (Reference (a)) in accordance with the authority in DoD Directive (DoDD) 5134.08 (Reference (b)) to implement policy, update responsibilities, and establish mandatory procedures for the DoD nuclear weapon system safety program for U.S. nuclear weapons in DoD custody.

2. APPLICABILITY. This manual applies to OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff (CJCS) and the Joint Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities within the DoD (referred to collectively in this manual as the "DoD Components").

3. POLICY. It is DoD policy that in accordance with DoDD 3150.02 (Reference (c)):

a. Nuclear weapon systems require special consideration because of their political and military importance, their destructive power, and the potential consequences of an accident or unauthorized act. Assured nuclear weapons and nuclear weapon systems safety, security, and control remains of paramount importance. Nuclear command and control safety and security also remain of paramount importance as stated in DoDD S-5210.81 (Reference (d)).

b. Standards, plans, procedures, and other positive measures will be developed and maintained to ensure the DoD can accomplish its nuclear mission in a safe, secure, and reliable manner. Four DoD nuclear weapon system surety standards provide positive measures to:

(1) Prevent nuclear weapons involved in accidents or incidents, or jettisoned weapons, from producing a nuclear yield.

(2) Prevent **deliberate** pre-arming, arming, launching, or releasing of nuclear weapons, except upon execution of emergency war orders or when directed by competent authority.

(3) Prevent **inadvertent** pre-arming, arming, launching, or releasing of nuclear weapons in all normal and credible abnormal environments.

(4) Ensure adequate security of nuclear weapons, as governed by DoDD O-5210.41 (Reference (e)).

c. Nuclear weapon system safety, security, and control are interrelated. Decisions concerning one will not be made without consideration of the effect of those decisions on others.

d. Safety rules and technical and operational procedures will be developed and approved for each nuclear weapon and nuclear weapon system in the custody of DoD through a formal approval process.

e. Nuclear weapons and nuclear weapon systems will not be intentionally exposed to abnormal environments, and there will be no deviation from established procedures, except in an emergency.

f. Procedures, personnel, equipment, hardware, software, facilities and organizations, will be certified before conducting operations with nuclear weapons or nuclear weapon systems.

g. Nuclear weapon systems will be evaluated throughout their DoD life cycles for compliance with the four DoD nuclear weapon system surety standards through a formal studies and review process.

h. Nuclear weapons systems will be maintained, transported, stored, and employed to incorporate maximum nuclear weapons surety, consistent with operational requirements.

4. RESPONSIBILITIES. See Enclosure 2.

5. PROCEDURES. See Enclosure 3.

6. RELEASABILITY. **Cleared for public release.** ~~This manual is available on the Internet from the DoD Issuances Website at <http://www.dtic.mil/whs/directives>.~~ **Cleared for public release.** *This manual is available on the Directives Division Website at <http://www.esd.whs.mil/DD/>.*

7. EFFECTIVE DATE. This manual is effective January 31, 2014.



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REFERENCES

- (a) DoD 3150.2-M, "DoD Nuclear Weapon System Safety Program Manual," December 23, 1996 (hereby cancelled)
- (b) DoD Directive 5134.08, "Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs (ASD(NCB))," January 14, 2009, as amended
- (c) DoD Directive 3150.02, "DoD Nuclear Weapons Surety Program," April 24, 2013, *as amended*
- (d) DoD Directive S-5210.81, "United States Nuclear Weapons Command and Control, Safety, and Security (U)," ~~August 8, 2005~~ *April 24, 2017*
- (e) DoD Directive O-5210.41, "Security Policy for Protecting Nuclear Weapons," ~~November 1, 2004~~ *January 22, 2015*
- ~~(f) DoD S 5210.41 M V1, "Nuclear Weapon Security Manual: The DoD Nuclear Weapon Security Program (U)," July 13, 2009~~
- (f) DoD Manual S-5210.41, Volume 1, "Nuclear Weapon Security Manual: The DoD Nuclear Weapon Security Program (U)," August 11, 2016, as amended*
- (g) DoD Instruction 4540.05, "DoD Transportation of U.S. Nuclear Weapons," June 23, 2011, as amended
- ~~(h) DoD Instruction 5210.42, "Nuclear Weapons Personnel Reliability Program (PRP)," July 16, 2012~~
- (h) DoD Instruction 5210.42, "DoD Nuclear Weapons Personnel Reliability Assurance," April 27, 2016*
- (i) DoD Instruction S-3150.07, "Controlling the Use of Nuclear Weapons (U)," December 21, 2010
- (j) DoD Instruction S-5200.16, "Objectives and Minimum Standards for Communications Security (COMSEC) Measures Used in Nuclear Command and Control (NC2) Communications (U)," November 14, 2007
- (k) Memorandum of Understanding between the Department of Defense and Department of Energy, "Memorandum of Understanding between the Department of Defense and the Department of Energy for the Preparation, Publication and Maintenance of Technical Publications in the Joint Nuclear Weapons Publication System," March 17, 1992
- (l) Technical Publication 0-1, "Numerical Index to Joint Nuclear Weapons Publications (Including Related Publications)," January 2, 2014
- (m) Chairman of the Joint Chiefs of Staff Instruction 3263.05A, "Nuclear Weapons Technical Inspections," August 9, 2013
- (n) Section 179 of Title 10, United States Code
- (o) Memorandum of Agreement between the Department of Defense and the Atomic Energy Commission, "An Agreement Between the AEC and the DoD for the Development, Production, and Standardization of Atomic Weapons," March 21, 1953, and as supplemented, September 5, 1984
- ~~(p) DoD Directive 3150.1, "Joint DoD-DOE Nuclear Weapon Life Cycle Activities," August 26, 2002~~

- (p) *DoD Directive 3150.01, "Joint DoD-Department of Energy/National Nuclear Security Administration (DoD-DOE/NNSA) Nuclear Weapon Life-Cycle Activities," August 4, 2016*
- (q) DoD Instruction 5030.55, "DoD Procedures for Joint DoD-DOE Nuclear Weapons Life-Cycle Activities," January 25, 2001
- (r) DoD Directive 5000.01, "The Defense Acquisition System," May 12, 2003
- (s) National Fire Protection Association 780, "Standard for the Installation of Lightning Protection Systems," 2014 Edition
- (t) Military Standard -882E, "Standard Practice for System Safety," May 11, 2012
- (u) Department of Defense Explosives Safety Board Technical Paper No. 22, "Guidance for the Installation and Maintenance of Lightning Protection System for Ammunition and Explosive Facilities"
- (v) Joint Nuclear Weapons Publication System Technical Publication 4-1, "Glossary of Nuclear Weapons Materiel and Related Terms," November 1, 2011

ENCLOSURE 2

RESPONSIBILITIES

1. ASSISTANT SECRETARY OF DEFENSE FOR NUCLEAR, CHEMICAL, AND BIOLOGICAL DEFENSE PROGRAMS (ASD(NCB)). Under the authority, direction, and control of the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)), the ASD(NCB):

- a. Develops safety policy and monitors compliance with the DoD nuclear weapon system safety program.
- b. Requests special safety studies (SSSs) and weapon system safety assessments (WSSAs).
 - (1) Reviews safety assessment recommendations.
 - (2) Recommends temporary compensatory measures when required to address special safety concerns for nuclear weapon system operations.
- c. Ensures that nuclear weapon safety is addressed as required in Reference (e), DoD *Manual* S-5210.41-~~M-VI~~ (Reference (f)) and DoDI 4540.05 (Reference (g)).
- d. Serves as proponent for and monitors compliance with this manual.
- e. Coordinates all DoD personnel access to Department of Energy (DOE) Sigma information with the Military Departments and DOE.
- f. Provides safety topics of special interest to the Military Departments and the CJCS to be addressed during nuclear weapon technical inspections (NWTIs). Monitors the effectiveness of NWTIs to assess unit compliance with the DoD nuclear weapon system safety program.
- h. Serves as the OSD principal point of contact for Military Department nuclear weapon system safety reports and safety rules packages.
- i. Coordinates Military Department safety rules packages with the CJCS, Military Departments, and DOE.
- j. Approves administrative changes to safety rules by the Military Departments.
- k. Provides guidance and direction for safety-related requirements for Quality Assurance and Reliability Test Program testing. Monitors results of safety validations and reliability point estimates.
- l. Oversees Non-Nuclear Assurance Program (NNAP) activities and coordinates with DOE for the provision of NNAP support.

m. Responds to joint Nuclear Weapons Council (NWC) surety actions.

2. DIRECTOR, DEFENSE THREAT REDUCTION AGENCY (DTRA). Under the authority, direction, and control of the USD(AT&L), through the ASD(NCB), the Director, DTRA:

a. Develops and maintains nuclear weapon safety databases as requested by a Military Department.

b. Chairs a joint working group, in coordination with the Military Department components, to define requirements for the maintenance of nuclear weapon safety databases.

c. Provides safety assessment support to the DoD Components as requested, to include conducting tests to verify safety data.

(1) Develops and evaluates safety risk assessment methodologies, models, and probabilities of occurrence for credible nuclear weapon accident scenarios and assesses mitigating factors.

(2) Conducts assessments and tests to define stockpile-to-target sequence (STS) environments.

d. Responds to NWC surety actions.

e. Coordinates with the Joint Staff and Military Departments on nuclear weapon system technical publications (TPs).

f. Coordinates with the Military Departments and DOE on safety-related Joint Nuclear Weapons Publications Systems (JNWPS), TPs, and other publications that have joint safety applications.

g. Provides a member for Military Department Nuclear Weapon System Surety Group (NWSSG) studies.

h. Develops, implements, and operates DoD Nuclear Weapon Surety Training Program.

3. SECRETARIES OF THE MILITARY DEPARTMENTS. The Secretaries of the Military Departments:

a. Ensure the safety of all nuclear weapons and nuclear weapon systems for which the Department has a DoD life-cycle management responsibility.

b. Publish nuclear weapon system safety procedures in JNWPS or Military Department TPs.

- c. Ensure that NNAP activities are conducted on all test assemblies.
- d. Conduct nuclear weapon system safety studies, reviews, and assessments on U.S. and allied nuclear weapon systems and operations with U.S. nuclear weapons.
- e. Develop safety rules and other positive measures to ensure that maximum safety is achieved, consistent with operational requirements and the DoD nuclear weapon system surety standards.
- f. Conduct safety certifications of nuclear weapon systems, including DoD support equipment and software that affect nuclear surety.
 - (1) Ensure early identification of new or modified items requiring nuclear surety design certification.
 - (2) Develop nuclear weapon system safety certification and decertification standards and procedures for combat delivery vehicles, transport vehicles, software, critical components, and support equipment to be used with nuclear weapons and nuclear weapon systems.
 - (3) Maintain a list of nuclear weapon system safety-certified equipment and software.
- g. In coordination with DTRA, participate in a joint working group to define requirements for the maintenance of nuclear weapon safety databases.
- h. Respond to NWC surety actions.
- i. Appoint a Sigma nuclear weapon data office of primary responsibility to coordinate DOE Sigma access with ASD(NCB).
- j. Provide an internally generated Military Department annual safety report to the ASD(NCB) on July 1st of each year describing the status of open corrective actions for each of the NWSSG findings and recommendations from completed studies and reviews. A copy of the report will be provided to the CJCS.

4. CJCS. The CJCS:

- a. Coordinates safety rules package in accordance with Appendix 1 to Enclosure 3.
- b. Responds to NWC surety actions.

5. COMBATANT COMMANDERS. Through the CJCS, the Combatant Commanders:

- a. Provide assistance to the responsible Military Departments for the conduct of required safety studies, reviews, and inspections of U.S. and allied forces that will use nuclear weapons and nuclear weapon systems.
- b. Respond to NWC surety actions.
- c. Provide members to Military Department NWSSGs as required.
- d. Ensure compliance with approved nuclear weapon system safety rules developed by the Military Departments.
- e. Notify Military Department NWSSG chair on any significant concept of operations (CONOPS) changes or new CONOPS development for determination on whether changes to Weapon System Safety Rules and a NWSSG study are required.

ENCLOSURE 3

PROCEDURES

1. DoD NUCLEAR WEAPON SYSTEM SURETY PROGRAM KEY ELEMENTS. Nuclear weapons and nuclear weapon systems must be protected against risks and threats inherent in their peacetime and wartime environments. To achieve nuclear weapon system safety, and to maintain the public trust by protecting public health, safety, and environment, it is critical that surety be considered as early as possible during weapon development and continued to be considered throughout the life-cycle of the weapon. The DoD Nuclear Weapon System Surety Program consists of the following key elements:

a. DoD Nuclear Weapon System Surety Standards. The four DoD nuclear weapon system surety standards are used in the evaluation of the safety of a nuclear weapon system beginning as early as possible during development and continuing throughout a weapon system's life cycle.

b. DoD Nuclear Weapon System Surety Policy. DoD surety policy is based on years of experience with nuclear weapons and the scientific development of new and innovative technologies and assessment techniques. It is developed jointly among the OSD, CJCS, the Defense Agencies, and the Military Departments with the common goal of providing maximum safety consistent with operational requirements.

