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SECRETARY OF THE AIR FORCE**

**DEPARTMENT OF THE AIR FORCE
INSTRUCTION 91-101**



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Safety

**AIR FORCE NUCLEAR WEAPONS
SURETY PROGRAM**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements Air Force Policy Directive (AFPD) 91-1, *Nuclear Weapons and Systems Surety*, and is consistent with AFPD 13-5, *Air Force Nuclear Mission*. This instruction applies to all civilian employees and uniformed members of the Regular Air Force, Air Force Reserve, and Air National Guard. This instruction applies to the United States Space Force (USSF) unless and until such time as separate service guidance is published. In this event, USSF guidance shall prevail in application to the USSF. **Note:** All references to United States Air Force (USAF) terminology, units, grades, and positions will also apply to the equivalent in the USSF, as appropriate. For example, references to Airmen will also apply to Guardians. References to MAJCOMs or NAFs will also apply to field commands. References to wings will also apply to deltas/garrisons. Air Staff roles and responsibilities (e.g., AF/A1, etc.) may also apply to the equivalent Office of the Chief of Space Operations (Space Staff) position or office (e.g., SF/S1, etc.), as deemed appropriate.

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SUMMARY OF CHANGES

This interim change revises AFI 91-101 by (1) changing this publication to a DAFI, (2) including applicability to the USSF, (3) correcting various grammar and spelling errors, (4) updating paragraph references, (5) standardizing terminology and acronym usage throughout the document, (6) correcting compliance statement tiering, (7) correcting table and figure formatting, (8) removing specific external paragraph references, (9) updating, rewording, and clarifying multiple paragraphs, and (10) adding the terms Safe/Safing and System Program Office to the *Terms* section of [Attachment 1](#). A margin bar (|) indicates newly revised material.

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Chapter 1

INTRODUCTION

1.1. Purpose.

1.1.1. The purpose of the Air Force Nuclear Weapons Surety Program is to incorporate maximum nuclear weapons surety, consistent with operational requirements, from weapon system development to target or dismantlement. This instruction implements positive measures to prevent unauthorized activation of critical functions, including unapproved or inadvertent authorization, prearming, launching, releasing, arming, and targeting, and protect against inherent risks and threats, and to ensure components are compatible with the assembled nuclear weapon system.

1.1.2. This document serves as the parent instruction to the following 91-1XX publications: AFI 91-102, *Nuclear Weapon System Safety Studies, Operational Safety Reviews, and Safety Rules*; AFI 91-106, *Unauthorized Launch, Threat Mitigation, and Launch Action Studies*; AFI 91-108, *Air Force Nuclear Weapons Intrinsic Radiation and 91(B) Radioactive Material Safety Program*; DAFI 91-111, *Safety Rules for US Strategic Bomber Aircraft*; DAFI 91-112, *Safety Rules for US/NATO Strike Fighters*; AFI 91-114, *Safety Rules for the Intercontinental Ballistic Missile System*; AFI 91-115, *Safety Rules for Nuclear Airlift Operations*; DAFI 91-116, *Safety Rules for Long-Term Storage and Maintenance Operations for Nuclear Weapons*; AFI 91-117, *Safety Rules for the Airborne Launch Control System*; AFMAN 91-118, *Safety Design and Evaluation Criteria for Nuclear Weapon Systems*; and AFMAN 91-119, *Safety Design Criteria for Nuclear Weapon Systems Software*.

1.2. Nuclear Weapons Surety Standards. The Air Force Nuclear Weapons Surety Program ensures personnel that design and operate nuclear weapons and nuclear weapon systems satisfy the surety standards in Department of Defense (DoD) Directive (DoDD) 3150.02, *DoD Nuclear Weapons Surety Program*. The four DoD nuclear weapons surety standards are:

1.2.1. There shall be positive measures to prevent nuclear weapons involved in accidents or incidents, or jettisoned weapons, from producing a nuclear yield. **Note:** A significant nuclear yield is considered the equivalent of four pounds of TNT as constrained by the Department of Energy's (DOE) one-point safety design criteria in accordance with DOE Order 452.1E, *Nuclear Explosive and Weapons Surety Program*.

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

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

1.2.4. There shall be positive measures to ensure adequate security of nuclear weapons, as governed by DoDD 5210.41, *Security Policy for Protecting Nuclear Weapons*.

1.3. Nuclear Surety Procedures. A goal of nuclear safety design certification is to maximize weapon safety within the design to minimize steps called out as nuclear surety procedures within technical orders/checklists. Nuclear surety procedures must be performed exactly as written. The Air Force Safety Center, Weapon Safety Division (AFSEC/SEW) is the adjudicating authority for

determining which procedures qualify as nuclear surety procedures, but may delegate that authority to another competent engineering authority within the US Government.

1.4. Commanders and Directors. Commanders and Directors at all levels are responsible for the success of the Air Force Nuclear Weapons Surety Program. Commanders must emphasize that safety, security, control, and effectiveness of nuclear weapons are of great importance to the United States.

1.5. Risk Assessment and Management.

1.5.1. This publication does not address risk assessment and management for nuclear weapon system environmental, safety, occupational, and health risks that cannot result in a nuclear yield or dispersal of nuclear materials and that neither impact nuclear weapons directly nor affect the manner in which the weapon system complies with any of the nuclear weapons surety standards. For guidance on assessing and managing these non-nuclear environmental, safety, occupational, and health risks consult AFI 90-802, *Risk Management*; Military Standard (MIL-STD)-882, *System Safety*; DoD Instruction (DoDI) 5000.02, *Operation of the Adaptive Acquisition Framework*; and AFI 63-101/20-101, *Integrated Life Cycle Management*.

1.5.2. Risk management for nuclear consequences is handled with the same general approach or methodology to that described in AFI 90-802 and MIL-STD-882, tailored for the nuclear application. Risk is categorized using a combination of frequency, quantified as a system's lifetime probability of an adverse nuclear event occurring and ranging from one in ten to one in one trillion; and severity, rated on an increasing scale ranging from direct damage to a nuclear weapon through to full-scale nuclear detonation. The aggregate risk level is determined by calculating the frequency and severity of potential consequences resulting from a mishap and finding the risk element in [Table 1.1](#) at the intersection of the assessed frequency and severity.

1.5.3. Due to the nature of nuclear weapons, the conventional low, medium, serious, and high risk categories are insufficient to address the potential outcomes. As a result, very high, extreme, and existential categories were added and assigned such that they were consistent with the probabilities normally included in nuclear weapon Military Characteristics as described in DoD Manual (DoDM) 3150.02, *DoD Nuclear Weapon System Safety Program Manual*.

1.5.4. Nuclear-scale consequences include but are not limited to damage to a nuclear weapon, dispersal of nuclear materials, and generation of nuclear yield.

1.5.5. Safety design criteria described in this document, AFMAN 91-118, and AFMAN 91-119 are intended to reduce the probability of the occurrence of an event with nuclear-scale consequences such that the aggregate risk is reduced to no greater than a high categorization. Full compliance with all safety design criteria or use of approved procedures is considered adequate rigor for ensuring compliance with safety requirements of DoDD 3150.02 and therefore does not require additional risk management measures. Non-compliance with any safety design requirements resulting in the application of alternative measures for reducing risk requires a probabilistic risk assessment of the system under the alternative measures to show that the aggregate risk does not exceed a high categorization. Approval of new procedures may require a probabilistic risk assessment if the procedures involve operations that defeat weapon safety features or create the potential for exposing a nuclear weapon to an abnormal

environment. **Note:** Numerical requirements for inadvertent critical function activation are located in AFMAN 91-118.

1.5.6. Risk acceptance authorities. Using the Nuclear Extended Risk Matrix in **Table 1.1**, the risk acceptance authority is found by determining the consequence, ordered by severity along the horizontal axis, and the probability of a given failure mode, ordered by the probability of occurrence along the vertical axis. The intersection of these two parameters in **Table 1.1** provides the risk level. The risk acceptance authority for the determined risk level is as follows:

1.5.6.1. Risk acceptance for risks within the low, medium, serious, and high categories are managed through the MAJCOM with the same risk acceptance authority as these risk categories for conventional risks. Consult AFI 90-802 and MIL-STD-882 for guidance on risk acceptance for risk categorized as high and below.

1.5.6.2. Risk acceptance for risks within the very high, extreme, and existential categories are managed through the Nuclear Weapons Systems Surety Group for coordination through the Office of the Secretary of Defense, Under Secretary for Acquisition and Sustainment (OUSD A&S) to identify and obtain concurrence of the proper risk acceptance authority.

Table 1.1. Nuclear Extended Risk Matrix.

Severity →	Direct Damage to a Nuclear Weapon*	Destruction of a Nuclear Weapon** Consequences contained within DoD controlled space / Multiple deaths during operations with nuclear weapons / loss ≥ \$50M	Plutonium Scatter*** Death (~10,000) / ≥ \$2.50B / Possible Political Consequence	Nuclear Detonation (10 kT yield) Death (~100,000) / ≥ \$750B / Political Consequence
Probability of Occurrence ↓				
1/10	Very High	Extreme	Extreme	Existential
1/10 to 1/100	Very High	Extreme	Extreme	Extreme
1/100 to 1/1,000	Very High	Very High	Extreme	Extreme
1/1,000 to 1/10,000	High	Very High	Very High	Extreme
1/10,000 to 1/100,000	High	Very High	Very High	Very High
1/100,000 to 1/1M	High	High	Very High	Very High
1/1M to 1/10M	Serious	High	High	Very High
1/10M to 1/100M	Serious	Serious	High	High
1/100M to 1/1B	Medium	Serious	Serious	High
1/1B to 1/10B	Medium	Medium	Serious	Serious
1/10B to 1/100B	Low	Medium	Medium	Serious
1/100B to 1/1T	Low	Low	Medium	Medium
Legend M = Million B = Billion T = Trillion	*Potential for localized release of Plutonium	**Localized release of Plutonium	***Widespread dispersal of Plutonium	

Chapter 2

ROLES AND RESPONSIBILITIES

2.1. Assistant Secretary of the Air Force for Acquisition shall:

2.1.1. Assign a Program Manager for nuclear certified items. (T-0)

2.1.2. Ensure any shortfall in meeting nuclear design requirements is corrected by the Program Executive Officer, granted a deviation based on a probabilistic risk assessment and accompanying risk acceptance, or granted a deviation with compensatory measures by the approval authority for the organization establishing the design requirement. Operational risk acceptance is owned by the lead command, the Program Executive Officer does not own operational risk acceptance.

2.2. Air Force Chief of Safety (AF/SE) will establish and oversee the Air Force Nuclear Weapons Surety Program and shall:

2.2.1. Establish nuclear weapons surety program requirements.

2.2.2. Publish instructions and guidance on the various portions of the program as required.

2.2.3. Maintain liaison for nuclear weapons surety matters with organizations outside the Air Force.

2.2.4. Advise the Office of the Secretary of the Air Force and the Assistant Secretary of the Air Force (Acquisition) on required nuclear surety policies associated with new technologies.

2.2.5. Provide, at the request of commanders, integrated surety visits to assist in developing a robust nuclear weapons surety program.

2.2.6. Ensure deviations are reviewed by technical authorities and briefed during Air Force Nuclear Surety Council and Nuclear Weapon System Surety Group meetings in accordance with AFI 91-102.

2.2.7. Maintain the Air Force authoritative tracking catalog for all deviations.

2.2.8. Obtain from the Deputy Chief of Staff for Logistics, Engineering and Force Protection, Headquarters Air Force all AF Form 116s, *Request for Deviation from Security Criteria*, no later than 15 September each year so a consolidated surety deviation picture is presented to the Chief of Staff of the Air Force within the annual Nuclear Surety Deviation Report.

2.2.9. Establish the minimum content of the Nuclear Surety Training Program. Create and distribute standardized nuclear weapons surety lesson plans and testing materials to MAJCOM Weapons Safety Offices. Coordinate lesson plans through Air Education and Training Command prior to distribution to MAJCOMs.

2.2.10. Distribute new nuclear weapons surety testing materials to MAJCOMs within two months after being notified of compromise of test material.

2.2.11. Oversee the Air Force Nuclear Surety Tamper Control and Detection Programs.

2.2.12. Establish requirements to designate, certify, and manage the critical component process. (T-0)

2.2.13. Through AFSEC/SEW, AF/SE shall:

- 2.2.13.1. Approve new or major changes to Operation Certification/Operational Decertification (OPCERT/DECERT) procedures and procedural controls for critical components. These procedures must adequately verify the system or component functions as design certified and mitigate all credible threats and scenarios. **Note:** The abbreviated terms OPCERT and DECERT are uniquely distinct from the Operational Certification and Operational Decertification terms without this abbreviation.
- 2.2.13.2. Establish criteria for nuclear surety procedures to be identified by the Program Manager.
- 2.2.13.3. Approve identified nuclear surety procedure tasks.
- 2.2.13.4. Provide augmentation to Air Force Inspection Agency nuclear surety inspection oversight teams in support of the Inspector General of the Air Force oversight responsibilities.
- 2.2.13.5. Provide assistance or augmentation to the MAJCOM safety office as requested for inspections, staff assistance efforts, or special interest evaluations relating to nuclear weapons surety at any level within the requesting command.
- 2.2.13.6. Certify the design of sealing methods proposed for use in nuclear weapon systems in accordance with **Chapter 4** of this instruction.
- 2.2.13.7. Designate and certify critical components in accordance with **Chapter 6** of this instruction (when not designated by the Air Force Nuclear Weapon System Surety Group).
- 2.2.13.8. Designate split-handling or split-knowledge procedures for critical components if not previously determined or if procedures proposed or in use are determined by AFSEC/SEW to be inadequate (when not designated by the Air Force Nuclear Weapon System Surety Group).
- 2.2.13.9. Approve vaults and containers used to store critical components.
- 2.2.13.10. Certify the design of tamper detection indicators in accordance with **Chapter 4** of this instruction and approve their use to protect the certification status of critical components.
- 2.2.13.11. Develop and publish Air Force safety design and evaluation criteria.
- 2.2.13.12. Determine when independent nuclear surety evaluations are required to support nuclear safety design certification in accordance with **Chapter 4** of this instruction, AFI 91-102, and AFI 63-125, *Nuclear Certification Program*.
- 2.2.13.13. Request Air Force Nuclear Weapons Center (AFNWC) support as needed, describing the specific review, evaluation, or analysis required.
- 2.2.13.14. Provide the independent evaluator (typically AFNWC) supporting information as required to evaluate design compliance with safety design criteria. This supporting information is usually provided in the form of a nuclear surety evaluation delivered by the Program Manager.
- 2.2.13.15. Review nuclear surety evaluations for compliance with all nuclear safety design certification requirements.

2.2.13.16. Identify, if required, the suspense time/date for safety design certification actions (normally identified in the Certification Requirements Plan developed in accordance with AFI 63-125).

2.2.13.17. Establish the Air Force Nuclear Surety Deviation Reporting Program.

2.2.13.18. Review/coordinate as appropriate and evaluate deviation requests, i.e., AF Form 116, *Request for Deviation from Security Criteria*, in accordance with **Chapter 8** of this instruction.

2.2.13.19. Review and coordinate on Nuclear Certification Impact Statements submitted by the program office(s).

2.2.13.20. Approve the nuclear safety certification annex(es) to the Certification Requirements Plan to ensure nuclear safety design certification requirements are adequately addressed.

2.2.13.21. Approve new or revised test and weapon maintenance procedures for nuclear weapons performed in Air Force facilities, as well as approve the performance of current procedures not currently approved for a given facility.

2.2.13.22. Conduct nuclear safety design certification of hardware, software, procedures, and facilities to be used with nuclear weapons.

2.2.13.23. Issue a nuclear safety design certification letter to the AFNWC upon completion of all nuclear safety design certification actions identified in the Certification Requirements Plan.

2.2.13.24. Identify nuclear safety design certified hardware and software items, and restrictions on usage, to AFNWC for listing in the Master Nuclear Certification List, located at <https://www.milnwc.kirtland.af.mil/MNCL/index.cfm>.

2.2.13.25. Rescind nuclear safety design certification of hardware, software, procedures, and facilities as appropriate.

2.2.13.26. Review high fidelity joint test assembly maintenance procedures performed in Air Force facilities.

2.3. Deputy Chief of Staff, Operations shall:

2.3.1. Coordinate with the Deputy Chief of Staff, Strategic Deterrence & Nuclear Integration to integrate strategic nuclear, non-strategic nuclear, conventional forces, and effects into operational strategies, concepts, policy and guidance, plans, and in compliance with all arms control treaties and agreements. **(T-1)**

2.3.2. Coordinate with the Deputy Chief of Staff, Strategic Deterrence & Nuclear Integration to ensure nuclear operations capabilities and effects are included in appropriate Concepts of Operations and reviewed and implemented through the Air Force Core Function Support Plans and Joint capabilities review processes. **(T-1)**

2.3.3. Ensure that treaties or international agreements do not contain provisions or are implemented in a manner to undermine the physical security of nuclear weapons under Air Force control. **(T-1)**

2.4. Deputy Chief of Staff, Strategic Deterrence & Nuclear Integration shall:

2.4.1. Ensure consistency of nuclear policy and guidance which impact people, organizations, processes, procedures, infrastructure, and systems that are used to train, plan, develop, test, acquire, support, maintain, execute, transport, inspect, and (when applicable) dispose of nuclear assets, operations, and forces across the Air Force and the nuclear mission. (T-1)

2.4.2. Assist the Administrative Assistant to the Secretary of the Air Force in developing guidance to manage, control, and classify information related to nuclear weapons and/or nuclear weapon delivery platforms. (T-1)

2.4.3. Provide procedures for the Nuclear Weapons Personnel Reliability Assurance Program. (T-1)

2.5. Deputy Chief of Staff, Logistics, Engineering and Force Protection shall:

2.5.1. Serve as the single point of contact for nuclear weapon and nuclear weapon system logistic matters. (T-1)

2.5.2. Develop and publish nuclear weapons and delivery systems maintenance and supply chain guidance. (T-1)

2.5.3. Include AFSEC/SEW on the distribution for the annual security deviation report to ensure the AF/SE has oversight of the overall AF Surety Program.

2.5.4. Appoint the Director of Civil Engineers as the single point of contact for nuclear weapon explosive ordnance disposal matters. (T-1)

2.5.5. Appoint the Director of Air Force Security Forces as the single point of contact for nuclear weapon and nuclear weapon system physical security guidance. (T-1) The Director of Air Force Security Forces shall:

2.5.5.1. Develop and publish guidance for the physical security of nuclear weapons and nuclear weapon systems. (T-1)

2.5.5.2. Evaluate nuclear weapon system designs for their impact on nuclear security in accordance with DoDS5210.41-M_AFMAN31-108, *Nuclear Weapon Security Manual*. (T-1)

2.6. The Nuclear Weapon System Surety Group:

2.6.1. Per DoDM 3150.02, the Nuclear Weapon System Surety Group reviews nuclear weapon system designs and operations to determine if they meet the DoD nuclear weapon system surety standards. It proposes safety rules and recommends changes to improve nuclear weapon system surety.