(1) Personnel Reliability Program (PRP). DoDI 5210.42 (Reference (h)) directs the DoD Components to ensure that the highest standards of individual reliability are demonstrated by personnel performing duties associated with nuclear weapons or nuclear components. PRP is applicable to personnel who control, handle, have access to, or control access to nuclear weapons, nuclear weapon systems, nuclear components, or sealed authenticators.

(2) Use Control

(a) DoDI S-3150.07 (Reference (i)) directs that positive measures will be taken to maintain control of all U.S. nuclear weapons during all phases of their life cycle. Use control features may be included in the warhead or weapon system, and may be complemented by system operation.

(b) Warhead design features usually include a coded control device, such as permissive action links, that require coded inputs to enable pre-arming circuitry and delay deliberate unauthorized human acts from achieving a nuclear detonation while facilitating authorized use; command disablement, which, when activated, disables critical warhead components; and active protection systems, which may detect attempts to tamper with the warhead and initiate actions that disable critical warhead components.

1. Weapon system features include the code enable system, which requires specific coded inputs to enable pre-arming circuitry for bombs or cruise missiles aboard strategic bombers, and the positive enable system, which requires specific coded inputs before launch of

intercontinental ballistic missiles. System operation design features involve the removal and separate secure storage of critical weapon or weapon system components until after receipt of an emergency action message authorizing use.

2. The requirement to maintain positive control of nuclear weapons does not change during advanced conditions of readiness or war. In North Atlantic Treaty Organization (NATO) countries, NATO commanders convey mission authority to both U.S. and non-U.S. delivery units executing NATO approved and directed use. On receipt of a valid nuclear control order through both venues, the U.S. custodial unit will transfer the weapon(s) to the applicable Allied employment unit. The U.S. custodial unit retains custody and responsibility for accountability until a nuclear control order authorizing release is received. (Normally, the authority to transfer-and-release is received simultaneously). When release for use or expenditure is authorized, the custodial unit retains responsibility for accountability.

3. Nuclear weapon system design for use control purposes must be assessed for its ability to satisfy safety requirements consistent with operational requirements. Requirements in Reference (i) and DoDI S-5200.16 (Reference (j)) also apply.

(3) Nuclear Weapon Transportation. Reference (i) establishes policies, responsibilities, and procedures for the transport of nuclear weapons. The requirements of the DoD nuclear weapons safety program apply to all DoD nuclear weapon transport carriers. Safety rules will be applied to nuclear weapon transport operations through all approved modes.

(4) JNWPS. The Military Departments and DTRA will maintain the JNWPS publications on nuclear weapons, associated materiel, and related components. The JNWPS also includes supplemental information and data considered applicable by DOE and the Military Departments. It provides authoritative policy, procedures, information, and data for nuclear weapon operations, maintenance, support, and management to DOE, DTRA, and the Military Departments.

(a) The JNWPS operates under a memorandum of understanding between the DoD and DOE (Reference (k)). Under JNWPS, individual Military Departments and DOE review and sign JNWPS publications for which they have an application. JNWPS TP 0-1 (Reference (l)) lists, defines, and indicates the status of JNWPS publications.

(b) Each JNWPS publication contains applicable safety precautions, warnings, and notes.

(5) DoD NWTI System. Commanders use NWTIs as the basis for certifying facilities and organizations for operations with nuclear weapons and weapon systems. Additional guidance and detailed procedures for conducting inspections is prescribed in CJCS Instruction 3263.05 (Reference (m)). The guidance and procedures will be coordinated with the ASD(NCB).

(a) The Military Departments will conduct NWTIs to ensure compliance with pertinent DoD, joint, and applicable Military Department requirements.

(b) Inspections will be conducted on all units that store, assemble, maintain, or transport nuclear weapons. The Military Departments will provide a list of units meeting the requirements to DTRA at the beginning of each fiscal year and as changes occur.

1. The Military Departments will inspect at intervals of their choosing, but not to exceed 24 months between inspections. Waivers beyond the 24 month certification cycle will be approved by the ASD(NCB), with notification provided to Joint Staff, Deputy Directorate for Nuclear, Homeland Defense, and Current Operations (J-33). The Military Departments may conduct limited notice inspections, as necessary.

2. DTRA will conduct inspection oversights at designated nuclear units at intervals specified by the CJCS.

(c) Inspections will evaluate the unit's management and administration; technical operations; tools, test, tie-down, and handling equipment; storage and maintenance facilities and condition of the stockpile; security; safety; supply support; nuclear weapon PRP; logistics transport; and special interest items. The Military Departments may amplify the scope of inspections to meet additional requirements.

(d) All DoD Components will periodically review the NWTI system for adequacy and to identify necessary improvements.

(e) DoD Components may propose special interest topics to the CJCS. CJCS will notify the Military Departments of special interest items to be evaluated.

(f) Nuclear bombs and warheads may be used for the technical operations portion of the NWTI when not specifically prohibited, but only if they are due for inspection, test, maintenance, or modification or retrofit at a time approximately coincident with the NWTI. Technical operations on war reserve bombs and warheads other than those due at the time of the inspection are prohibited.

(g) Training weapons will be used for:

1. All certification and recertification inspections, except as noted in paragraph 1b(5)(f) of this enclosure.

2. All operations that are forbidden for war reserve weapons by safety rules, the DoD, the CJCS, Military Departments, or major command publications.

(6) Security. DoD nuclear weapon physical security policy is addressed in Reference (e) and provides information and guidance for items such as locks, fences, guard forces, response forces, and personnel (including custodial, maintenance, and guard) access procedures. Selected security policy statements that are related to nuclear safety include:

(a) Nuclear weapons and nuclear weapon systems will be protected to prevent unauthorized access, damage or sabotage, unauthorized destruction, loss of custody, capture or theft, and unauthorized use during all phases of their life cycle.

(b) Safety and survivability will be significant considerations in the design of security systems.

(c) The objectives of security are to prevent unauthorized access to nuclear weapons; prevent damage or sabotage to nuclear weapons; prevent loss of custody; and prevent to the maximum extent possible radiological contamination caused by unauthorized acts or damage, or security operations necessary to recapture or recover a weapon.

c. DoD Nuclear Weapon Safety Design Criteria. Quantitative safety design criteria are established by the DoD, issued in weapon specific military characteristics (MCs), and implemented by the DOE in coordination with the Project Officers Group (POG). They are used during nuclear weapon design, to ensure one-point safety, and to lower premature detonation probabilities and component malfunctions.

d. Positive Measures. Positive measures do not provide absolute assurance against an accident or unauthorized act, but provide acceptable assurance for continuing safe operation of the nuclear weapon system. Measures are applied in a layered approach; they are added to create a system of surety and reduce the potential for single points of failure. This system must be viewed holistically when addressing surety impacts.

e. Safety Rules. Safety rules are comprised of general and specific provisions applicable to a nuclear weapon system for conducting approved operations while ensuring maximum safety consistent with operational or logistic requirements. The process to develop and to expeditiously approve safety rules is described in Appendix 1 to this enclosure. Section 3 of this enclosure specifies the general nuclear weapon system safety rules applicable to all nuclear weapon systems.

f. Technical Procedures. Technical procedures are the explicit directions which must be followed to conduct operations with nuclear weapons. Technical procedures are documented in Military Department technical publications and JNWPS TPs.

2. DoD NUCLEAR WEAPON SYSTEM SAFETY CRITERIA

a. Nuclear weapons systems will be designed or improved to the extent practical with approved advanced safety and security technologies, as determined through risk analysis, consistent with operational feasibility.

(1) Quantifiable design criteria will be applied for one-point safety and premature detonation.

(2) Stockpile improvement initiatives will evaluate the feasibility of incorporating current safety technologies in existing nuclear weapon systems.

b. Quantitative one-point safety criteria for warhead design specifications, normally included in nuclear weapon MCs, are:

(1) The probability of achieving a nuclear yield greater than 4 pounds trinitrotoluene (TNT) equivalent will not exceed 1 in 10^6 , in the event of a detonation initiated at any one point in the high explosive (HE) system.

(2) One-point safety will be inherent in the nuclear system design and will be obtained without the use of a nuclear safing device.

c. Quantitative premature detonation probability criteria for safe warheads are:

(1) 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), will not exceed:

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

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

(2) 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 will 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.)

d. Quantitative premature detonation probability criteria for safe bombs are:

(1) 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), will not exceed:

(a) 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.

(b) 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.

(2) 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,

will not exceed 1 in 10^3 . (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.)

3. DoD NUCLEAR WEAPON SYSTEM SAFETY RULES

a. General Safety Rules. General safety rules apply to all nuclear weapons and nuclear weapon systems. General safety rules primarily apply safety policy and will be included as part of the Military Department's safety rules package.

(1) Nuclear weapons will not be intentionally exposed to abnormal environments except in an emergency.

(2) Nuclear weapons will not be used for training or for troubleshooting (i.e., to confirm the existence of a fault, aid in fault isolation, or verify that a fault has been corrected) except as explicitly allowed by a specific safety rule.

(3) Nuclear weapons may be used for exercises except when explicitly prohibited by specific safety rules.

(4) Personnel having physical access to nuclear weapons must be certified under the PRP in accordance with Reference (h).

(5) Only certified procedures, personnel, equipment, software, facilities, and organizations, authorized by the appropriate level of authority, will be employed to conduct nuclear weapon system operations.

(6) The total number of personnel performing nuclear weapon system operations will be held to the minimum consistent with the operations performed.

(7) At least two authorized persons must be present during any operation with a nuclear weapon, and certain designated components as defined by the Military Department, except when authorized by a specific safety rule. They must be able to detect incorrect or unauthorized procedures in the task being performed. They must also know and understand applicable safety and security requirements.

(8) Physical security will be maintained in accordance with Reference (e).

(9) Nuclear weapons will be transported as determined by the Combatant Commander or the custodial Military Department in accordance with Reference (g). Additionally, custody and accountability transfers during logistic movements will be by courier receipt system to ensure positive control.

(10) Use control operations will be in accordance with plans and procedures prescribed by the applicable Combatant Command and TPs.

(11) Verification that a nuclear warhead is not present in a test assembly must be made using NNAP at the last practical opportunity agreed on by the DoD and or DOE before the conduct of an operational test.

(12) Deviations from safety rules are permitted in an emergency, except as follows:

(a) U.S. custody must be maintained until receipt of a valid nuclear control order that permits transferring U.S. nuclear weapons to non-U.S. delivery forces.

(b) Nuclear weapons will not be expended unless a valid, properly authenticated nuclear control order conveying release or expenditure authority is received.

(c) Jettisoning of nuclear weapons, for applicable systems, is permitted in the event of an emergency, and is to be accomplished according to plans and procedures prescribed for the area of operations.

b. Specific Safety Rules. Specific safety rules are procedural and administrative safeguards unique to each individual nuclear weapon system (and logistics carriers as required) that are identified during safety studies and operational safety reviews (OSRs). Safety rules will be updated as a minimum every 5 years following the OSR. If there are no significant to changes to the NWSSG report the Military Department may submit a letter certifying the current rules are sufficient after conducting the OSR and coordinating the results. Specific safety rules will be reviewed during OSRs and updated as necessary at outlined in Appendix 1 to this enclosure.

(1) Approved safety rules are required for all operations in the STS of each nuclear weapon system to include allied operations with U.S. nuclear weapons.

(2) Safety rules do not in themselves provide the authority to conduct operations but comprise the framework and constraints for conducting operations.

(3) System-specific safety rules must be in effect before the DoD Components can accept custody of, or conduct any operations with the specific nuclear weapon system.

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

(5) The Military Departments may impose restrictions that are stricter than those contained in safety rules, but may not unilaterally change the safety rules.

(6) Technical and operational procedures, and other positive measures, recommended by the NWSSG in a safety study or review, will be formally reviewed by the Military Department.

(7) Technical and operational procedures and other positive measures, developed independently by the Military Department, will be evaluated for their impact on surety through a formal approval process.

(8) Technical and operational procedures will be certified periodically for all operations throughout the STS.

(9) Nuclear weapon systems will meet the DoD nuclear weapon system surety standards or positive measures will be implemented to permit continued safe operations.

4. NUCLEAR WEAPON SYSTEM SAFETY CERTIFICATION. Certification will be in accordance with Military Department standards and procedures.

a. Nuclear weapon system safety certification is the process that ensures nuclear weapons and nuclear weapon systems are designed, built, and used in a manner so the equipment does not impose abnormal environments, inadvertently provide unintended signals, or aid in providing unauthorized signals to the weapon.

b. All procedures, personnel, equipment, software, facilities, and organizations will be certified before conducting any operations involving a nuclear weapon and nuclear weapon system. Any significant modification to procedures, equipment, software, or facilities will require recertification before use with an operational weapon system. Certification requirements also include allied nuclear weapon systems that include operations with U.S nuclear weapons systems. Significant modifications are those that could degrade nuclear surety. Military Departments will ensure nuclear safety certification reviews are considered during the development of security, transportation, and use control enhancements, modifications, and modernization.