2.6.2. Specifically, the Nuclear Weapon System Surety Group shall:

2.6.2.1. Designate which nuclear weapon system components are critical and review those designated by the AF/SE. (T-1)

2.6.2.2. Designate which critical components require split-handling or split-knowledge procedures and review those designated by the AF/SE. (T-1)

2.6.2.3. Designate split-handling or split-knowledge procedures during the lifecycle of the critical component. (T-1)

2.6.2.4. Review and, if required, update weapon system safety rules. **(T-0)**

2.6.2.5. Recommend sealing requirements in operational nuclear weapon systems and propose specific weapon system safety rules in accordance with AFI 91-102. **(T-1)**

2.7. Program Executive Officers shall:

2.7.1. Acknowledge and identify risks in accordance with AFI 90-802, AFI 63-101/20-101, MIL-STD-882, and **paragraph 1.5** of this instruction. **(T-1)**

2.7.2. Ensure risk acceptance is properly approved and documented. **(T-1)**

2.7.3. Ensure all deviations are routed through the lead command prior to submitting the guidance to the OPR for technical review. **(T-1)**

2.7.4. Ensure deviations are reported to the lead command for inclusion in the annual deviation report. **(T-1)**

2.8. Program Managers:

2.8.1. Responsible for nuclear certified items shall manage the following responsibilities: **(T-1)**

2.8.1.1. Ensure nuclear capable/certified weapon systems and nuclear certified mission support items comply with established design requirements. **(T-1)**

2.8.1.2. Manage and document non-nuclear program risk in accordance with DoDI 5000.02, AFI 63-101/20-101, and MIL-STD-882. **(T-0)**

2.8.1.3. Manage/document nuclear program risk in accordance with this publication. **(T-1)**

2.8.2. Responsible for procuring or modifying a nuclear weapon system shall:

2.8.2.1. Field, sustain, and maintain configuration control of hardware and software to be nuclear safety design certified throughout their life-cycle. **(T-1)**

2.8.2.2. Evaluate all aspects of the proposed program(s) for potential nuclear weapons surety degradation. **(T-1)** This evaluation includes conditions that could violate AFMAN 91-118 or AFMAN 91-119 requirements, degrade safety and internal security features of the weapon system, or contribute to an AFI 91-106 scenario.

2.8.2.3. Comply with the nuclear safety design certification program in accordance with **Chapter 4** of this instruction. **(T-1)**

2.8.2.4. Perform unauthorized launch studies in accordance with AFI 91-106 with support from AFSEC/SEW. **(T-1)**

2.8.2.5. Support the tamper detection indicator development and evaluation process. **(T-1)**

2.8.2.6. Evaluate Air Force use of DOE-certified equipment with nuclear weapons to determine whether operating environments are consistent with the design environments and if any differences impact nuclear weapons surety. **(T-1)**

2.8.2.7. Review deficiencies (material deficiency reports, service bulletins, and nuclear safety deficiency reports) for possible impact on nuclear weapons surety or certification status and implement required corrective action. **(T-1)**

2.8.2.8. Ensure each nuclear surety procedure is individually marked with the nuclear surety procedures symbol to enable positive identification. **(T-1)** Apply special emphasis to the nuclear surety procedures to protect against degrading or rendering ineffective the critical nuclear safety features of the weapon system as determined by AFSEC/SEW or other appropriate technical engineering authority as determined by AFSEC/SEW. **(T-1)** With the exception of minor grammatical corrections, changes to nuclear surety procedures coded steps must be coordinated with AFSEC/SEW. **(T-1)**

2.8.2.9. Develop OPCERT and DECERT procedures. **(T-1)**

2.8.2.10. Assist the Program Executive Officer's compliance with established design requirements as identified by the lead command. **(T-1)** Report design requirement shortfalls to the lead command. **(T-1)**

2.8.2.11. Maintain archives of all pertinent documentation related to nuclear certification. **(T-1)** Documentation requirements are summarized in AFI 63-125, Chapter 6.

2.8.2.12. Notify AFSEC/SEW of weapon system modifications by submitting a Nuclear Certification Impact Statement to the AFNWC. The Nuclear Certification Impact Statement, in accordance with AFI 63-125, provides a functional description of the proposed new system or modification and includes the Program Manager's evaluation of its potential for nuclear certification impact. Further Nuclear Certification Impact Statement guidance is provided in AFI 63-125.

2.8.2.13. Recommend items for critical component status to AFSEC/SEW.

2.8.2.14. Recommend OPCERT and DECERT concepts and technical order procedures of critical components to AFSEC/SEW. Recommend decertification of critical components when the component is no longer part of an assembled nuclear weapon system.

2.8.2.15. Ensure that weapon systems and technical orders or other certified procedures for troubleshooting and maintaining loaded nuclear weapon systems adhere to safety criteria established by the DoD and Air Force, e.g., a combat delivery-capable platform with one or more nuclear weapons mechanically and electrically connected in a normal operational configuration. **(T-0)**

2.8.2.16. Maximize engineered-in weapon safety design features to minimize steps called out as nuclear surety procedures within technical orders/checklists.

2.9. MAJCOMs, Field Operating Agencies, and Direct Reporting Units Commanders, as appropriate:

2.9.1. Lead/using command commanders shall designate a representative to manage the nuclear certification program in accordance with AFI 63-125. **(T-1)**

2.9.2. Send all MAJCOM supplements affecting two-person concept during Prime Nuclear Airlift Force missions to AMC/A10NA, 402 Scott Drive Unit 3A1, Scott AFB, IL 62225-5301 or email to amc.a3na@us.af.mil.

2.9.3. At bases with units and personnel from two or more MAJCOMs, the host/gaining command will have responsibility for the MAJCOM responsibilities outlined in this chapter. Memorandums of Understanding/Memorandums of Agreement may be developed between MAJCOMs to delineate the actions required by each command to meet these responsibilities. MAJCOMs shall:

2.9.3.1. Recommend new uses for tamper detection indicators, and request approval from AFSEC/SEW. **(T-1)**

2.9.3.2. Ensure OPCERT of critical components before use and initiate DECERT when needed. **(T-1)**

2.9.3.3. Ensure units report deficiencies on certified items in accordance with AFMAN 91-221, *Weapons Safety Investigations and Reports*. **(T-1)**

2.9.3.4. Designate a Program Manager for the certification and configuration control of facilities (as defined in [paragraph 4.2.1.10](#) of this instruction) to include Facility Lifting and Suspension Systems. **(T-1)** Perform the following when serving as the Program Manager for facility certification:

2.9.3.4.1. Prepare a Nuclear Certification Impact Statement in accordance with AFI 63-125 for facility modifications to support the nuclear safety design certification process. **(T-1)** Additional information is available in [paragraph 4.4.2](#) of this instruction.

2.9.3.4.2. Develop the nuclear safety certification annex to the Certification Requirements Plan for each facility to be nuclear safety design certified in accordance with AFI 63-125. **(T-1)**

2.9.3.4.3. Evaluate nuclear weapons maintenance and storage facilities for compliance with nuclear weapons surety requirements and document results in a nuclear surety evaluation to support certification actions. **(T-1)**

2.9.3.4.4. Request, through the MAJCOM safety office, any required AFSEC/SEW assistance or augmentation for inspections, staff assistance efforts, or special interest evaluations relating to nuclear weapons surety at any level within the requesting command. The request will include a proposed schedule, locations to be visited, and scope of effort for AFSEC to determine team composition and level of support. The requesting MAJCOM is responsible for funding AFSEC support efforts.

2.9.3.4.5. Review deficiencies (materiel deficiency reports, service bulletins, and nuclear safety deficiency reports) for possible impact on facility certification status and implement required corrective action. **(T-1)**

2.9.4. Annually certify to the Chief of Staff of the Air Force, through AF/SE, as to the operational risk, compensatory measures, corrective actions, and resulting vulnerabilities created by surety deviations for facilities.

2.9.5. Review and approve the MAJCOM annual Nuclear Surety Deviation Report.

2.9.6. Serve as the operational risk acceptance authority for any deviation submitted for nuclear weapons systems and nuclear related facilities.

2.9.7. Work with the Program Executive Officer and/or Program Manager to evaluate operational risks of any deviation from nuclear safety design criteria and work with AFSEC on approval if warranted. (T-1)

2.9.8. Consult combatant commanders on all risk management decisions affecting the combat capability of allocated/assigned nuclear systems.

2.9.9. Implement a MAJCOM Nuclear Surety Deviation Reporting Program and designate an OPR.

2.9.10. Send data on proposed changes to nuclear weapon systems and non-combat delivery platforms to AFNWC and the appropriate program executive officer and Program Manager in accordance with AFI 63-125. (T-1)

2.9.11. Conduct nuclear surety inspections of nuclear-capable units in accordance with AFI 90-201, *The Air Force Inspection System*, and Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3263.05E, *Nuclear Weapons Technical Inspections*. (T-0)

2.9.12. Ensure new weapon system/facility developments and modifications to existing weapon systems/facilities comply with the minimum Air Force safety design and evaluation criteria specified in AFMAN 91-118 and AFMAN 91-119. (T-1)

2.9.13. Request any necessary deviations and provide supporting engineering analyses in accordance with [Chapter 8](#) of this instruction. (T-1)

2.9.14. Establish a Nuclear Surety Council in accordance with [paragraph 3.4.3](#) of this instruction. (T-1)

2.9.15. Establish training programs in accordance with [paragraph 3.6.2](#) of this instruction. (T-1)

2.9.16. Establish a tamper control program in accordance with [paragraph 3.7](#) of this instruction. (T-1)

2.10. MAJCOM Nuclear Surety Deviation Reporting Program OPR shall:

2.10.1. Maintain a log of draft and approved deviations and send copies of approved deviations to AFSEC/SEW.

2.10.2. Review the deviation request, compensatory measures, associated risks, and proposed corrective actions. Coordinate the request to the MAJCOM technical representative prior to submitting the deviation request to AFSEC for technical review.

2.10.3. Submit a MAJCOM commander approved annual Nuclear Surety Deviation Report, in accordance with [paragraph 8.8](#) of this instruction.

2.10.4. Brief all deviations to the Nuclear Surety Council annually.

2.11. Air Force Materiel Command Commander. In addition to the responsibilities listed in [paragraph 2.9](#), shall:

2.11.1. Serve as the Air Force focal point for the technical aspects of nuclear weapons surety.

2.11.2. Maintain a technology base to support development of Nuclear Safety Design and Evaluation Criteria. (T-1)

2.11.3. Evaluate the impact on nuclear safety of all designs, maintenance processes and practices, and modifications to nuclear weapons systems or components for which Air Force Materiel Command has program management responsibility. **(T-1)** This includes compliance with **Chapter 5** of this instruction, AFI 91-102, and DoDM 5030.55_AFMAN 63-103, *DoD Procedures for Joint DoD-Department of Energy/National Nuclear Security Administration (DOE/NNSA) Nuclear Weapon Life-Cycle Activities*.

2.11.4. Provide consultant and technical services to support the requirements of AFI 91-108. **(T-1)**

2.11.5. Review nuclear mishap reports pertaining to materiel or technical data deficiencies, take corrective action when appropriate, and provide reports and summaries in accordance with DAFI 91-204, *Safety Investigations and Reports*. **(T-1)**

2.11.6. Provide technical support for the Nuclear Weapon System Surety Group. **(T-1)**

2.11.7. Through the AFNWC Commander:

2.11.7.1. Manage the Air Force Nuclear Certification Program in accordance with AFI 63-125. **(T-1)**

2.11.7.2. Provide Nuclear Certification Program guidance to MAJCOMs/Product Centers/Air Logistics Complexes. **(T-1)**

2.11.7.3. Ensure product centers and air logistics complexes have policies and procedures in place to identify nuclear certified items, processes, and modifications and to assess modifications to determine if nuclear certification is required in accordance with AFI 63-125. **(T-1)**

2.11.7.4. Act as the single point of contact regarding AFMC-sourced independent review/evaluation/analysis support to AFSEC. **(T-1)**

2.11.7.5. Establish an independence program in accordance with **paragraph 3.8** of this instruction. **(T-1)**

2.11.7.6. Publish data on weapons maintenance, shipping, and storage configurations in the appropriate 11N-series technical orders and Explosive Ordnance Disposal Procedures in the 60-series technical orders (**Exception:** 11N-series and 60-series technical orders published through the Joint Nuclear Weapons Publications Systems are the responsibility of Air Force Global Strike Command, Nuclear Stockpile Division (AFGSC/A4Z)). **(T-1)**

2.11.7.7. Maintain an Engineering Liaison Office collocated with US Air Forces in Europe to:

2.11.7.7.1. Provide support for nuclear weapons surety programs for ally-operated nuclear weapon systems. **(T-1)**

2.11.7.7.2. Provide pertinent nuclear weapon system safety rules to allied nations. **(T-1)**

2.11.7.7.3. Ensure the design of ally-operated nuclear weapon systems meet Air Force nuclear certification criteria when allied nations have engineering responsibility. **(T-1)**

- 2.11.7.7.4. Provide engineering support for host nation support equipment, hardware, software, firmware, and procedures for nuclear safety design certification in accordance with **Chapter 4** of this instruction and AFI 91-102. **(T-1)**
- 2.11.7.8. Ensure tamper detection indicators and designated critical components are nuclear safety design certified in accordance with AFI 63-125, as appropriate. **(T-1)**
 - 2.11.7.8.1. Ensure Nuclear Certification Impact Statements affecting designated critical components and tamper detection indicators are coordinated with AFSEC/SEW to determine appropriate nuclear safety design certification requirements. **(T-1)**
 - 2.11.7.8.2. Ensure designated critical components are properly identified in the Master Nuclear Certification List. **(T-1)**

2.12. Air Force Global Strike Command Commander. In addition to the responsibilities listed in **paragraph 2.9**, shall through AFGSC/A4Z:

- 2.12.1. Publish data on weapons maintenance, shipping, and storage configurations in the appropriate 11N-series technical orders and Explosive Ordnance Disposal Procedures in the 60-series technical orders that are published through the Joint Nuclear Weapons Publications Systems. **(T-1)**
- 2.12.2. Provide the single point of contact within the Air Force for the management and coordination of nuclear weapon and associated equipment material defects and deficiency procedures as specified in Technical Order 11N-5-1, *Unsatisfactory Reports*. **(T-1)**
- 2.12.3. Ensure AFSEC/SEW is notified about weapon alterations, modifications, and nuclear weapon maintenance or test procedures not defined as a weapon alteration or modification (see **paragraph 4.10** of this instruction) that will be accomplished in Air Force facilities. **(T-1)**
- 2.12.4. Review nuclear mishap reports pertaining to materiel or technical data deficiencies, take corrective action when appropriate, and provide reports and summaries in accordance with DAFI 91-204. **(T-1)**

2.13. US Air Forces in Europe Commander. In addition to the responsibilities listed in **paragraph 2.9**, shall:

- 2.13.1. Assist allied personnel in the US Air Forces in Europe area of responsibility with setting up nuclear weapons surety programs for ally-operated nuclear weapon systems. **(T-1)**
- 2.13.2. Verify that allied personnel comply with the weapon system safety rules for ally-operated nuclear weapon systems. **(T-1)**
- 2.13.3. Verify that allied personnel accomplish time compliance technical orders applying to their nuclear support equipment and notify the time compliance technical orders issuing agency and AFSEC/SEW when time compliance technical orders do not apply. **(T-1)**
- 2.13.4. Verify, through the Air Force custodial unit, that allied combat delivery platforms meet approved standards for nuclear loading and delivery. **(T-1)**
- 2.13.5. Verify that units report and investigate nuclear mishaps involving US-owned, ally-operated nuclear weapon systems. **(T-1)**
- 2.13.6. Due to the unique mission and geographic separation between Munitions Squadrons /Munitions Support Squadrons and their parent wing(s), the US Air Forces in Europe

Maintenance Squadron/Munitions Support Squadron(s) and their parent wing(s) are permitted to assign responsibilities outlined in paragraphs 2.22 and 2.29 of this instruction to wing/base level Weapon Safety Managers or Unit Safety Representatives as is necessary to best meet nuclear weapons surety and safety requirements. Assignment of responsibilities will be outlined in writing to ensure all requirements are addressed, and procedures do not prevent commanders at any level from performing their program responsibilities. (T-1)

2.14. Air Education and Training Command Commander. The Air Education and Training Command commander's training and education role is vitally important to the Air Force Nuclear Weapons Surety Program's success, as it enables a successful nuclear surety culture across the nuclear mission. In addition to the applicable responsibilities listed in paragraph 2.9 of this instruction, the Air Education and Training Command commander shall:

2.14.1. Integrate, in coordination with impacted career field managers, nuclear weapons surety concepts and skills into technical training courses. (T-1)

2.14.1.1. Ensure nuclear weapons surety concepts and skills are included in technical training courses involving nuclear weapons, nuclear weapon systems, or critical components. (T-1)

2.14.1.2. Ensure nuclear weapons surety concepts and skills are included in technical/formal training courses when a significant percentage of students will perform in positions subject to the Personnel Reliability Assurance Program. (T-1)

2.14.1.3. Ensure that those technical training courses which include nuclear concepts and skills also include a presentation to promote understanding of unique cultural aspects within the nuclear mission. (T-1) Presentation topics should include: deterrence concepts and national strategy related to nuclear weapons; US nuclear force structure; definition and tenets of nuclear weapons surety; the Personnel Reliability Assurance Program; individual responsibilities and contributions to nuclear deterrence operations.

2.14.2. Develop and implement inspection standards for the Air Education and Training Command Nuclear Surety Program. (T-1)

2.15. Headquarters Air Force/Center Requirement Owners and MAJCOM Staff Agencies shall:

2.15.1. Review deviations (specific to design requests) to ensure adequate compensatory measures have been put into place and associated risks have been analyzed correctly.

2.15.2. Ensure deviations to publications submitted by wing/unit commanders have adequate compensatory measures and associated risks have been analyzed correctly.

2.15.3. Coordinate deviations affecting nuclear surety to publication outside of the 91-series (e.g., 11-series, 21-series, 33-series) through the MAJCOM Safety Directorate prior to approval.