5. CERTIFICATION GUIDELINES

a. Personnel Certification. Personnel certification will be accomplished by the Military Departments through training and an evaluation of individual technical proficiency, and implementation of the requirements in Reference (h).

b. Certification of Nuclear Weapon Organizations and Facilities. Certification of nuclear weapon facilities and organizations will include successful completion of an NWTI in accordance with Reference (m).

c. Nuclear Weapon Safety Certification. DOE is responsible for the safety design, test, and analysis of nuclear weapons. A review to ensure that a weapon meets its design requirements (including safety) is accomplished by a joint Design Review and Acceptance Group (DRAAG) review process. After successful completion of the DRAAG review process, DOE documents the safety certification in the final design development report. The DoD accepts the weapon as certified. However, safety is further addressed through Military Department NWSSG and POG activities.

d. Nuclear Weapon System Safety Certification

(1) The Military Departments oversee the safety certification process for nuclear weapon systems. They develop the policy and establish nuclear weapon system safety design criteria.

(2) The weapon system program manager is responsible for the safety design, development, analysis, and testing of nuclear weapon systems. The weapon system program manager evaluates nuclear safety to identify hardware, software, and procedures to be used with a nuclear weapon or nuclear weapon system.

(3) The Military Departments will ensure that independent analyses are conducted of the weapon system and the operating command's procedures. Those analyses are performed against the system safety design criteria, and recommendations on nuclear safety design certification will be provided.

(4) The completion of the nuclear weapon system safety certification process qualifies the system for use, along with the completion of the appropriate nuclear weapon system safety study or review and the USD(AT&L) approval of safety rules.

(5) The Military Department reviews the data from the weapon system program manager and the independent evaluation, and provides safety certification. That certification is documented in Military Department publications.

e. Safety Certification of DOE-Developed Support Equipment. DOE is responsible for the nuclear weapon safety design, test, and analysis of nuclear weapon support equipment and software developed by DOE for a specific nuclear weapon. The Military Departments evaluate use of DOE-developed nuclear weapons support equipment. Approval of a nuclear weapon retrofit order and its incorporation into the JNWPS manual constitutes nuclear safety certification for the DoD. However, the equipment may be reviewed by the Military Department NWSSGs, which may restrict use of DOE safety-certified weapons or equipment if they believe the equipment is not safe in a Military Department-operational context.

f. Safety Certification of DoD-Developed Support Equipment

(1) Safety certification is required of DoD-developed equipment that is used to handle nuclear weapons, all specialized equipment (components designed specifically for use with nuclear weapons), and all non-specialized equipment (components used with nuclear weapons but not specifically designed for that purpose).

(2) The weapon system program managers are responsible to the Military Department for the safety design, analysis, and testing of equipment or software to meet Military Department safety criteria. The weapon system program managers submit the data documenting compliance with nuclear safety criteria for a Military Department-designated independent technical review. That independent analysis provides a safety certification recommendation to the Military Departments.

(3) The Military Department then certifies the equipment or software, documenting the certification in a Military Department publication, or rejects certification and sends the package back to the weapon system program managers for additional action.

6. NNAP

a. The NNAP is a verification system that ensures that test assemblies are non-nuclear. Positive safety measures are implemented with the goal of preventing inadvertent nuclear detonation. The Military Departments perform unique test programs, independent from DOE, which require denuclearized test assemblies and will exercise the intent of the NNAP.

b. Test units are designed to simulate the nuclear weapon in its operational configuration as much as possible. Actual arming, fuzing, and firing system components, weapon case structures, and detonators can be used. Test assemblies and the test units housing them will look like actual warheads. Additionally, during flight tests, the units are expected to operate as if they were an actual nuclear weapon, with the exception of a nuclear detonation. The test conditions simulate actual operational scenarios to the maximum extent possible. These realistic test conditions and simulations require a deliberative inspection and test process to verify and ensure a test unit is not an actual warhead. The Military Departments will develop and implement procedures to ensure that an actual warhead cannot be inadvertently assembled into a test unit and subsequently tested as part of the operational test.

c. There are three methods to the NNAP process for verifying that a test assembly is not a nuclear weapon. Those three methods are to be used in combination with each other and are as follows:

(1) Inspection of Tamper-Evident Seals. Tamper-evident seals will be inspected (on those weapons equipped with such seals) to verify serial numbers and for alterations or damage to ensure that the test assembly configuration has not been altered or substituted.

(2) Inspection of Engineered Signatures. The physical or electrical characteristics that differentiate between a nuclear weapon and a test assembly will be inspected. Those include external differences, such as engraved markings, electrical connections and antennas, as well as internal differences that may be verified with instrumentation.

(3) Radiation Detection Instrument Measurements. Nuclear emissions from each test assembly will be measured at multiple times as close as practical to the timing of the test to ensure that the test assembly does not contain plutonium or other special nuclear materials (other than depleted uranium).

d. For joint tests, DOE is responsible for providing joint test assembly (JTA), tamper-evident seals, signature information, and radiation detection equipment. As additional verification that JTAs are non-nuclear, DOE permanently marks them as test assemblies.

7. PERIODIC SAFETY STUDIES AND REVIEWS

a. The Military Department evaluates system safety throughout the life cycle of a nuclear weapon system, including allied systems that will have assigned capability to use U.S. nuclear weapons, for which the Military Department has cognizance. One method used is periodic safety studies and reviews performed by the Military Department NWSSG.

b. A NWSSG evaluates current information about the nuclear safety of the weapon system, observes weapon system operations, and makes assessments of the nuclear weapon system on DoD nuclear weapon system safety policy and standards. A NWSSG may recommend draft safety rules, technical and operational procedures, and other positive measures to maximize safety consistent with operational requirements.

c. This enclosure describes NWSSGs and their activities and identifies the different types of safety studies and reviews. It provides the guidelines for the conduct of safety studies and reviews, and outlines the process for the preparation, coordination, and approval of associated safety documentation.

(1) NWSSGs conduct detailed nuclear weapon system safety studies and reviews periodically throughout the DoD life cycle of a nuclear weapon system. An NWSSG is convened for a particular study or review by the Military Department and is operated for its duration by the Military Department.

(2) A NWSSG Chair is selected by the convening Military Department. NWSSGs provide one means of assessment of nuclear weapon system surety but have no oversight responsibility. NWSSG member organizations remain informed through their applicable chains of command.

(3) Based on its evaluations, the NWSSG may also recommend draft safety rules for operation of the nuclear weapon system to ensure that it continues to meet the DoD nuclear weapon system surety standards. Alternately, the NWSSG may draft safety rules that permit continued operations with an identified vulnerability, while maximizing safety consistent with operational requirements. The NWSSG is disbanded when the Military Department accepts its report, which serves as the basis for the Military Department's NWSSG report.

Appendixes

1. Safety Studies and Reviews
2. Nuclear Weapon System Safety Assessments
3. DoD Nuclear Weapon Surety Training Program
4. Joint Nuclear Weapon Life-Cycle Process
5. Lightning Protection Systems Program

APPENDIX 1 TO ENCLOSURE 3
SAFETY STUDIES AND REVIEWS

1. NWSSG MEMBERSHIP. The NWSSG is composed of the military and civilian representatives from the Military Departments, the United States Strategic Command (USSTRATCOM), DTRA, and, by agreement, DOE. Other Combatant Commands or any additional commands and agencies with responsibility for nuclear weapon system surety may be included as considered applicable by the Military Department. Members will be assigned for the duration of the study or review.

2. RESPONSIBILITIES. NWSSG members will:

- a. Be knowledgeable of safety policy and procedures.
- b. Identify, analyze, and provide assessments of pertinent nuclear weapon system surety-related information and operations.
- c. Convey to the NWSSG the unique operational requirements of their organization, parent command, and the DoD.
- d. Independently formulate their judgments when assessing whether the system meets the DoD nuclear weapon system surety policy and standards.

3. MEMBER QUALIFICATIONS

a. NWSSG Chair. The Chair must be a grade O-6 or civilian equivalent and have nuclear weapon experience necessary to meet the position's responsibilities. Exceptions to the required O-6 level must be approved by general or flag officer in the chain of command.

b. NWSSG Members. The NWSSG members will:

(1) Be at a minimum a grade O-5 or civilian equivalent. Exceptions will be approved by the NWSSG Chair.

(2) Have extensive operational or technical experience with nuclear weapon systems, and experience or training in evaluation techniques applicable to the DoD nuclear weapon surety standards.

(3) Have no direct responsibility for the design, development, or production of the specific nuclear weapon system under evaluation.

(4) Be encouraged to complete the applicable curriculum of the DoD Nuclear Weapon Surety Training program outlined in Appendix 3 to this enclosure.

4. MEMBERSHIP ROLES

a. NWSSG Chair. The Chair will:

- (1) Be responsible for all aspects of a given safety study or review, including preparation, conduct, and reporting.
- (2) Conduct the study in the schedule and scope, specified by the convening authority, and ensure complete coverage of safety-related issues.
- (3) Ensure that all opinions and observations are recorded in the NWSSG report.

b. Military Department Member(s). Military Department members will provide a combination of operational experience and technical expertise to support thorough evaluation of nuclear weapon system safety.

c. USSTRATCOM or Other Invited Combatant Command Members. USSTRATCOM or other invited Combatant Command members will:

- (1) Provide a combination of operational experience and technical expertise to support thorough evaluation of nuclear weapon system safety.
- (2) Provide current knowledge in nuclear weapon mission requirements, as applicable.

d. DTRA Member. The DTRA member will represent the interests of the CJCS and ASD(NCB).

e. DOE Member. The DOE member represents the nuclear weapon design and development aspects of nuclear weapon system safety and provides technical knowledge of the warhead.

5. NWSSG ADVISORS. Advisors may be invited by NWSSG members, as approved by the NWSSG Chair. The Chair may also request specific advisors as needed.

a. Advisors must have relevant technical knowledge of nuclear weapon systems, or specific technical knowledge or operational experience with the design, development, production, or operation of the nuclear weapon system under evaluation.

b. Advisors are encouraged, but are not required, to have completed the DoD Nuclear Weapon Surety Training Program outlined in Appendix 3 to this enclosure.

c. Advisors do not have a formal voice in NWSSG proceedings but may submit findings through their organizations NWSSG voting member. They are encouraged to make contributions to NWSSG briefings, discussions, and deliberations, through the member whom

they represent, to clarify points of discussion on issues raised by their sponsor or another NWSSG member. Advisors may participate in such discussions, but their input will be limited by their advisor status.

6. TYPES OF STUDIES AND REVIEWS

a. Safety studies and reviews are conducted by NWSSGs to examine nuclear weapon system design features and technical and operational procedures to determine if the system is able to meet DoD nuclear weapon surety policy and the four DoD nuclear weapon surety standards. Nuclear weapon systems will be evaluated to ensure procedural safeguards minimize exposure of nuclear weapons to credible abnormal environments during the STS.

b. The following sub-sections addresses the different types of studies and reviews and provides the purpose, timing, specific scope of each study or review as related to the joint DoD and DOE life-cycle process, and report formats. The types of safety studies and reviews include initial safety study (ISS), preliminary safety study (PSS), interim safety study (INSS), pre-operational safety study (POSS), SSS, and OSR. The studies and reviews, when conducted, are normally performed in relation to specific phases of the joint DoD and DOE life-cycle process.

(1) ISS. The ISS will examine design features and aspects of the proposed CONOPS (if available) that will affect the safety of the nuclear weapon system. The ISS will address the safety themes and identify safety-related concerns so that changes, if necessary, can be made to the nuclear weapon system design in a timely and cost-efficient manner.

(a) The ISS will be conducted following completion of the joint DoD and DOE design, definition and cost study (Phase 2A). The ISS is conducted before the start of the joint DoD and DOE full-scale engineering development phase (Phase 3) and the production engineering phase (Phase 4).

(b) The NWSSG will review the joint DoD and DOE life-cycle process feasibility phase (Phase 2) and Phase 2A reports, draft MCs, draft STS, safety design theme, and the system CONOPS.

(c) The Military Department NWSSG report on the ISS will be made available to the preliminary DRAAG, when applicable, and to the nuclear weapon system lead project officer (LPO) (or program manager, as applicable) for information.

(2) PSS. The PSS will examine design features, hardware, procedures, and aspects of the CONOPS affecting the safety of the nuclear weapon system. The PSS will identify safety-related concerns and deficiencies in the nuclear weapon and nuclear weapon system so that corrections may be made in Phase 3 of the development process in a timely and cost-efficient manner.

(a) The need for and timing of this study will be determined by the using Military Department, normally following the completion of the preliminary DRAAG review.