2.16. MAJCOM Weapons Safety Office shall:

2.16.1. Serve as the MAJCOM OPR for nuclear weapons surety matters. (T-1)

2.16.2. Develop criteria for wing Nuclear Surety Councils. (T-1)

2.16.3. Advise the MAJCOM staff on nuclear weapons surety issues. (T-1)

- 2.16.4. Publish directives and supplements outlining MAJCOM-unique nuclear weapons surety requirements as appropriate. (T-1)
- 2.16.5. Provide MAJCOM inspection teams with requested information related to nuclear weapons surety matters. (T-1)
- 2.16.6. Review plans submitted for storage of conventional and nuclear weapons within the same facility. (T-1)
- 2.16.7. Ensure Weapon Safety Officers and Weapon Safety Managers are trained on MAJCOM-unique items and Nuclear Surety Program management within 90 days of assuming their positions. (T-1)
- 2.16.8. Distribute standardized nuclear weapons surety training lesson plans to applicable units. (T-1)
- 2.16.9. Approve units' additional instructional material or augmented nuclear weapons surety training lesson plans. (T-1)
- 2.16.10. Request new nuclear weapons surety test bank questions and/or testing materials from AFSEC/SEW if a test has been compromised or when otherwise deemed inadequate to support nuclear surety training and testing. (T-1)
- 2.16.11. Approve MAJCOM/Wing specific nuclear surety test questions submitted by/to units. (T-2)

2.17. Numbered Air Force Weapons Safety Managers shall:

- 2.17.1. Advise the Numbered Air Force Director of Safety and staff on nuclear weapons surety issues. (T-1)
- 2.17.2. If delegated by the MAJCOM, assume Weapon Safety Manager training responsibilities and conduct training in conjunction with staff assistance visits. (T-2)
- 2.17.3. Visit subordinate units as needed. (T-1)
- 2.17.4. Assist Numbered Air Force staff on Personnel Reliability Assurance Program issues. (T-1)
- 2.17.5. Review the adequacy and completeness of nuclear mishap reports. (T-1)
- 2.17.6. Review the adequacy and completeness of the corrective actions for nuclear weapons surety problems found during higher headquarters inspections or assistance visits. (T-1)
- 2.17.7. Review plans submitted for new or modified weapon storage facilities, areas, and sites and notify the MAJCOM and AFSEC/SEW. (T-1)

2.18. Joint Basing: Unless otherwise provided for in the Joint Basing Memorandum of Agreement, all applicable responsibilities prescribed in this instruction shall remain with the Joint Base Air Force commander exercising command and control over nuclear mission functions.

2.19. Commanders of Organizations Possessing Critical Components shall:

- 2.19.1. Implement split-handling and split-knowledge control procedures. (T-1)
- 2.19.2. OPCERT critical components in accordance with **Chapter 4** of this instruction and as required by approved technical order procedures. (T-1)

2.19.3. DECERT critical components in accordance with **Chapter 4** of this instruction and as required by approved technical order procedures. (T-1)

2.19.4. Control certified critical components in accordance with **Chapter 6** of this instruction. (T-0)

2.20. Wing/Installation Commanders shall:

2.20.1. Establish a Nuclear Surety Program and provide guidance to subordinate units. (T-1)

2.20.2. Submit requests for deviations, if applicable, through the Numbered Air Force to MAJCOM Nuclear Surety Deviation Reporting Program OPR. (T-1)

2.20.3. Perform all general duties in accordance with **paragraph 3.2** of this instruction. (T-1)

2.20.4. Ensure host and tenant unit(s) relationships are established and reflected in a host-tenant agreement(s) for nuclear weapons surety requirements in accordance with **paragraph 3.3** of this instruction. (T-1)

2.20.5. Establish a Nuclear Surety Council in accordance with **paragraph 3.4.1** and **paragraph 3.4.2** of this instruction. (T-1)

2.20.6. Follow all facility directives in accordance with **paragraph 3.5** of this instruction. (T-1)

2.20.7. Ensure training program directives are implemented in accordance with **paragraph 3.6.1** of this instruction. (T-1)

2.20.8. Ensure the Public Affairs office screens and releases mishap information to the public in accordance with DAFI 91-204. (T-2)

2.21. Air Force Reserve and Air National Guard Commanders will: In addition to the responsibilities in **paragraph 2.20**, if tasked to source nuclear tasked units or personnel, provide headquarters and unit-level OPRs to coordinate and assist the gaining MAJCOM/wing with the duties and responsibilities outlined in this instruction. (T-1)

2.22. Wing/Base Level Weapon Safety Managers: These individuals must be cleared to have access to restricted data/formerly restricted data and be read into critical nuclear weapons design information if applicable. (T-2) Weapon Safety Managers shall:

2.22.1. Review all locally developed checklists, instructions, operating procedures, plans, training, and programs impacting nuclear surety. (T-1) For locally developed workcards, checklists, job guides, and page supplements for nuclear weapons follow guidance in Technical Order 00-5-1, *AF Technical Order System*.

2.22.2. Ensure adequacy of corrective actions for nuclear weapons surety findings and critical/substantive deficiencies identified against the weapons safety office during higher headquarters inspections, Nuclear Surety Staff Assistance Visits, and Weapon Safety Manager inspections. (T-2)

2.22.3. Conduct and/or assist in nuclear safety reporting as prescribed in DAFI 91-204 and AFMAN 91-221 to include safety reporting of nuclear certified equipment located in both nuclear and non-nuclear units. (T-2)

2.22.4. Review and disseminate information from nuclear mishap and deficiency reports. (T-2)

2.22.5. Keep the commander, staff, and supervisors informed of issues and changes in the Nuclear Surety Program. (T-2)

2.22.6. Verify supervisors only allow the use of authorized or certified equipment and only allow the use of Air Force-approved technical orders, checklists, or procedures during nuclear operations. (T-2)

2.22.7. Participate in the preparation of Safe Haven and Prime Nuclear Airlift Force mission support plans. (T-1)

2.22.8. Perform inspections of areas involved with nuclear weapons surety and emphasize nuclear surety culture in accordance with AFI 91-202, *The US Air Force Mishap Prevention Program*. (T-2)

2.22.9. Develop localized specific training, as applicable, and incorporate into the standardized nuclear weapons surety training lesson plan. (T-2) Additional training should be inserted into the appropriate section to ensure proper flow of lesson objectives. Specific training above the mandatory requirements may be added at the end of the lesson plan. (T-1) Spot checks of training sessions shall be performed periodically in accordance with AFI 91-202. (T-2)

2.22.10. Review and coordinate site plans for new or modified nuclear facilities in accordance with Defense Explosives Safety Regulation (DESR) 6055.09_AFMAN 91-201, *Explosives Safety Standards*. (T-1)

2.22.11. Ensure nuclear weapons surety training for senior staff (as designated by the wing commander) and Unit Safety Representatives assigned to a unit with a nuclear mission is accomplished and documented. (T-1) Wing/base-level Weapon Safety Managers are authorized to delegate the teaching of nuclear weapons surety training to other wing/base agencies whose mission scope normally includes nuclear weapons surety training.

2.22.12. Ensure currency/completeness of electromagnetic radiation surveys in accordance with AFI 91-208, *Hazards of Electromagnetic Radiation to Ordnance (HERO) Certification and Management*. (T-1)

2.22.13. Ensure compliance with the two-person concept, in accordance with [Chapter 5](#) of this instruction. (T-1)

2.22.14. Ensure compliance with safety requirements/precautions specified in pertinent directives in the areas of weapons handling, assembly, maintenance, storage operations, and logistics movements. (T-1)

2.22.15. Ensure compliance with weapons system safety rules and safety practices. (T-1)

2.22.16. Ensure nuclear certified equipment monitors are thoroughly trained in accordance with AFI 63-125 to identify nuclear certified equipment within the unit; use the Master Nuclear Certification List to identify and report deficiencies in accordance with AFMAN 91-221. (T-1)

2.23. Maintenance Squadron Commander. In addition to the duties in [paragraph 2.28](#), shall:

2.23.1. Ensure, in accordance with [paragraph 5.6](#) of this instruction, maintenance personnel, aircrews, missile combat crews, and other involved personnel are trained to recognize distinctive markings or unique identifiers on malleable seals and to identify singularly unique wing identifiers or serial numbers, as well as a color control system on self-locking, non-reversible seals. **(T-1)**

2.23.2. Ensure, in accordance with [paragraph 5.6.2](#) of this instruction, sealing procedures are followed.

2.24. Force Support Squadron Commander. In addition to the duties in [paragraph 2.28](#), shall ensure Force Support Squadron staff provide guidance and monitor the Personnel Reliability Assurance Program for installations without a nuclear mission in accordance with DoDM 5210.42_AFMAN 13-501, *Nuclear Weapons Personnel Reliability Program (PRP)*. **(T-0)** The Personnel Reliability Assurance Program for installations with a nuclear mission are guided and monitored through the wing staff agency, directly reporting to the Wing commander.

2.25. Medical Treatment Facility Commander. In addition to the duties in [paragraph 2.28](#), shall ensure the medical treatment facility complies with all medical and dental Personnel Reliability Assurance Program requirements in accordance with DoDM 5210.42_AFMAN 13-501 and AFI 31-117, *Arming and Use of Force by Air Force Personnel*. **(T-0)**

2.26. Civil Engineer Commander. In addition to the duties in [paragraph 2.28](#), shall:

2.26.1. Ensure fire protection personnel are trained to fight fires involving nuclear weapons. **(T-1)**

2.26.2. Conduct timely inspections, maintenance, and repair of facilities and real property installed equipment used to secure and maintain nuclear weapons. **(T-1)**

2.26.3. Coordinate plans for building or modifying nuclear weapon facilities with the Weapon Safety Manager, Security Forces commander, and the affected unit to ensure proposed changes comply with [Chapter 5](#) of this instruction, AFI 63-125 and AFMAN 91-118. **(T-1)**

2.26.4. Establish a nuclear accident and incident response organization in accordance with AFI 10-2501, *Emergency Management Program*. **(T-1)** **Note:** Ensure that during exercises, personnel do not wear complete chemical ensembles when handling war reserve nuclear weapons (e.g., remove the gas mask to aid in personal identification and gloves to ensure weapons are not inadvertently damaged). **(T-1)**

2.26.5. Develop and annually route through the Wing Weapon Safety Office pre-fire plans and firefighting checklists for all areas and locations where nuclear weapons or nuclear weapon systems are present. **(T-1)**

2.26.6. Ensure the assigned or host base Emergency Operations Center personnel develop nuclear accident and incident response procedures including emergency management plans, and ensure disaster response force members and initial response element training is accomplished in accordance with AFI 10-2501. **(T-1)**

2.26.7. Ensure Explosive Ordnance Disposal (EOD) personnel develop nuclear accident and incident response procedures, maintain training on weapons in Air Force custody, and maintain task certification for supported weapons systems/platforms in the active inventory. **(T-1)** Training and certification requirements are detailed in AFMAN 32-3001, *Explosive Ordnance Disposal (EOD) Program*.

2.26.8. Assist response force members in the development of checklists and advise on training and equipping personnel to respond to nuclear accidents and incidents. (T-1)

2.26.9. Perform required inspection, test, and maintenance of facilities and real property classified as nuclear certified equipment used with nuclear weapons. (T-1)

2.26.10. Provide firefighting, medical, public affairs, and logistics support. (T-1)

2.27. Security Forces Commander. In addition to the duties in [paragraph 2.28](#), shall:

2.27.1. Ensure, in coordination with Wing Weapon Safety Manager, applicable locally developed unit security policies, procedures, and directives comply with nuclear weapons surety requirements, weapon system safety rules, support of Safe Haven requirements, and diversions of nuclear-laden aircraft. (T-1)

2.27.2. Ensure the Safe Haven plan includes the following responsibilities:

2.27.2.1. Park vehicles afforded Safe Haven in a secure and lighted area. (T-1)

2.27.2.2. Temporary physical security if DOE couriers are disabled or request security assistance. (T-0)

2.27.2.3. When appropriate, command and control if an accident involving the shipment occurs on the installation. (T-1)

2.27.2.4. Provide notification to Munitions Accountable Systems Officer of Safe Haven. (T-1)

2.27.3. Evaluate, in conjunction with munitions personnel, logistical plans for the movement of nuclear cargo during the overall review of plans for nuclear weapon sites. (T-1)

2.27.4. Support Personnel Reliability Assurance Program investigation requirements. (T-1)

2.27.5. Ensure physical security and facility security software updates and upgrades are coordinated through the Weapon Safety Manager. (T-1)

2.27.6. Ensure subordinate security forces functional guidance complies with nuclear weapons surety requirements. (T-1)

2.27.7. In conjunction with applicable munitions/maintenance and EOD personnel, review the plans for any movement of nuclear cargo, in accordance with AFMAN 21-203, *Nuclear Accountability Procedures*, and AFMAN 13-526, *Nuclear Airlift Operations*. (T-1)

2.28. Unit/Squadron Commanders shall:

2.28.1. Provide leadership emphasis on nuclear surety culture and enforce Nuclear Surety Program requirements. (T-1)

2.28.2. Correct nuclear weapons surety findings and deficiencies identified during nuclear surety inspections. (T-1)

2.28.3. Perform Personnel Reliability Assurance Program responsibilities in accordance with DoDM 5210.42_AFMAN 13-501 and AFI 31-117. (T-0)

2.28.4. Appoint primary and alternate Unit Safety Representatives to serve as liaison to the wing Weapons Safety Office. (T-2)

2.28.5. Ensure transportation or contractor personnel notify the unit/squadron Weapon Safety Manager if a possible nuclear safety deficiency exists on nuclear certified equipment. **(T-1)**

2.29. Unit Safety Representatives shall:

2.29.1. Perform nuclear surety spot inspections in accordance with AFI 91-202 and emphasize nuclear surety culture. **(T-2)**

2.29.2. Ensure initial and recurring nuclear weapons surety training is documented for unit individuals. **(T-1)**

2.29.3. Coordinate with the Weapon Safety Manager on all matters concerning nuclear weapons surety. **(T-2)**

2.29.4. Use nuclear weapons surety cross-feed reports for unit mishap prevention. **(T-2)**

2.29.5. Contact the Weapon Safety Manager for training after being appointed a Unit Safety Representative in accordance with AFI 91-202. **(T-2)**

2.29.6. Ensure locally developed unit checklists, instructions, operating procedures, and plans that impact nuclear surety are coordinated through the Weapon Safety Manager. **(T-2)**

2.30. Wing Commanders Without a Nuclear Mission shall: Establish a process for their units to inform them on nuclear weapons surety issues, including nuclear certified equipment. **(T-2)** For information on nuclear flagwords (e.g., DULL SWORD, BROKEN ARROW) refer to AFMAN 91-221.

2.31. Supervisors shall:

2.31.1. Emphasize nuclear surety culture and ensure personnel are properly trained and certified before starting nuclear operations. **(T-1)**

2.31.2. Ensure no-lone zone programs are implemented in accordance with [paragraph 3.9](#) of this instruction. **(T-1)**

2.31.3. Emphasize reporting of all nuclear deficiencies. **(T-1)**

2.31.4. Inform personnel of all changes to the Nuclear Surety Program. **(T-1)**

2.31.5. Perform Personnel Reliability Assurance Program responsibilities in accordance with DoDM 5210.42_AFMAN 13-501 and AFI 31-117. **(T-0)**

2.31.6. Ensure personnel use only authorized and certified equipment prior to operations involving nuclear weapons and or nuclear weapon systems in accordance with AFI 63-125. **(T-1)**

2.31.7. Ensure personnel use only Air Force-approved technical orders, checklists, and procedures during nuclear operations. **(T-1)**

2.32. Individuals shall:

2.32.1. Promote nuclear surety culture and inform supervisors if they are not qualified to perform a particular task. **(T-1)**

2.32.2. Report nuclear safety hazards/deficiencies or security problems to supervisors and Unit Safety Representatives. **(T-1)**

2.32.3. Comply with the two-person concept. **(T-1)**

2.32.4. Immediately identify unreliable personnel to their supervisor, certifying official, or commander. **(T-1)**

2.32.5. Report information which could affect their own ability or reliability to perform a task due to medical or other problems. **(T-1)**

Chapter 3

AIR FORCE INSTALLATION LEVEL NUCLEAR SURETY PROGRAM

3.1. Purpose. The purpose of an installation level nuclear weapons surety program is to maximize nuclear surety, consistent with operational requirements, in support of this instruction. This chapter details directive guidance and procedures necessary to execute the various pieces of this program. This document serves as the parent document to the 91-1XX publications stated in [paragraph 1.1.2](#) and is to be used in conjunction to those documents.

3.2. General Duties.

3.2.1. Support the Nuclear Weapon System Surety Group in accordance with AFI 91-102.

3.2.2. Implement the Personnel Reliability Assurance Program responsibilities in accordance with DoDM 5210.42_AFMAN 13-501 and AFI 31-117. **(T-0)**

3.2.3. Ensure applicable nuclear surety topics are included in training directives and programs for assigned personnel, including an annual review of the Weapon System Safety Rules for their specific weapon system(s).

3.2.4. Comply with guidance and procedures for maintenance, personnel certification, logistics movement, and accountability procedures for nuclear weapons in accordance with applicable AFI 21-series publications.

3.2.5. Enable immediate implementation of MAJCOM approved compensatory measures upon identification of a nuclear weapon surety deficiency. **(T-1)** Corrective action should be pursued and implemented by the operational risk acceptance authority until the deficiency is corrected or no longer required. If the deficiency cannot be corrected within 90 days, a deviation request shall be immediately submitted to the MAJCOM commander for approval, in accordance with [Chapter 8](#) of this instruction. **(T-1)**

3.2.6. Promote senior leader emphasis on nuclear surety culture, enforce compliance with nuclear weapons surety requirements, and mishap prevention.

3.2.7. Identify, investigate, correct, and report nuclear weapons surety deficiencies.

3.2.8. Establish reviews of nuclear surety plans and procedures by affected agencies before implementation.

3.2.9. Establish a nuclear weapons surety awards program to recognize deserving individuals and provide incentive for integrating nuclear surety culture and practices into daily activities. Nomination procedures and selection criteria for nuclear weapons surety awards can be found in AFMAN 36-2806, *Awards and Memorialization Program*.

3.2.10. Establish plans and procedures to support Safe Haven requirements as outlined in DoDS5210.41-M_AFMAN31-108, DAFI 31-101, *Integrated Defense (ID)*, and Technical Order 11N-45-51, *Transportation of Nuclear Weapons Materials*.

3.2.11. Develop emergency management plans to address nuclear accidents and incidents in accordance with AFI 10-2501.

3.3. Host Tenant Agreements.

3.3.1. Per [paragraph 2.20.4](#), host-tenant agreement(s), specify the support required to implement an effective Nuclear Surety Program. As a minimum, the host-tenant agreement must include the following areas:

- 3.3.1.1. Nuclear Surety Program management. **(T-1)**
- 3.3.1.2. Inspections (e.g., nuclear weapons surety, 12-month, spot). **(T-1)**
- 3.3.1.3. Personnel Reliability Assurance Program. **(T-1)**
- 3.3.1.4. Review of local procedures in support of weapon system safety rules. **(T-1)**
- 3.3.1.5. Mishap investigations, boards, and reporting responsibilities. **(T-1)**
- 3.3.1.6. Major accident response procedures. **(T-1)**

3.3.2. Submit in writing, those areas where a host-tenant agreement cannot be reached, to the appropriate MAJCOM(s) for resolution. **(T-1)** Refer to AFI 25-201, *Intra-Service, Intra-Agency, and Inter-Agency Support Agreements Procedures*, for implementation of host-tenant agreement(s).