(b) The NWSSG will review the preliminary DRAAG report and ISS NWSSG report to identify any nuclear weapon system safety design criteria that are not met or have been waived. In addition, the NWSSG will examine proposed storage, maintenance, and transportation concepts for relevant elements of the nuclear weapon system.

(c) The Military Department NWSSG report on the PSS will be made available by the responsible Military Department to the interim DRAAG and the nuclear weapon system LPO (or program managers, as applicable) for information.

(3) INSS. The INSS normally will examine changes to design features, hardware, procedures, and aspects of the CONOPS that affect the safety of the nuclear weapon system to determine if the DoD nuclear weapon system surety standards are attainable.

(a) The need for and timing of this study will be determined by the using Military Department. If conducted following the completion of the preliminary DRAAG review, it will identify safety-related concerns and deficiencies in the nuclear weapon and nuclear weapon system, so that corrections may be made in Phase 3 of the development process in a timely and cost-efficient manner.

(b) The INSS may be conducted at the option of the Military Department following completion of the preliminary or interim DRAAG, as applicable, if significant changes have occurred in the nuclear weapon system's proposed design and operations.

(c) The NWSSG will:

1. Review the preliminary or interim DRAAG report and any ISS or PSS reports, as applicable.

2. Identify any nuclear weapon system safety design criteria that are not met or that have been waived.

3. Examine proposed storage, maintenance, and transportation concepts for relevant elements of the nuclear weapon system.

(d) The Military Department NWSSG report on the INSS, if conducted, will be made available by the responsible Military Department to the final DRAAG, and to the nuclear weapon system LPO (or program manager, as applicable) for information.

(4) POSS. The POSS will examine safety procedures for new or modified systems, and aspects of the CONOPS that will affect the safety of the nuclear weapon system, to determine if the DoD nuclear weapon surety standards are met. It will recommend draft nuclear weapon system safety rules to the Military Department.

(a) The POSS will be conducted in such time that specific system safety rules can be coordinated, approved, distributed, and implemented 60 days before initial operational capability or first assets delivered (FAD).

(b) The Military Department NWSSG report on the POSS will be made available by the responsible Military Department to the DRAAG, if applicable, to the nuclear weapon system LPO (or program managers), as applicable for action.

(c) The NWSSG will:

1. Review the final DRAAG report, if available, and the previous NWSSG report.
2. Examine the system CONOPS.
3. Review unauthorized launch analysis (ULA) and inadvertent launch analysis (ILA), if applicable.
4. Examine proposed storage, maintenance, and transport operations.
5. Identify any nuclear weapon safety design criteria that are not met or that have been waived.
6. Develop draft safety rules.

(5) OSR. An OSR will examine all operational aspects of a nuclear weapon or nuclear weapon system for safety to determine if the DoD nuclear weapons surety standards are met.

(a) An OSR will be conducted during the second year after initial approval of safety rules or no later than the second year after FAD for the nuclear weapon system. Additionally, an OSR will be repeated, as required, based on weapon system design, procedural or operational concept changes, and experience with the weapon system and the system's safety rules. Each nuclear weapon system will receive an OSR at least every 5 years from the start of each preceding OSR.

(b) The NWSSG will:

1. Review the previous Military Department NWSSG reports.
2. Examine the operational history of the weapon system.
3. Identify any nuclear weapon safety design criteria that are not met or that have been waived.
4. Observe operations with the delivery system, using training or inert weapons when possible, and applicable support equipment, and in a representative sample of operational

environments (and in unique operational locations). Where applicable and possible, observe weapons on alert.

5. Examine storage, maintenance, and transport operations.
6. Review ULA and ILA, if applicable.
7. Recommend changes or additions to safety rules, as applicable.

(c) The Military Department NWSSG report on the OSR will be made available by the responsible Military Department to the nuclear weapon system LPO (or program manager, as applicable).

(6) SSS. An SSS investigates unsafe conditions revealed by operational experience; accidents and or incidents; modifications, tests, or retrofits involving nuclear safety; significant changes in the CONOPS or STS; additional new equipment and or weapons; proposed changes to nuclear weapon system safety rules; or storage of inactive nuclear weapons.

(a) An SSS will be conducted for a nuclear weapon system when deemed necessary by the Military Department concerned or when requested by the ASD(NCB). DOE and DTRA may request, through the ASD(NCB), that an SSS be conducted. An SSS may be conducted with an OSR, if desired.

(b) The NWSSG will:

1. Examine modifications, alterations, retrofits, and special tests.
2. Assess potentially unsafe conditions revealed by operational experience, studies, or analyses.
3. Review significant changes in the system CONOPS, operational conditions, STS, or performance of the safety features incorporated into the weapon system.
4. Review ULA and ILA, if applicable.
5. Review probabilistic risk assessment (PRA) reports, when available, to help evaluate the nuclear weapon system's compliance with the first and third DoD nuclear weapon system surety standards.
6. Recommend changes or additions to safety rules, as applicable.

(c) Military Department SSS NWSSG reports will be made available by the responsible Military Department to the nuclear weapon system LPO (or program manager, as applicable) for information.

7. STUDY AND REVIEW PROCEDURES

a. Pre-study and Review Requirements

(1) The Military Department will request and consider recommendations from the NWSSG member organizations regarding the scope and agenda of the study or review, and will distribute a convening letter and an agenda to member organizations.

(2) A Military Department data package will be provided to NWSSG member organizations at least 30 days before the start of a study or review. The package will include at a minimum:

(a) Technical description and CONOPS for the nuclear weapon system. That information subsequently becomes Part A of the Military Department safety rules package.

(b) Description of the safety features incorporated into the nuclear weapon system. That information subsequently becomes Part B of the Military Department safety rules package.

(c) Current or draft safety rules, or draft changes to current safety rules, as proposed by the Military Department. That information is Part C of the Military Department safety rules package.

(3) The Military Department, in coordination with the Deputy Assistant Secretary of Defense for Nuclear Matters (DASD(NM)) under the authority, direction, and control of the ASD(NCB), will request that DOE provide the following information at the study site:

(a) Warhead descriptions, including history of alterations and modifications, status of the major assembly release (MAR), and operating modes.

(b) A summary of the warhead design safety features, including use control, that support the weapon safety theme.

(c) An assessment of how the design safety features support the MCs and the DoD nuclear weapons system surety standards, including information on environments in which inherent weapon design characteristics alone are inadequate to meet the MCs.

(d) Information concerning specific system security vulnerabilities that may be accessed by the NWSSG Chair and limited to others in the group with a need to know, as approved by the Military Department component in consultation with DASD(NM). Issues that arise concerning such vulnerabilities will be addressed in the context of the impact to weapon safety. Specific findings during limited access discussions will not be included in open findings due to classification concerns.

(4) The Military Department will review the following material and make it available to the NWSSG at the study site, as applicable:

(a) JNWPS TP and Military Department technical manuals.

(b) Pertinent material from previous Military Department NWSSG reports on the specific nuclear weapon system, including approved findings and recommendations and corrective action taken.

(c) The most recent POG and DRAAG reports.

(d) A summary of relevant accidents and incidents, NWTI results, and unsatisfactory reports.

(e) Technical nuclear safety analyses, as available, that address system features, interfaces, operations (e.g., transportation), and applicable risk assessments.

(f) Applicable operations orders, operations plans, directives, and related materials.

b. Conduct of the Study or Review. The NWSSG will conduct a safety study or review, in accordance with this manual and the Military Department implementing instructions. The NWSSG will:

(1) Review the Military Department data package.

(2) Review the status of relevant findings, recommendations, and open corrective actions from previous Military Department NWSSG reports.

(3) Receive technical and operational briefings on the weapon system under study.

(4) Determine if the nuclear weapon system may be operated safely in the CONOPS. Observe operations with applicable support equipment in a representative sample of operational environments and in substantially unique operational environments, as applicable.

(5) Review technical and operational procedures in TPs and in safety rules, in view of observed operations.

(6) Examine the STS document, with particular emphasis on storage, maintenance, transportation, and employment operations, to ensure that all relevant activities that have safety aspects are reviewed.

(7) Review potential hazards in normal and abnormal environments identified in the STS document for impact on safety. Review possible credible abnormal environments and examine potential hazards where applicable.

(8) Review the process for the authentication of nuclear control orders at the delivery unit level.

(9) Review results and recommendations of available ILA and ULA and related software and physical security analyses.

(10) Examine surety-related use control matters in the context of the second nuclear weapon system surety standard.

(11) Examine surety-related security matters in context of the fourth nuclear weapon system surety standard.

c. Determinations. The NWSSG will determine if the nuclear weapon system is being operated in a manner that meets DoD nuclear weapons surety policies and standards.

(1) If the system meets the policies and standards, the NWSSG will draft, if applicable, new safety rules or changes to current safety rules, or recommend other positive measures to further ensure maximum safety consistent with operational requirements.

(2) If the system may not be verified to meet the policies and standards, the NWSSG will:

(a) Draft safety rules, or other positive measures stating their benefits, that will permit continued operations.

(b) Determine operational impacts if the safety rule or other positive measure is not adopted.

(3) If the system does not meet the policies and standards, the NWSSG will determine nuclear weapon system limitations and constraints that do not allow safe operation of the system and either:

(a) Determine draft safety rules or other positive measures that will allow the system to meet the standards; or

(b) Draft safety rules that permit continued operations with an identified vulnerability while maximizing nuclear weapon system safety consistent with operational requirements.

(4) In cases where a weapon system does not meet or cannot be verified to meet the policies and standards, the NWSSG also will identify:

(a) Affected part(s) of the STS.

(b) Applicable accident scenario(s), abnormal environment(s), or other factors causing nonconformance with the nuclear weapon system surety standards, including:

1. Plausible sequences of events that may lead to those undesirable situations.

2. System response(s), if known, to the abnormal environment or other factors causing nonconformance with the standards (e.g., nuclear yield, high-explosive detonation, pre-

arming, launching, or releasing). Credible combinations of abnormal environments should be identified where possible.

3. Procedures and hardware, if any, that are identified as deficient.

4. Specific limitations imposed on system operations will be identified and justified in the safety rules package.

(5) If hazardous conditions exist, the NWSSG Chair may recommend immediate constraints on nuclear weapon system operations or cessation of operations for the nuclear weapon system. If such action is recommended, the Military Department will be notified through the fastest means of communication. Notification will include all minority opinions. The NWSSG must also recommend the conditions that must be satisfied before operations may resume.

d. Reporting Requirements. The NWSSG will prepare an NWSSG report, in accordance with the format specified in paragraph 7j of this appendix.

(1) The record paper copy report must be signed by all members participating in the safety study or operational review. The NWSSG report will not be changed following the signature of the NWSSG members other than to correct administrative errors.

(2) The report will be forwarded to the Military Department within 2 weeks following completion of the study. Copies of the NWSSG report will be distributed by the responsible Military Department to NWSSG member organizations within 30 days.

(3) For those studies where no safety rules are changed by the NWSSG, the Military Department may submit a letter to the ASD(NCB) and CJCS certifying the current rules are sufficient.

e. Post-Study or Review Requirements

(1) On receipt of the NWSSG report, the Military Department will:

(a) Notify the ASD(NCB) of the completion of the study.

(b) Approve or disapprove, within 90 days, with applicable rationale, the findings and recommendations in the NWSSG report. The Military Department may require the NWSSG to provide additional information. A corrective action will be identified for each approved recommendation, as appropriate.

(c) Use the NWSSG report, including minority reports, as the basis for preparation of the Military Department NWSSG report and a safety rules package, in accordance with the formats specified in this section as applicable.

(2) The Military Department will distribute the NWSSG report in time to support the coordination of the safety rules package to the ASD(NCB), the NWSSG member organizations, the Office of the CJCS, and the Military Department nuclear weapon system LPO (or managers, as applicable).

f. Military Department Safety Rules Package. When the NWSSG report includes draft safety rules or changes to existing safety rules, the Military Department will, simultaneously with the preparation of the NWSSG report, prepare the Military Department safety rules package for separate coordination and approval. The format for the safety rules package is in this appendix. Proposed alterations to the safety rules package during Military Department processing must be coordinated through and concurred with by the NWSSG membership convened for the subject study or review.

(1) Every effort will be made to ensure timely and responsive coordination and approval of nuclear weapon system safety rules, including:

(a) Military Department coordination of safety rules package. The Military Department may elect, through the NWSSG Chair, to reconvene the NWSSG to address unresolved issues.

(b) Forwarding of completed Military Department safety rules package to the DASD(NM) to begin the departmental coordination and approval process.

(c) DASD(NM) concurrent coordination of the Military Department safety rules package with the OSD staff, Joint Staff, DTRA, and DOE National Nuclear Security Administration (NNSA).

(d) The Joint Staff will coordinate the safety rules package with the applicable Combatant Commands and Military Departments. Re-coordinating with the Military Department submitting the proposed safety rules package is not required. The CJCS will submit a recommendation for approval or disapproval to the USD(AT&L).