3.4. Nuclear Surety Council.

3.4.1. As a minimum, Wings/Installations with a nuclear mission shall:

3.4.1.1. Establish a Nuclear Surety Council to examine and resolve problems affecting the successful execution of the organization's nuclear weapon program. The Nuclear Surety Council will act as a review board to assist the commander in ensuring all facets of the nuclear weapons surety program function in an effective manner. The wing/group commander or the deputy wing/group commander will chair the Nuclear Surety Council. **(T-2)**

3.4.1.2. Include all members who are Personnel Reliability Assurance Program certifying officials or their alternate, the installation Personnel Reliability Assurance Program Monitor, and advisors and functional experts who support the Nuclear Surety Program. **(T-2)**

3.4.1.3. Monitor wing Nuclear Surety Program. **(T-2)**

3.4.1.4. Include a review of wing nuclear weapons surety deviations. **(T-2)**

3.4.2. Wings/Installations without a nuclear mission may establish an alternative process to inform local commanders as needed on nuclear surety issues, including those pertaining to nuclear certified equipment.

3.4.3. MAJCOMs shall:

3.4.3.1. Establish a Nuclear Surety Council to advise the MAJCOM staff on nuclear surety matters. **(T-2)**

3.4.3.2. Appoint the MAJCOM commander or deputy commander to chair the council, unless otherwise delegated, and establish the frequency in which MAJCOMs Nuclear Surety Council shall meet, not less than semi-annually. **(T-2)**

3.4.4. As requested, host or tenant units will attend Nuclear Surety Councils. **(T-2)**

3.5. Facility Programs. Wings/Installations shall:

3.5.1. Establish procedures to provide the immediate storage, when appropriate, of nuclear and conventional munitions within a facility for 72 hours in the event of fire, flood, or natural disaster, or if the nuclear storage facility can no longer be secured. **(T-2)** DESR 6055.09_AFMAN 91-201 and Technical Order 11N-20-7, *Nuclear Safety Criteria*, contain specific guidance. Reference DESR 6055.09_AFMAN 91-201 when storing conventional munitions inside a hardened aircraft shelter with a weapon storage and security system vault. Initiate PINNACLE EMERGENCY EVACUATION (OPREP-3PEV) procedures prescribed in AFMAN 10-206, *Operational Reporting (OPREP)*, while nuclear weapons are in transit. Storage for more than 72 hours requires MAJCOM commander approval. **(T-1)**

3.5.2. Establish procedures to ensure nuclear weapons and conventional munitions are NOT stored together, except as part of flightline or protective aircraft shelter operations conducted in accordance with weapons system safety rules. **(T-1)**

3.5.3. Establish procedures to ensure AF/SE approval for storage of nuclear and conventional munitions within a facility for more than 90 days. At a minimum, the approval request shall include a management action plan containing the reason for the request, risk assessment, any corrective action and expected duration of the use of the facility. MAJCOM and wing commanders must review, at least once every three months, the progress of the management action plan and provide an update to AFSEC/SEW on behalf of the AF/SE. The AF/SE rescinds approval once the management action plan has been completed to the satisfaction of the MAJCOM and wing commanders. **(T-1)** **Note:** Storing nuclear weapons in one facility and conventional munitions in another facility within the same weapon storage area is not considered simultaneous presence and does not require MAJCOM approval. Conventional munitions inherently part of a nuclear weapon system and/or nuclear weapon component (e.g., forward shroud, forward section, electrical explosive devices, and limited life components) located in the same assembly, surveillance, and inspection/maintenance and inspection, vault or storage facility are not considered simultaneous presence. Examples of conventional munitions include MK82, MK84, and Massive Ordnance Penetrator.

3.5.4. Establish procedures to prohibit direct over flight, in airspace controlled by the base, of weapon storage area, weapon movements, nuclear-loaded aircraft, and aircraft shelters with nuclear weapons inside. Over flight of aircraft shelters where the weapons inside are secured in a weapons storage and security system vault is permitted. **(T-1)**

3.5.5. Establish procedures to prohibit direct over flight of Prime Nuclear Airlift Force aircraft during ground operations within the airspace controlled by the base and ensure aircraft with forward firing ordnance, to the maximum extent possible, will not sweep across or be parked pointed toward Prime Nuclear Airlift Force flightline operations or active convoy routes. **(T-1)**

3.5.6. Establish procedures and plans to direct personnel to cease all weapon operations and take appropriate safety precautions (e.g., personnel evacuation, termination of weapons operations, equipment shut down) when lightning is within 10 miles or if there are indications of a possible strike and weapons operations are not within a facility protected by an operational Lightning Protection System. **(T-1)** Operations may resume when electrical storms are beyond 10 miles or if a Lightning Warning System sensors show positive indications that hazards from lightning have passed. If the Lightning Warning System cannot provide information to

determine local lightning conditions, operations will not resume until 30 minutes after the last indication of lightning within 5 miles. **(T-1)**

3.6. Training Programs.

3.6.1. Wings/Installations shall:

3.6.1.1. Establish procedures to ensure individuals assigned to nuclear safety positions are trained in accordance with their role in nuclear surety. Nuclear safety position, in this context, refers to any position having a role in a safety-related activity with respect to nuclear weapons. **(T-1)**

3.6.1.2. Establish procedures to ensure Weapon Safety Managers in both nuclear and non-nuclear units are trained, knowledgeable, and qualified. **(T-2)**

3.6.1.3. Establish procedures to ensure full-time Weapon Safety Managers are not assigned additional tasks which detract from their primary safety duties. **(T-2)**

3.6.2. MAJCOMs, Field Operating Agencies, and Direct Reporting Units, as appropriate, shall:

3.6.2.1. Establish a program to ensure personnel are trained and certified on the following functional tasks as applicable:

3.6.2.1.1. Nuclear weapons maintenance, mate/demate, handling, and final assembly checkouts. **(T-1)**

3.6.2.1.2. Loading and unloading of nuclear weapons for transport and delivery platforms. **(T-1)**

3.6.2.1.3. Explosive Ordnance Disposal component diagnosis and recovery procedures. **(T-1)**

3.6.2.1.4. Weapon convoys. **(T-1)**

3.6.2.2. Establish a program to ensure personnel are trained on the following functional tasks, nuclear weapons surety concepts, and support programs as applicable:

3.6.2.2.1. Security procedures. **(T-1)**

3.6.2.2.2. Custody procedures. **(T-1)**

3.6.2.2.3. Operational control. **(T-1)**

3.6.2.2.4. Nuclear certified equipment tracking procedures and deficiency reporting procedures at both nuclear and non-nuclear units. **(T-1)**

3.6.2.2.5. Flag word reporting at both nuclear and non-nuclear units. **(T-1)**

3.6.2.2.6. Nuclear surety procedures. **(T-1)**

3.6.2.3. Establish procedures to ensure individuals receive instructor-led initial nuclear weapons surety training and instructor-led 15-month recurring nuclear weapons surety training before they work with nuclear weapons, nuclear weapons systems, certified critical components, perform nuclear-related duties, control entry into no-lone zones, perform duties as a Personnel Reliability Assurance Program certifying official, or perform nuclear-related duties at Prime Nuclear Airlift Force routine divert locations. **(T-1)** Individuals

must complete a closed-book test with a minimum passing score of 80 percent. (T-1) Tests will be randomly built from an AFSEC validated test bank using at least two test questions for each mandatory topic for a minimum of 20 questions per test. (T-1) MAJCOM unique questions may be added in accordance with paragraphs 2.16.9, 2.16.11, 2.22.9, and 3.6.2.3.11 of this instruction. A test score of less than 80 percent requires remedial training and retesting with a different test before that person may perform nuclear-related duties. (T-1) Training/testing will include, at a minimum, the standardized nuclear weapons surety lesson plan and testing materials below. (T-1) Nuclear surety culture will be emphasized during initial and recurring nuclear weapons surety training. Document initial and 15-month recurring nuclear weapons surety training. (T-1) Initial and recurring training will include the following mandatory topics:

3.6.2.3.1. Importance of, and need for, a US nuclear capability. (T-1)

3.6.2.3.2. Nuclear mishap prevention responsibilities of those personnel who work with nuclear weapons and components. (T-1)

3.6.2.3.3. Possible adverse impact on US nuclear capability in the event of a serious nuclear mishap. (T-0)

3.6.2.3.4. Security requirements. (T-1)

3.6.2.3.5. Two-person concept, sole vouching authority, and associated requirements and procedures. (T-1)

3.6.2.3.6. Personnel Reliability Assurance Program requirements in accordance with DoDM 5210.42_AFMAN 13-501 and AFI 31-117. (T-0)

3.6.2.3.7. Mishap and hazard reporting. (T-1)

3.6.2.3.8. Use of Master Nuclear Certification List as the sole source for verifying the certification status of nuclear certified weapon systems, hardware, support equipment, and facilities. (T-1)

3.6.2.3.9. Intrinsic radiation and the “As Low As Reasonably Achievable” principle. (T-1)

3.6.2.3.10. Weapon system safety rules. (T-1)

3.6.2.3.11. Unique topics commensurate with the unit’s nuclear duties will also be trained (i.e., Safe Haven procedures, sealing of nuclear components, local situations increasing the risk of nuclear mishaps). (T-1)

3.7. Tamper Control and Detection Programs. MAJCOMs, Field Operating Agencies, and Direct Reporting Units, as appropriate shall:

3.7.1. Develop and publish field publications, as needed, to implement and enforce the Air Force Nuclear Surety Tamper Control and Detection Programs. (T-1)

3.7.2. Develop and distribute procedures for sealing, where appropriate. At a minimum, the procedural publication shall:

3.7.2.1. State when, and by whom, seals can be applied and removed. (T-1)

3.7.2.2. Establish controls for the handling, receipt, storage, issue, inventory, and disposal of tamper detection indicators (including all residue), controlled dies, and self-locking, non-reversible seals (e.g., roto-seals). **(T-1)**

3.7.2.3. Establish procedures to ensure that tamper detection indicators, controlled dies and self-locking, non-reversible seals are stored and accounted for by individuals not responsible for their installation. **(T-1)**

3.7.2.4. Establish procedures to ensure personnel comply with Tamper Detection Program requirements in accordance with **Chapter 5** of this instruction.