(2) Critical comments or non-concurrences received from DOE NNSA will be provided to the Joint Staff and the appropriate Military Department, and considered prior to requesting USD(AT&L) approval.

(3) Critical comments or non-concurrences received from the Joint Staff or DTRA will be provided to the originating Military Department and resolved prior to requesting USD(AT&L) approval of the rules.

(4) Concurrently, the originating Military Department will present an overview of the revised safety rules, including the findings and recommendations of the NWSSG, to the Nuclear Weapons Council Standing and Safety Committee (NWCSSC). Critical comments received from the NWCSSC will be resolved prior to requesting USD(AT&L) approval of the rules.

(5) Once coordination is completed, the ASD(NCB) will submit a recommendation for approval or disapproval of the safety rules to the USD(AT&L). If the USD(AT&L) approves the safety rules, the ASD(NCB) will return approved safety rules to the CJCS for dissemination to the Military Department for implementation. If the USD(AT&L) does not approve the safety rules, ASD(NCB) will return the safety rules to the Military Department for appropriate action and notify the CJCS of the disapproval.

g. Safety Rules Package Process Guidelines. The following additional guidelines apply to all safety rules package processing:

(1) Military Department directives will address the details of how the Military Department returns proposed safety rules changes or alterations to the NWSSG, program offices, or operational commands. Issues arising from DoD coordination of safety rules packages will be resolved by the ASD(NCB).

(2) USD(AT&L) approval of all safety rules is contingent on Parts A and B of the safety rules package remaining substantively unchanged from the Military Department data package considered during the safety study or review.

(3) The Military Department may request that the USD(AT&L) grant interim approval of the proposed safety rules when circumstances dictate approval in a time period that does not permit completion of the formal coordination process. The ASD(NCB) will provide the interim safety rules package to DOE NNSA with a 14-day suspense. Interim approval of safety rules will be effective for a maximum of 6 months and does not negate the requirement for final processing of a safety rules package. Interim approval of safety rules permits acceptance of custody, routine peacetime storage, maintenance, training, inspection, transportation, and deployment activities. It does not permit nuclear weapons to be used in exercises or permit operations with nuclear weapons except in response to a valid nuclear release order. If final processing of safety rules is not completed in the 6-month period, the Military Department must request an extension.

(4) Unless otherwise specified, safety rules and revisions to approved safety rules will be implemented within 30 days of USD(AT&L) approval.

(5) Safety rules remain in effect until rescinded by the CJCS. The Secretaries of the Military Departments, CJCS or Vice Chairman of the Joint Chiefs of Staff, USD(AT&L), or ASD(NCB) may recommend rescinding the safety rules. The USD(AT&L) will be informed of any rescission.

(6) Draft safety rules will be coordinated and approved within the timelines outlined in the Table.

Table. Safety Rules Coordination Process and Staffing Time Standards

Action	Time	Remarks
1. Military Department's NWSSG completes POSS, periodic OSR or SSS and recommends draft safety rules or changes to current safety rules.	D	
2. Military Department develops NWSSG report and updates weapon system safety rules.	D + 90	
3. Secretary of the Military Department submits proposed NWSSG report and safety rules to the ASD(NCB).	D + 120	
4. The ASD(NCB) coordinates NWSSG report and safety rules with Joint Staff, DOE, and OSD. The ASD(NCB) will schedule the safety rule overview with the NWCSSC.	D + 165	Joint Staff will coordinate with the Military Departments, Combatant Commands, and DTRA.
5. The ASD(NCB) obtains USD(AT&L) approval.	D + 195	
6. The ASD(NCB) returns coordinated rules to the CJCS.	D + 210	Joint Staff notifies the Military Departments and Combatant Commands of rules completion.
7. Military Departments develop and distribute updates to safety rules.	D + 225	Process complete.

h. Administrative Changes

(1) Administrative changes are used for name changes or changes to nomenclature, deletion of weapons or delivery vehicles from the inventory, or word changes that do not change the meaning or concept of the approved safety rules.

(2) Administrative changes with supporting rationale, are proposed by the Military Department and will be coordinated with the Joint Staff, DTRA, and DASD(NM). Administrative changes are approved by the ASD(NCB).

(3) Administrative changes will not change:

- (a) Established nuclear weapon system safety policy.
- (b) The CONOPS on which safety rules are based.
- (c) Nuclear safety features in either the weapon(s) or the delivery vehicle.

(d) Specific restrictions in the approved safety rules.

(4) Approved administrative changes will be provided to the Joint Staff, DTRA, and the Office of the DASD(NM) for distribution to OSD, Military Departments, Combatant Commands, and DOE NNSA.

i. Waivers. Waivers to existing safety rules may be approved pending the next safety review. Military Departments will provide a waiver request package with rationale to the ASD(NCB) through the DASD(NM).

j. Formats for NWSSG Report Documents. The NWSSG report title will be descriptive and will include the name of the weapon system under study. NWSSG reports will include the following sections:

(1) Executive Summary. The executive summary will:

(a) Summarize the study results. It will include an appraisal statement that assesses whether or not the weapon system meets DoD nuclear weapon system safety policy and standards, when operated in accordance with prescribed technical and operational procedures, in the system CONOPS, and with proposed or existing safety rules and other positive measures.

(b) Include a synopsis of the findings and recommendations and minority opinions (if any), and will comment on limitations that affected the conduct of that study.

(2) Study Overview. The study overview will:

(a) Summarize the study's scope, background, and purpose; describe the assessments conducted by the NWSSG; list any assumptions that were necessary to complete the study; and include the system's CONOPS, current safety rules (if any), a system functional description, including the safety technologies incorporated in the system; and the safety feature description provided in the Military Department data package. Those documents may be attached as appendixes. The study overview is not intended to be a technical or engineering source document.

(b) Provide comments on the impact of safety on the system CONOPS and the different implications for safety inherent in unique operational locations; reiterate recommendations from previous studies or reviews that remain open pending completion of corrective action, and provide the status of each; and note any limitations that affected the study or review (e.g., scope, implementation, and instructions).

(3) Findings and Recommendations

(a) Findings. Findings are statements of fact, or conclusions of the NWSSG on the nuclear safety of the weapon system.

1. The first finding will include an appraisal statement that assesses whether the weapon system meets DoD nuclear weapon system surety policy and standards, when operated in accordance with prescribed technical and operational procedures, in the system CONOPS, and with proposed or existing safety rules and other positive measures.

a. If the system is not verified to meet the standards as evaluated by the NWSSG, identify system limitations and constraints that do not allow safe operation of the system, or any other factors that preclude conformance with the standards.

b. If the system does not meet the DoD nuclear weapon system surety standards, identify system limitations and constraints that do not allow safe operation of the system, or any other factors that preclude conformance with the standards.

2. Remaining findings will address system-specific enhancements or deficiencies related to hardware, firmware, software, and procedures.

(b) Recommendations. Each finding will be followed by a recommendation. If a finding is a positive statement of nuclear weapon safety, the recommendation may be “none.” Recommendations will be, as follows:

1. Weapon systems that meet the DoD nuclear weapon system surety standards. Recommend actions (e.g., new safety rules or changes to current safety rules or other positive measures), if applicable, to further ensure maximum safety consistent with operational requirements.

2. Weapon systems that are not verified to meet the DoD nuclear weapon system surety standards. Recommend positive measures and safety rules in consideration of the requirements identified in paragraph 7c(2) of this appendix, including those that may permit continued operations while maximizing safety consistent with operational requirements.

3. Weapon systems that do not meet the DoD nuclear weapon system surety standards. Recommend positive measures and safety rules permitting continued operations or recommending cessation of operations. Additionally, recommend positive measures that address system-specific enhancements or deficiencies regarding hardware, firmware, software, and procedures.

4. Reiterate applicable recommendations for the weapon system made during previous studies or reviews for which corrective actions have not been completed.

(4) Draft Safety Rules. The draft safety rules provides a separate listing of the draft safety rules or recommended changes to current safety rules as identified in the findings and recommendations. Findings and recommendations provide the basis for Part C of the Military Department safety rules package. Members may recommend processing changes as an administrative change, if applicable.

(5) Observations. Observations are non-binding statements made by the NWSSG on areas not normally covered in the scope of the study but which are felt to warrant documentation in the report.

(6) Addendum of Minority Opinions. An addendum of minority opinions will be included if agreement is not reached by the NWSSG through discussion and deliberation. Minority opinions will be presented at the same time and in the same format as the other findings and recommendations of the basic report, and will be signed by each member supporting the minority opinion.

k. Military Department NWSSG Report. The Military Department NWSSG report will include an executive summary, assessment, findings, recommendations and corrective actions, and, as an enclosure, the NWSSG report.

(1) The executive summary will summarize the Military Department position on the study results.

(a) It will include an appraisal statement that assesses whether or not the weapon system meets DoD nuclear weapon system surety policy and standards, when operated in accordance with prescribed technical and operational procedures, in the system CONOPS and with proposed or existing safety rules and other positive measures.

(b) If the NWSSG report assessment of compliance with the DoD surety standards differs from that of the NWSSG (majority or minority), that difference will be noted in the executive summary, along with the rationale for the disagreement.

(c) The executive summary will also include a synopsis of the most significant NWSSG report recommendations and the corresponding Military Department action. The executive summary will also comment on limitations that affected the conduct of the study.

(2) The assessment section will include evaluations and analyses to support the Military Department appraisal statement in the executive summary.

(3) Each item in the findings, recommendations, and corrective actions sections of the NWSSG report will be associated with a corrective action. This section will:

(a) List NWSSG findings and recommendations and minority opinions, and indicate approval or disapproval of each recommendation (with rationale).

(b) List corrective actions that the Military Department will implement for approved recommendations.

(c) Provide recommendations on the retention, modification, or retirement of the system, as applicable.

(4) The NWSSG report will be included as an enclosure to the Military Department NWSSG report.

1. Safety Rules Package. The safety rules package will consist of an executive summary, technical description and CONOPS (Part A), safety features (Part B), and proposed safety rules (Part C). Each part is factual and will stand alone, without subjective or qualifying data.

(1) The executive summary will summarize the Military Department position on the results of the study or review.

(a) It will include an appraisal statement that assesses whether or not the weapon system meets DoD nuclear weapon system surety policy and standards, when operated in accordance with prescribed technical and operational procedures, in the system CONOPS and with proposed or existing safety rules and other positive measures.

(b) If the NWSSG report assessment of compliance with the DoD surety standards differs from that of the NWSSG (majority or minority), that difference will be noted in the executive summary, along with the rationale for the disagreement.

(c) The executive summary will include a synopsis of the proposed safety rules or changes to current safety rules. It will also provide a descriptive title and study date.

(2) Technical description and CONOPS (Part A) will contain a brief functional description and the CONOPS for the nuclear weapon system. The information will be consistent with that provided in the Military Department data package.

(3) Safety features (Part B) will describe the safety features incorporated in the nuclear weapon system. The information will be consistent with that provided in the Military Department data package. This part will include a summary description of specific positive measures that support DoD nuclear weapon system surety policy and standards.

(4) Proposed safety rules (Part C) will list all general and specific system safety rules that apply to the nuclear weapon system. The proposed safety rules or changes to current rules will be clearly identified.

APPENDIX 2 TO ENCLOSURE 3

NUCLEAR WSSAs

1. GENERAL. WSSAs evaluate the effectiveness of and compliance with the system-specific safety rules developed to meet the four nuclear weapon surety standards. Historically, the WSSA process was the capability to quantify the safety of the nuclear weapon stockpile using PRA techniques. WSSAs provide the OSD staff with an independent safety analysis capability that is responsive to change and problem resolution for nuclear weapon STS and life-cycle issues.

2. WSSA. A WSSA may address all or any part of the weapon system and may be broad or limited in scope, or focused on a specific issue or characteristic. A special safety assessment (SSA) is a methodology that can be used as a limited and focused assessment of a specific nuclear weapon incident or safety issue. ILA and ULA are assessments used to analyze technical malfunctions, natural events, human errors, and malicious acts that could result in an inadvertent or unauthorized use of a nuclear weapon.

a. The STS document of a nuclear weapon system provides the operating environments that the nuclear weapon system may encounter, either as part of or independent of its delivery vehicle. Testing is conducted on the weapon system to assess the effects of as many of those environments as possible. Credible combinations of abnormal environments pose an additional risk to nuclear weapon systems and may not have been tested extensively for their combined effects.

b. The Military Departments will use qualitative and quantitative assessment techniques to evaluate the risk throughout the STS. Those assessments identify external influences on all components and or equipment that may result in noncompliance with a nuclear surety standard, through natural occurrence, faulty design, misuse, failure, degradation, and or manufacturing defects. The assessments also include a determination of the modes of failure and the effects on safety when failure occurs in systems, subsystems, components, or software. The human factor can play a major role in the degradation of nuclear weapons surety standards through noncompliance with established weapons safety policy or guidance. The NWSSG will consider the results of those assessments during their evaluations of system safety.

c. The DoD nuclear weapon system safety program uses three safety assessment methodologies: SSA, ILA, and ULA. ILA and ULA are safety assessment methodologies used to analyze technical malfunctions, natural events, human errors, and malicious acts that could result in the inadvertent or unauthorized use of a nuclear weapon. Assessment techniques which are not all inclusive include:

(1) SSA. Is limited in effort and scope and will concentrate on a specific issues associated with the nuclear weapon system. SSAs can be nominated by the Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological/Nuclear Matters, DTRA, or the Military Departments.

(2) ULA. A ULA provides a qualitative or quantitative assessment of a specific nuclear weapon system safety risk. The purpose of the ULA, while recognizing that the chance of an unauthorized launch cannot be completely eliminated, is to ensure that the possibility of such an event is minimized to the fullest extent possible.

(a) The objective of a ULA is to reveal facts about a nuclear weapon system's design and the potential vulnerabilities of the design and its operation, which will form the basis for a determination on the likelihood of such an event. The systems are evaluated for human actions that may affect nuclear safety design safeguards. The ULA reports will be made available to the NWSSG and will be controlled on a strict need-to-know basis. The NWSSG will use the ULA reports to help evaluate the nuclear weapon system's compliance with the second DoD nuclear weapon system surety standard, preventing deliberate pre-arming, arming, launching, or releasing of nuclear weapons, except upon execution of emergency war orders or when directed by competent authority, and to make recommendations for system design modifications and or operating procedure changes.

(b) A ULA is normally conducted for each nuclear weapon system or launch platform as soon as sufficient weapon system design data is available to complete a thorough evaluation. ULAs will be updated periodically as the weapon system is modified, and will be verified as current in support of required safety studies.

(c) A ULA considers all subsystems of the entire weapon system (e.g., missiles, bombs, launch platforms, weapon control and launching systems, and support systems).

(3) ILA. In the context of an ILA, the term "inadvertent launch" refers to the accidental or unintentional launching or releasing of a nuclear missile or bomb in either a normal or credible abnormal environment. An ILA investigates how an unforeseen launch of a nuclear weapon could occur. It is usually based on a fault tree analysis or probabilistic risk assessment approach. It may or may not be quantitative and identifies things that can go wrong, the likelihood of occurrence, and probable outcomes. Its purpose, while recognizing that the chance for an inadvertent launch may not be completely eliminated, is to ensure that the possibility of such an event is minimized to the fullest extent possible.

(a) The objective of an ILA is to reveal facts about a nuclear weapon system's design that will form the basis for a determination concerning the likelihood of such an event. The systems are evaluated for human actions, component failures, and combinations thereof that may affect nuclear safety design safeguards. ILA reports will be made available to an NWSSG. The NWSSG will use the ILA results to help evaluate the nuclear weapon system's compliance with the third DoD nuclear system surety standard preventing inadvertent pre-arming, arming, launching, or releasing of nuclear weapons in all normal and credible abnormal environments.

(b) An ILA is normally conducted for each nuclear weapon system or launch platform when sufficient weapon system design data is available to complete a thorough evaluation. ILAs will be updated periodically as the weapon system is modified and in support of required safety studies.

(c) An ILA considers all subsystems of the entire weapon system (e.g., missiles, bombs, launch platforms, weapon control and launching systems, and support systems).

3. NOMINATION PROCESS. The DoD or DOE may propose WSSAs. In addition, the requirement to conduct a WSSA may be generated by the NWC or the Military Departments, or independently by the USD(AT&L), or by the DOE NNSA Administrator. When the parties have formally accepted a proposed or required WSSA, the scope, schedule, and associated protocols between the DoD and the DOE will be negotiated. DASD(NM) WSSA responsibilities will include, but are not limited to:

- a. Designate issues appropriate for focused WSSAs.
- b. Provide specific guidance and focus for each WSSA.
- c. Provide implementing policy direction for WSSAs.
- d. Delegate authority for management and implementation of WSSAs as appropriate and provide assignment guidance for conducting the assigned WSSAs.
- e. Provide clear direction, requirements, and deliverables for specific WSSAs to be performed by DTRA.

4. RESPONSIBILITIES. DTRA will represent the ASD(NCB) and the Joint Staff and be responsible for providing WSSA support, advice, and assistance to OSD, the Military Departments, the CJCS, and other DoD Components, as appropriate, in matters concerning nuclear weapons and nuclear weapon systems, their safety considerations, and similar aspects of the DoD nuclear weapons program as directed.

a. DTRA will provide focused WSSA support, advice, and assistance to the ASD(NCB) as appropriate. These matters will include aspect of nuclear weapons and nuclear weapon systems, their safety considerations, and such other aspects of the DoD nuclear weapons program as authorized or provided for under this manual.

b. Specific DTRA WSSA responsibilities will include, but are not limited to:

(1) Define and coordinate specific WSSA requirements and goals with the Military Department Components, DOE NNSA, and the ASD(NCB).

(2) Request DOE NNSA support for specific WSSAs.

(3) Coordinate with DOE for the integration of the work of the DoD and DOE and for fielding DOE requests for specific WSSA support.

- (4) Planning, programming, and resourcing WSSAs.
- (5) Contracting, contract technical management and oversight of WSSA performance.
- (6) Reporting format and standardization.
- (7) Oversight of DoD WSSA performance by establishing and managing WSSA working groups.
- (8) Develop abnormal environment specifications and scenarios.
- (9) Serve with DOE on the WSSA Oversight Committee and designating other DoD participation on this committee.
- (10) Maintaining one or more database(s) with DoD- and DOE-provided material on previous and ongoing WSSAs. Information maintained in the database(s) will be available for future use by DTRA, DOE NNSA, and their selected contractors, with express written approval of the originating organization. Raw data from previous studies will be available by exception only, to ensure this data is not misused.

APPENDIX 3 TO ENCLOSURE 3

DoD NUCLEAR WEAPONS SURETY TRAINING PROGRAM

1. GENERAL. The objective of the DoD Nuclear Weapons Surety Training Program (referred to in this manual as the “Surety Training Program”) is to enhance nuclear weapons surety by broadening the knowledge of participants in technical and programmatic safety matters. It is intended to provide uniformity to safety program activities and to ease the nuclear weapons safety interactions between the DoD and DOE.

2. DoD TRAINING PROGRAM OUTLINE. The Surety Training Program is comprised of three curricula that emphasize different aspects of safety to support the needs of personnel associated with nuclear weapons surety. Those curricula are tailored to individual responsibilities and levels of participation in the DoD Nuclear Weapons Surety Program.

a. Personnel with nuclear weapon safety responsibilities should complete the applicable curriculum.

b. Level 1 training and orientation is for senior officials responsible for policy-related decisions. The officials typically will include senior participants, as well as the DoD Component representatives to NWC safety activities. The Joint DoD-DOE Nuclear Surety Executive Course, available at the Defense Nuclear Weapons School, satisfies the training requirement.

c. Level 2 training and orientation is for action officers responsible for nuclear weapon policy formulation and implementation. The officers typically will include action-level participants, as well as the DoD Component representatives or observers to NWC action-level activities.

d. Level 3 training and orientation is for DoD NWSSG members. Members are encouraged to complete the curriculum before they participate in safety studies and reviews if they have not had previous NWSSG experience. NWSSG advisors are encouraged to complete the curriculum. The curriculum is also available for nuclear weapon system LPOs and POG chairs to ease coordination between the joint DoD and DOE nuclear weapon life-cycle process and the DoD Nuclear Weapons Surety Program.

3. SURETY TRAINING PROGRAM TOPICS. The Surety Training Program will include, as a minimum, elements of instruction on the following topics:

a. The DoD Nuclear Weapons Surety Program.

(1) A detailed review of the safety studies and review process, including guidance from DoD and the Joint Staff.

(2) A discussion of the technical implementation of positive measures and safety philosophy, both for active weapons and for weapons in inactive storage awaiting dismantlement.

(3) Safety policies, standards, positive measures, rules, procedures, and documentation related to the DoD Nuclear Weapons Surety Program.

(4) Historical overview of nuclear weapons surety.

(5) Sources of authority.

b. Safety roles and responsibilities of DoD, DOE, and joint DoD and DOE organizations.

c. Safety aspects of joint life-cycle activities.

d. Safety design principles, technology, and environments.

e. Safety aspects of security and use control.

f. Safety assessments.

g. Hazards.

h. Basics of probabilistic assessments.

4. PROGRAM PLAN

a. A program plan will be developed and maintained by DTRA. Specific course information may be obtained from:

Registrar, Defense Nuclear Weapons School
1900 Wyoming Blvd SE
Kirtland AFB, NM 87117-5669

b. The program plan will be provided to the DASD(NM) no later than November 1 of each year.

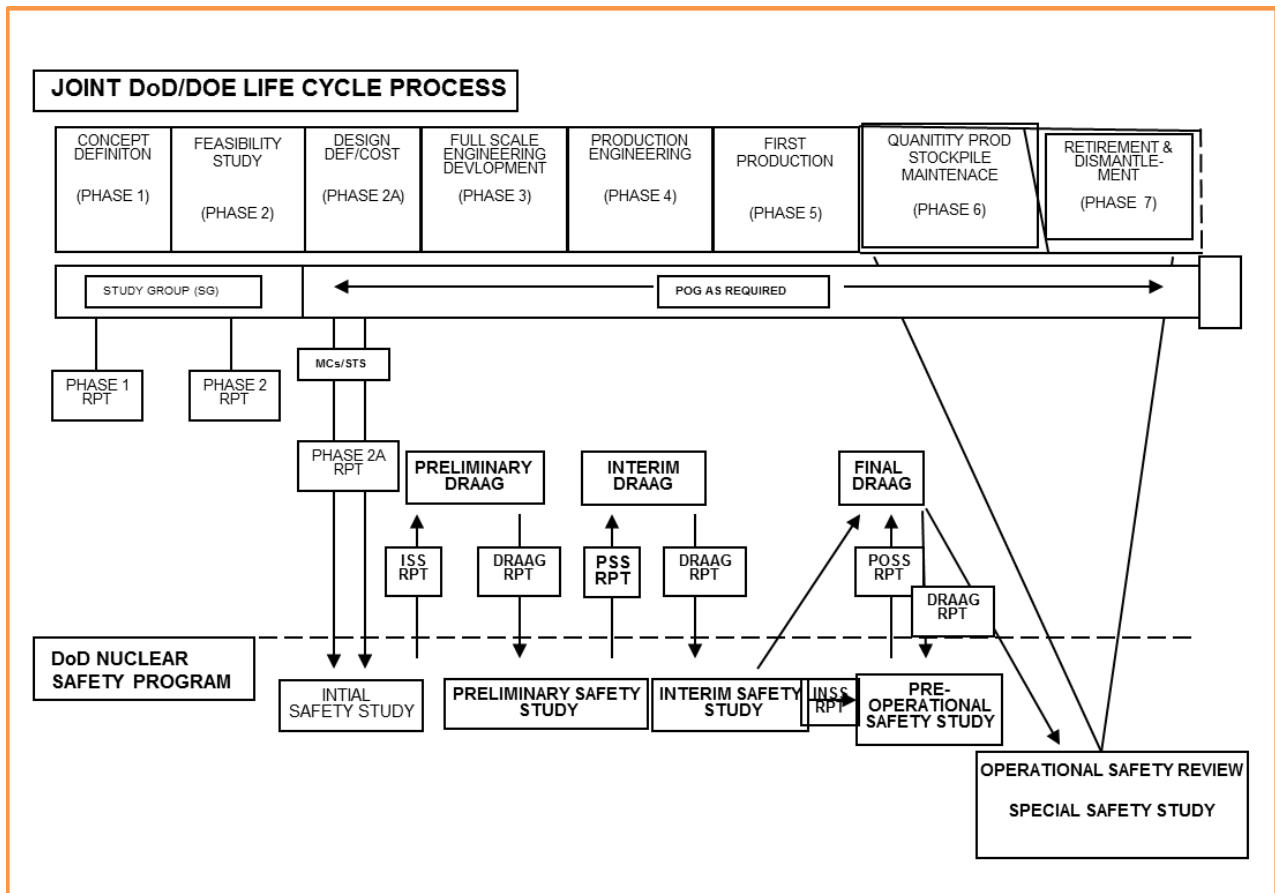
APPENDIX 4 TO ENCLOSURE 3

JOINT NUCLEAR WEAPON LIFE-CYCLE PROCESS

1. GENERAL. The joint DoD-DOE nuclear weapon life-cycle process outlines each phase from a safety perspective, to ensure that the joint life-cycle process and the DoD Nuclear Weapons Surety Program are integrated.

a. The joint life-cycle process consists of seven distinct phases ranging from concept definition through retirement and dismantlement. Through that life-cycle process, nuclear weapons are developed, maintained, improved (through modification), and retired. The close alignment of the nuclear weapons surety program with the joint life-cycle process ensures that nuclear weapon safety is maintained throughout all phases of a weapon’s life-cycle process as illustrated in the Figure.

Figure. Interrelationship of DoD Safety Program and the Joint DoD and DOE Life-cycle Process



b. The Joint Nuclear Weapons Council was established and given specific responsibilities by section 179 of Title 10, United States Code (Reference (n)), as amended. Its subordinate committee, the NWCSSC, acts as the point of contact for the DoD and the DOE on all atomic energy matters that either Department determines to be related to nuclear weapon research, development, production, maintenance, dismantlement, allocation of nuclear material, and nuclear weapon safety matters. The NWC is required to report annually on the status of the safety of the nuclear stockpile to the Congress.

c. The DoD life-cycle functions, responsibilities, and procedures for nuclear weapons are governed by the Memorandum of Agreement, as amended (Reference (o)), DoDD 3150.01 (Reference (p)), and DoDI 5030.55 (Reference (q)).

d. DoD nuclear weapon system life-cycle activities, including development, procurement, sustainment, and demilitarization, are conducted in accordance with the DoD acquisition process, as described in DoDD 5000.01 (Reference (r)).

2. JOINT LIFE-CYCLE ACTIVITIES

a. Two design documents are developed early in the life-cycle process of each nuclear weapon.

(1) MCs specify the DoD performance requirements and physical characteristics for a nuclear weapon before design and development by the DOE. Safety parameters are specifically addressed, as the principal competing characteristic. Other parameters are operational, physical, functional, environmental, vulnerability, and reliability.

(2) STS defines a nuclear weapon system's logistical and employment concepts and related normal and abnormal environments. It may also define the logistical flow involved in moving nuclear weapons to and from various locations for a variety of peacetime functions. Each nuclear weapon system is evaluated for safety under those logistic and employment environments

b. The joint life-cycle process for nuclear weapons provides for the formation of joint Military Department and DOE study groups and Military Department led POGs, as well as for the formation of DoD DRAAGs. Reference (c) and this manual address the linkage of study group, POG, and DRAAG activities with the DoD Nuclear Weapon System Safety Program.

(1) Early in the life-cycle process, a joint DoD-DOE study group is formed to assess the technical feasibility of a nuclear weapon concept. Later, a joint POG is formed to coordinate the integration of the warhead and the weapon system. The cognizant Military Department assigns a LPO to chair the POG. Once established, the POG continues to meet, as necessary, throughout the life cycle of the nuclear weapon.

(a) The functions of the POG are to coordinate the design, development, test, evaluation, and other nuclear weapon life-cycle activities performed by the Military Departments

and the DOE. The POG examines issues and determines technological or interface tradeoffs related to safety, security, use control, cost, performance, reliability, and other significant matters.

(b) POG subgroups are organized, as necessary, to meet particular needs of a nuclear weapon program. The safety subgroup is specifically established by the LPO of the POG, according to Reference (q) to ensure, by reviewing weapon and weapon system design concepts and other relevant information, that a nuclear weapon demonstrates compliance with all applicable safety standards and criteria. Modifications of the safety parameters of MCs are recommended by the POG safety sub-group as necessary throughout the weapon development process.

(2) The DRAAG provides an independent review of a proposed DOE nuclear weapon design to determine whether that design complies with safety and other requirements specified in the MCs and the STS. DRAAG reviews normally are conducted following the completion of draft weapon development reports by the DOE. The DRAAG should also consider the latest NWSSG report, if available. After each review, the DRAAG forwards reports through the cognizant Military Department to the NWC containing findings and recommendations on the acceptability or non-acceptability of the weapon design. DRAAG reports are also used by NWSSGs as inputs in safety studies of the nuclear weapon.

3. PHASE I – WEAPON CONCEPT DEFINITION STUDY. During Phase 1, the DoD agency or the DOE explores, or the two jointly explore, the possibility of initiating the development of a new nuclear weapon or modifying an existing weapon. A Phase 1 study group conducts that effort and may form a separate subgroup to address safety matters, as follows:

a. For a DoD-led Phase 1, the DoD agency will direct the study group to:

(1) Consider weapon system life-cycle safety in the development of outline MCs and draft STS documents.

(2) Specifically address safety in its Phase 1 report, including:

(a) Safety technologies that have application to the nuclear weapon system under consideration.

(b) How the new weapon will meet the nuclear weapon system's general safety theme.

(c) How the new weapon design tentatively will meet the DoD nuclear weapon system surety standards.

(d) How the likelihood of fissile material release or dispersal will be minimized.

b. The Military Department will provide a copy of the Phase 1 report to the NWSSG conducting the ISS, as applicable.

c. A copy of the Phase 1 report, if conducted, should accompany the Phase 2 study request to the NWCSSC.

4. PHASE 2 – FEASIBILITY STUDY. During a Phase 2 study, a study group investigates the technical feasibility of developing or modifying a nuclear warhead to meet military needs, as follows:

a. The Military Department will direct the study group to:

(1) Form a surety working group to define the safety, security, and use control requirements and themes.

(2) Identify safety technologies that could be applied to the weapon system.

(3) Address weapon safety in preliminary draft documents, including outline MCs and draft STS.

(4) Specifically address safety in the Phase 2 report, including:

(a) Safety technologies examined during the study.

(b) Safety themes proposed by the DOE design agencies.

(c) How the new weapon system will meet DoD nuclear weapon system surety standards.

(d) How the likelihood of plutonium release or dispersal will be minimized.

b. The Military Department will provide a copy of the Phase 2 report to the NWSSG conducting the ISS.

c. A copy of the Phase 2 report will be submitted to the NWCSSC and a request to begin Phase 2A must be approved by the NWCSSC before action is taken.

5. PHASE 2A - DESIGN DEFINITION AND COST STUDY. Phase 2A and all subsequent phases are conducted by a joint DoD-DOE POG. Some Phase 2 activities may continue into Phase 2A to resolve issues on the technical feasibility and cost implications of developing or modifying a nuclear weapon. As required, the POG will report its actions to the NWCSSC, as follows:

a. The LPO directs the POG to:

(1) Form a nuclear weapon system safety subgroup. That subgroup will exist for the lifetime of the POG.

(2) Examine the weapon safety design in conjunction with the DoD nuclear weapon system surety standards.

(3) Address safety implications of updates to draft MCs and the draft STS, and of refinements to nuclear weapon design definitions, decision cost estimates, cost and/or benefit tradeoff studies, and cost-effectiveness analyses.

(4) Specifically address safety in its Phase 2A report, including:

(a) Safety issues addressed during the study.

(b) The safety design theme for the nuclear weapon system at a level of detail that will permit the Military Department to validate the safety aspects of the nuclear weapon system. That specific safety theme will be examined by the NWSSG in the subsequent ISS.

b. The Military Department will provide a copy of the Phase 2A report to the NWSSG conducting the ISS.

c. A copy of the Phase 2A report will be submitted to the NWCSSC. A request for initiation of Phase 3 must be approved by the NWCSSC, the NWC, the Secretary of Defense, and the Secretary of Energy before action may be taken.

6. PHASE 3 - FULL-SCALE ENGINEERING DEVELOPMENT. Besides the POG, the DoD establishes a DRAAG to determine acceptability. During Phase 3, the DOE develops a nuclear warhead design that is safe, reliable, producible, and maintainable. That phase culminates in the release of design information by the national laboratory team to DOE production plants. POG activities continue to be monitored by the NWCSSC, as follows:

a. The LPO directs the POG to:

(1) Examine weapon concepts with the DoD nuclear weapon system surety standards.

(2) Examine the approved MCs and STS and the ISS NWSSG report for safety considerations.

(3) Specifically address safety in a report that includes:

(a) Safety issues addressed during Phase 3.

(b) A level of detail that permits the Military Department to validate the safety design aspects of the nuclear weapon system.

b. The Military Department will direct the preliminary DRAAG to consider the ISS NWSSG report in the preparation of the preliminary DRAAG report. In turn, the preliminary DRAAG report will be provided to the NWSSG conducting the PSS. The need and timing for this study will be determined by the using Military Department.

c. The Military Department will:

(1) Conduct the PSS following publication of the preliminary DRAAG report.

(2) Forward the nuclear weapon system Phase 3 POG report(s), preliminary DRAAG report, and Military Department PSS NWSSG report to the ASD(NCB).

7. PHASE 4 - PRODUCTION ENGINEERING. This phase is conducted by the DOE, with the support of the DoD. During Phase 4, the DOE develops specifications necessary to produce a manufacturable nuclear weapon. The POG continues to meet to finish Phase 3 activities and provide an annual report to the NWCSSC. The DRAAG continues its activities to consider the DOE design. Activities continue to be monitored by the NWCSSC, as follows:

a. The Military Department will direct the interim DRAAG to consider the PSS NWSSG report in the preparation of the interim DRAAG report. In turn, the interim DRAAG report will be provided to the NWSSG conducting the next safety study.

b. The Military Department will:

(1) Conduct the INSS, if necessary, following the publication of the interim DRAAG report.

(2) Forward the interim DRAAG report to the Military Department and the INSS NWSSG report, when available, to the ASD(NCB).

8. PHASE 5 - FIRST PRODUCTION. This phase is conducted by DOE, with the support of DoD. During Phase 5, DOE begins building nuclear weapons while working to achieve a desired production rate. The POG and its safety subgroup meet, as necessary. The DRAAG continues its activities. Phase 5 ends with the DOE MAR, which states that the war reserve weapon is satisfactory for release to DoD for operational capabilities and uses. An emergency capability (EC) release is a special category in the MAR that is used when all MAR prerequisites have not been satisfied, but an emergency capability requirement has been established by DoD. Any request for an EC release must verify that the surety standards are met. Activities continue to be monitored by the NWCSSC, as follows:

a. Before accepting custody of a nuclear weapon, DoD will ensure that:

(1) A successful POSS has been conducted.

- (2) Nuclear weapon safety rules have been approved and are in place.
 - (3) Receiving organizations acquired the approved safety rules and pertinent technical publications sufficiently in advance to allow for unit training.
 - (4) Procedures, personnel, equipment, facilities, and organizations have been certified.
 - (5) Nuclear weapons technical inspections have been completed.
- b. The DRAAG will consider the ISS and the POSS NWSSG reports, if available, in the preparation of the final DRAAG report.
 - c. The final DRAAG report will be provided to the NWSSG conducting the next safety study or review, and to the ASD(NCB) for applicable distribution.

9. PHASE 6 - QUANTITY PRODUCTION AND STOCKPILE MAINTENANCE AND EVALUATION

- a. DOE declares the beginning of Phase 6 based on the requirements for production in the Nuclear Weapons Stockpile Plan. In that phase, DOE completes production and DoD accepts custody of the remaining nuclear weapons to meet the requirements of the stockpile plan. The NWCSSC monitors all Phase 6 activities.
- b. The Military Department will conduct the safety studies and reviews described in Appendix 1 to Enclosure 3 to provide continuing DoD safety oversight.
- c. The POG members and the NWCSSC will be provided copies of Military Department NWSSG reports.

10. PHASE 7 – RETIREMENT

- a. Nuclear weapons are retired from the stockpile and returned to DOE custody for dismantlement and disposal. Safety study requirements will continue, and pertinent safety rules will apply, until the DOE assumes custody. Those requirements apply specifically to nuclear weapons that have been disassociated from their nuclear weapon system. The NWCSSC monitors all Phase 7 activities.
- b. If no operational requirement remains for a nuclear weapon, and the weapon has been retired yet remains in DoD custody, safety rules apply until DOE assumes custody. If necessary, the POG will establish additional technical procedures, weapon modifications, operations and documentation to maximize safety. When DOE has assumed custody for all retired weapons of that type, the applicable safety rules should be rescinded.

APPENDIX 5 TO ENCLOSURE 3

LIGHTNING PROTECTION SYSTEMS (LPSs) PROGRAM

1. GENERAL. This appendix provides the minimum explosives safety criteria for the design, installation, inspection, testing, training, and maintenance of LPSs for nuclear weapons storage and maintenance facilities. The DoD has selected the LPS criteria of the National Fire Protection Association (NFPA) 780 (Reference (s)), including Annex D (Inspection and Maintenance of Lightning Protection Systems), and Annex E (Ground Measurement Techniques) for ammunition and explosives facilities, with three exceptions.

a. Inspection periods for DoD are 12 months for visual and 24 months for testing (less restrictive than section 8.9, "Inspection, Testing, and Maintenance," of Reference (s) but necessary for an effective trend analysis for determination of system deterioration).

b. All gateposts within sideflash distance of explosives or through which nuclear weapons must pass or through which nuclear weapons are capable of passing, will be grounded to a grounding electrode (more restrictive than section 8.5.5, "Metallic Fences," of Reference (s)).

c. It is not required to bond each fence post to an individual grounding electrode.

2. FACILITY LIFE-CYCLE ASSESSMENTS

a. All LPS for facilities that provide storage or maintenance of nuclear weapons will be assessed within 2 years of new publication of Reference (s).

b. All LPS for above-ground facilities that provide storage or maintenance of nuclear weapons will be reassessed by the Military Department at a minimum of every 5 years or upon:

(1) Changes of policy or safety guidance (to include but not limited to Reference (s), approved DoD guidance document, Military Department directives). For example, a significant change in safety guidance could result from improved technologies such as surge protective devices (SPD), lightning arrestors, grounding and bonding.

(2) Changes in facility configurations through modifications or additions resulting in a deviation from a currently approved or validated site plan to include penetrations and utility additions to existing facilities.

(3) Mission changes, changes in operations, or change in facility use, which might change LPS parameters and the outcome of the current risk assessment.

c. A facility life-cycle assessment will consist of:

(1) Military Department safety evaluation of compliance with the current or applicable DoD Explosives Safety Board (DDESB) approved explosives site plan and with current LPS policy, guidance, and standards.

(2) Military Department engineering analysis of existing LPS systems, to determine corrective actions for deviations or requirement for compliance with guidance of section 1 of this appendix.

(3) Military Department risk assessment and written acceptance of this risk for non-compliant areas. Military Standard 882E (Reference (t)) or equivalent Military Department publication will be used as minimum guidance. Any risks that are categorized that could result in catastrophic consequences as per Tables A - I of Reference (t), will require approval authority of a general or flag officer.

3. CONFIGURATION MANAGEMENT (CM). DoD Components will implement and enforce a CM program to identify and manage changes to facilities or systems that would affect LPS for nuclear weapons maintenance and storage facilities. The CM program will:

a. Include provisions to ensure all facility and operational stakeholders are aware the proposed changes.

b. Include provisions to identify and document the functional and physical characteristics of a configuration item (CI), to control changes to a CI and the consequences of the change(s), and to record and track status of changes.

c. Include provisions to ensure that construction complies with approved design plans or that design plans are re-approved if additions change previously approved plans. Compliance exemptions from Reference (s) include:

(1) Section 8.1.3 of Reference (s) does not apply to nuclear facilities. There are no exceptions.

(2) Section 8.5.5.1 should say, “all gateposts within side flash distance of explosives or which nuclear weapons may pass through will be grounded to grounding electrode.”

(3) Section 8.9.6.3. should say, “SPDs will be inspected in accordance with the manufacturer’s instructions at intervals not exceeding 12 months or when visual inspection is performed.”

(4) Section 8.9.7. should say “The lightning protection system will be tested electrically at least every 24 months.”

4. LIGHTNING WARNING SYSTEM (LWS). A LWS will be provided for nuclear weapons storage and maintenance areas.

- a. Optimal warning systems are typically based on two independent methodologies: localized prestrike warning systems that are based on measuring electromagnetic atmospheric conditions over 2000 volts per meter, and lightning reporting based on detection networks.
- b. The LWS will be capable of providing notification of lightning within 10 miles of nuclear weapons storage and maintenance facilities. The LWS will also be capable of providing a localized prestrike warning based upon electromagnetic atmospheric conditions.
- c. Strike density data (number of strikes per square kilometer per year) should be considered in analyzing existing systems that might match up specifically with paragraphs 4a and 4b of this appendix.
- d. Military Departments will document and approve lightning warning systems and operational guidance.
- e. Chapter 5 of DDESB Technical Paper 22 (Reference (u)) provides additional guidance.

5. CESSATION AND RESUMPTION OF OPERATIONS FOR LIGHTNING ENVIRONMENTS

- a. Operations will cease and necessary safety precautions (i.e., personnel evacuation and equipment shut down) will be observed when lightning is within 10 miles or if there are indications of possible strike (i.e., positive indications from LWS) when not inside a LPS-protected facility (e.g., transfer, movement, not fully protected facilities).
- b. Operations may resume when indication of electrical storms are beyond 10 miles or if sensors show positive indications (i.e., indications from LWS). If LWS cannot provide information to determine local lightning conditions, operations will not resume until 30 minutes after the last indication of lightning within 5 miles.

6. LPS TRAINING. Each Military Department will establish training requirements for personnel conducting the following LPS functions for nuclear weapons maintenance and storage facilities:

- a. Maintenance and repair.
- b. Inspection.
- c. Testing.
- d. Facility design and design modification.

GLOSSARY

PART I. ABBREVIATIONS AND ACRONYMS

ASD(NCB)	Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs
CI	configuration item
CJCS	Chairman of the Joint Chiefs of Staff
CM	configuration management
CONOPS	concept of operations
DASD(NM)	Deputy Assistant Secretary of Defense for Nuclear Matters
DDESB	DoD Explosives Safety Board
DoDD	DoD Directive
DoDI	DoD Instruction
DOE	Department of Energy
DRAAG	Design Review and Acceptance Group
DTRA	Defense Threat Reduction Agency
EC	emergency capability
FAD	first assets delivered
HE	high explosive
ILA	inadvertent launch analysis
INSS	interim safety study
ISS	initial safety study
JNWPS	Joint Nuclear Weapons Publication System
JTA	joint test assembly
LPO	lead project officer
LPS	lightning protection system
LWS	lightning warning system

MAR	major assembly release
MCs	military characteristics
NATO	North Atlantic Treaty Organization
NNAP	Non-Nuclear Assurance Program
NNSA	National Nuclear Security Administration
NWC	Nuclear Weapons Council
NWCSSC	Nuclear Weapons Council Standing and Safety Committee
NWSSG	Nuclear Weapons System Surety Group
NWTI	nuclear weapons technical inspection
OSR	operational safety review
POG	Project Officers Group
POSS	pre-operational safety study
PRA	probabilistic risk assessment
PRP	Personnel Reliability Program
PSS	preliminary safety study
SPD	surge protective devices
SSA	special safety assessment
SSS	special safety study
STS	stockpile-to-target sequence
TNT	trinitrotoluene
TP	technical publication
ULA	unauthorized launch analysis
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
USSTRATCOM	United States Strategic Command
WSSA	weapon system safety assessment

PART II. DEFINITIONS

Unless otherwise noted, these terms and their definitions are for the purpose of this manual.

abnormal environments. Environments as defined in a weapon's STS and MCs in which a nuclear weapon or a nuclear weapon system is not expected to retain full operational reliability.

access. 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 was provided for either the person or the weapon when the person is near the weapon.

arming. Readyng a nuclear weapon so that a fuzing signal will operate the firing system; includes operation or reversal of safing items.

certification. A determination by the applicable Military Department that procedures, personnel, equipment, software, facilities, and organizations are capable of safely performing assigned nuclear weapon functions and missions.

custody. Responsibility for the control of, transfer and movement of, and access to nuclear weapons and components. Custody may include accountability.

DoD Nuclear Weapon System Safety Program. A program integrating safety policy, organizational responsibilities, and formalized procedures throughout a nuclear weapon system's life cycle to protect nuclear weapon systems. The program involves identifying, evaluating, controlling, and reducing risks related to nuclear weapons. Positive measures are used to enhance the safety of nuclear weapon systems.

emergency. An unexpected occurrence or set of circumstances in which personnel or equipment unavailability, due to accident, natural event, hostile act, or combat, may demand immediate action that may require extraordinary measures to protect, handle, service, secure, transport, jettison, or to employ nuclear weapons.

ILA. Methodology for analyzing technical malfunctions, natural events, and human errors that could result in an accidental or unintentional use of a nuclear weapon.

incident. An unexpected event that presents the potential for negative consequences that may be caused by accidental or intentional acts, acts of God, unfavorable environmental conditions, or other factors.

jettison. The intentional separation of an unarmed weapon from its delivery system or transport carrier in response to an emergency.

launching. Propulsion of a missile with a nuclear warhead into flight beyond the immediate area of the launching site. Specific definitions for each nuclear weapon or nuclear weapon system will be provided in the CONOPS, as appropriate.

life-cycle process. The breadth of activities applicable to a nuclear weapon throughout its lifetime, which includes development, testing, production, transportation, acceptance, storage, maintenance, upgrades, retirement, and dismantlement, as well as approved operations.

maintenance. Work and oversight necessary to ensure a system is in proper working order and will operate, act, or protect in accordance with its intended purpose.

MAR. A Sandia National Laboratory prepared, NNSA approved statement that war reserve weapon material is satisfactory for release on a designated effective date to the DoD for specified uses which are qualified by exceptions and limitations.

normal environments. The expected logistical, storage, and operational environments defined in the STS document and the MCs that the weapon system is required to survive without degradation in operational reliability

nuclear weapon. A complete assembly (i.e., implosion type, gun type, or thermonuclear type), in its intended ultimate configuration which, upon completion of the prescribed arming, fusing, and firing sequence, is capable of producing the intended nuclear reaction and release of energy.

nuclear weapon accident. An unexpected event due to accidental circumstances involving U.S. nuclear weapons or nuclear weapon components that may result in:

Errors committed in the assembly, testing, loading, or transportation of equipment or the malfunctioning of equipment and materiel that could lead to an unintentional operation of all or part of the weapon arming or firing sequence, or that could lead to a substantial change in yield or increased dud probability;

Accidental or unauthorized launching, firing, or use by U.S. forces, or U.S.-supported allied forces, of a nuclear-capable weapon system that could create the risk of an outbreak of war;

Loss or destruction of a nuclear weapon or nuclear weapon component, including jettisoning;

An increase of the possibility of, or actual occurrence of, an explosion, a nuclear detonation, or radioactive contamination;

Non-nuclear detonation or burning of a nuclear weapon or nuclear weapon component;

Public hazard, actual or implied; or

Any act of God, unfavorable environment, or condition resulting in damage to the weapon, facility, or component.

nuclear weapon incident. A nuclear weapon accident or an intentional hostile event involving a nuclear weapon, facility, or component.

nuclear weapons surety. Policies, procedures, controls, and actions that encompass safety, security, and control measures, which ensure there will be no nuclear weapon accidents, incidents, unauthorized detonation, or degradation of weapon effectiveness during its stockpile-to-target sequence.

nuclear weapon system. A nuclear weapon and a means for delivering it to the target, with associated support equipment, facilities, procedures, personnel, and any vehicles peculiar to the system used for weapon transport.

nuclear weapon system safety. The application of engineering and management principles, criteria, and techniques to protect nuclear weapons against the risks and threats inherent in their environments within the constraints of operational effectiveness, time, and cost throughout all phases of their life cycle.

one-point safe. A nuclear weapon is one-point safe if, when the HE is initiated and detonated at any single point, the probability of producing a nuclear yield exceeding 4 pounds of TNT equivalent is less than one in 10^6 .

positive measures. The combination of procedural and administrative actions, physical safeguards, and design features expressly for the purpose of ensuring security, safety, and control of nuclear weapons and systems, including associated personnel.

pre-arming. Defined in Joint Nuclear Weapons Publication System Technical Publication 4-1 (Reference (v)).

prevent. To minimize the possibility of occurrence of an undesired event. It does not imply absolute assurance that the event will not occur.

probabilistic risk assessment. A quantitative analysis of weapon system safety activities. It uses variables such as frequency of accidents, degree of severity of a possible accident, probability of exposure to the population and possible effects of an accident to identify where positive measures can be taken to reduce risk. Those positive measures then serve as the basis for assessing and rendering judgments on the reduction of risks associated with a nuclear weapon system activity.

releasing. The separation of a missile or gravity bomb with a nuclear warhead, for use in its intended mode of operation, from a delivery aircraft.

safety-related. Anything related to the direct exposure to energy that could degrade, either deliberately or inadvertently, the safety of the nuclear weapon.

side flash. The phenomenon where lightning current will arc through a non-conductive medium in order to attach to other objects. An electrical arc caused by differences of potential that occur between conductive metal bodies or between such metal bodies and a component of the LPS or earth electrode system.

security. Protection against loss of control, theft, or diversion of a nuclear weapon system; protection against unauthorized access; or protection against unauthorized actions, vandalism, sabotage, and malevolent damage.

stockpile-to-target sequence

The order of events involved in removing a nuclear weapon from storage and assembling, testing, transporting, and delivering it on the target.

A document that defines the logistic and employment concepts and related physical environments involved in the delivery of a nuclear weapon from the stockpile to the target. It may also define the logistic flow involved in moving nuclear weapons to and from the stockpile for quality assurance testing, modification and retrofit, and the recycling of limited life components.

survivability. The capability of the nuclear weapon and supporting systems to endure and to maintain the ability to perform assigned nuclear missions.

ULA. Methodology for analyzing elements that can lead to an unauthorized launch of a nuclear weapon.

unauthorized launch. In the context of a ULA, the term “unauthorized launch” refers to deliberate launching or releasing of a nuclear missile or bomb (except jettisoning) before execution of an emergency war order.

use control. The positive measures that 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, security, and system safety rules.

visual inspection. A process by which all components of a system are looked at, in depth, and discrepancies, damage, changes, etc., are identified, documented, planned and programmed for correction or repair.