3.7.2.5. Establish procedures to accomplish periodic inspections of seals on nuclear weapon-loaded aircraft, missile systems, and certified critical components in storage or transport. **(T-1)**

3.7.2.6. Establish procedures to ensure that only two-person concept teams install seals and verify they remain intact. **(T-1)**

3.8. Independence Programs.

3.8.1. Provide independent nuclear weapons surety review/evaluation/analysis.

3.8.2. Retain the capability to provide independent nuclear weapons surety review, evaluation, and analysis to support nuclear safety design certification as required by AFSEC in accordance with **Chapter 4** of this instruction, AFI 91-102, and AFI 63-125.

3.8.3. Establish procedures to perform independent reviews, evaluations, analyses, assessments, etc. when formally requested by AFSEC/SEW.

3.8.4. Ensure the AFNWC organization tasked to perform the independent analysis does not have direct responsibility for designing, developing, producing, maintaining, operating or providing logistics for the weapon system/item under review.

3.8.5. Notify AFSEC/SEW which organization within the AFNWC has been designated as the independent review/evaluation/analysis organization.

3.8.6. Notify AFSEC/SEW if the AFNWC is unable to ensure independence in performing the required safety review/evaluation/analysis.

3.8.7. Coordinate all required technical assistance to properly assess compliance with applicable nuclear safety design certification criteria.

3.8.8. Establish procedures to reply to AFSEC/SEW requests for independent review/evaluation/analysis within the suspense time/date.

3.9. No-Lone Zone Programs. Procedures shall be established by supervisors to:

3.9.1. Ensure all personnel entering a no-lone zone receive a pre-task/safety brief or visitors brief including nuclear weapons surety prior to entering. **(T-1)**

3.9.2. Ensure the pre-task safety brief includes as a minimum an outline of the operation, identification of applicable no-lone zones, location of war reserve weapons and/or critical components within the no-lone zone, intrinsic radiation procedures, applicable safety, emergency procedures and two-person concept. **(T-1)**

3.9.3. Ensure visitor briefs are tailored to personnel being allowed access to the no-lone zone and the area being visited. The briefing must include applicable safety precautions, escort requirements, and specific actions to be taken in the event of an emergency at a minimum. (T-1)

Chapter 4

AIR FORCE NUCLEAR SAFETY DESIGN CERTIFICATION PROGRAM

4.1. Overview. The Air Force Nuclear Certification Program has two major elements: design certification and operational certification. Design certification has four components, one being nuclear safety design certification. The design certification process evaluates hardware, software, procedures, and facilities against specific nuclear safety criteria before use with nuclear weapons to prevent nuclear weapon accidents and incidents.

4.1.1. One of the goals of the safety design requirements is to ensure that the DOE-certified safety probabilities remain valid; unintentional significant nuclear yield numerical requirements are located in AFMAN 91-118. See AFI 63-125 for complete details of the Air Force Nuclear Certification Program. This document serves as the parent document to the 91-1XX publications stated in [paragraph 1.1.2](#) and is to be used in conjunction to those documents.

4.1.2. The Air Force Nuclear Safety Design Certification program promotes maximum integration of nuclear surety into Air Force nuclear weapon system designs. All new nuclear weapon systems and nuclear certified equipment, and existing nuclear weapon systems and nuclear certified equipment that undergo modification, are subject to safety design criteria and Air Force policies (91-series publications) as documented in a fully coordinated and approved Certification Requirements Plan for the specific scope of effort under development, modification, and review.

4.2. Items That Require Nuclear Safety Design Certification.

4.2.1. The following operational hardware and software items require certification:

4.2.1.1. Combat and non-combat delivery platforms as defined in [Attachment 1](#) of this instruction.

4.2.1.2. Operational and support equipment used to move, support, store, handle, load and unload, or mate and demate nuclear weapons.

4.2.1.3. All hardware and software components that directly interface (electrically or physically) with a nuclear weapon or critical component.

4.2.1.4. Items that, if failed or operated incorrectly, could degrade the operator's ability to monitor the status of the nuclear weapon or weapon system critical components.

4.2.1.5. Items that, if failed or operated incorrectly, could degrade the operator's ability to command the weapon to a safe state.

4.2.1.6. Hardware and software items designated as critical components in accordance with [Chapter 6](#) of this instruction.

4.2.1.7. All hardware or software used to directly control critical functions or signals, as defined in AFMAN 91-118 and AFMAN 91-119.

4.2.1.8. Tamper detection indicators used to maintain the OPCERT status of critical components and protection of secure nuclear command and control codes and coded components.

4.2.1.9. Operational and maintenance hardware and software used to command and control critical functions or signals and perform status reporting as required in AFMAN 91-118 and AFMAN 91-119.

4.2.1.10. Nuclear Weapons Maintenance and Storage Facilities. Nuclear safety design certification of facilities will be based on the design and evaluation of essential facility systems, in accordance with AFMAN 91-118 and AFMAN 91-119.

4.2.1.11. Modifications to non-specialized equipment that could impact the item's primary structure, electrical and hydraulic power systems, load-bearing capacity, steering and braking capability, software, or positive control features, as well as any changes resulting in noncompliance with specific AFMAN 91-118 design criteria.

4.2.1.12. Test equipment that:

4.2.1.12.1. Verifies the proper operation of circuits and functions of the unit under test that perform critical functions (defined in AFMAN 91-118).

4.2.1.12.2. Interfaces directly with a nuclear weapon or operationally certified critical component.

4.2.1.12.3. Is used to operationally certify, decertify, or verify proper operation of applicable items identified in [paragraph 4.2.1](#) of this instruction, and all subparagraphs thereof.

4.2.1.12.4. Is used in special test or maintenance programs to identify system anomalies or failures.

4.2.2. Procedures. Nuclear weapon system technical order procedures involving OPCERT or DECERT. Other nuclear weapon or nuclear weapon system technical order procedures are certified in accordance with AFI 63-125.

4.2.3. Other. When items do not clearly fall into any of the categories identified, AFSEC/SEW is the authority for determining if nuclear safety design certification is required.

4.3. Items That Do Not Require Nuclear Safety Design Certification.

4.3.1. For a list of items that may be administratively certified such as non-specialized commercial off-the-shelf equipment and DOE or other agency items, refer to AFMAN 91-118 for hardware and AFMAN 91-119 for software.

4.3.2. For a list of common items and other items that do not require certification, refer to AFMAN 91-118 for hardware and AFMAN 91-119 for software.

4.3.3. For guidance on modifications to administratively certified non-specialized equipment, refer to AFMAN 91-118.

4.4. Nuclear Safety Design Certification Process for Materiel. Use the following paragraphs in conjunction with AFI 63-125 to determine the steps and timelines for the nuclear safety design certification process.

4.4.1. The operational MAJCOM or Program Manager identifies items that may require nuclear safety design certification according to [paragraph 4.2](#) of this instruction. (T-1)

4.4.1.1. The Program Manager must maintain configuration control of identified hardware, software, and facilities to be nuclear safety design certified throughout their life-cycles. **(T-1)**

4.4.1.2. For facilities, the lead or using command performs the role of the Program Manager for the certification process. **(T-1)**

4.4.1.3. For host nation owned nuclear weapon systems, the host nation functions similar to a Program Manager in coordination with the AFNWC.

4.4.2. For new weapon systems or weapon system modifications, the Program Manager or MAJCOM prepares a Nuclear Certification Impact Statement in accordance with AFI 63-125. The Nuclear Certification Impact Statement must address those items that require certification and recommend a certification approach for verifying compliance with this publication, AFI 91-106, AFMAN 91-118 and AFMAN 91-119.

4.4.3. As the development or modification effort nears completion (as determined by achieving a stable design basis, typically prior to entering full rate production), the Program Manager or equivalent prepares a nuclear surety evaluation(s). **(T-1)** See [Attachment 2](#) for a recommended outline of the nuclear surety evaluation. The nuclear surety evaluation focuses on all DAFI 91-101, AFMAN 91-118, and AFMAN 91-119 design and evaluation criteria. It also includes a recommendation for certification or certification with restrictions if design and evaluation criteria are not met. The evaluation and certification recommendation will be submitted to AFSEC/SEW with copy to the AFNWC. **(T-1)** If required, AFSEC/SEW will request an independent nuclear surety evaluation. **(T-1)**

4.4.3.1. If a safety study is required as defined in DoDM 3150.02, the Program Manager will submit the nuclear surety evaluation to AFSEC/SEW at least 120 calendar days before the study in accordance with AFI 91-102. **(T-1)** This nuclear surety evaluation is only a part of the broader Nuclear Safety Analysis Report required to support the Nuclear Weapon System Surety Group. See DoDM 3150.02 and AFI 91-102 for additional information on safety studies and the Nuclear Weapon System Surety Group.

4.4.3.2. If a safety study is not required, submit the nuclear surety evaluation at least 60 calendar days before the required operational capability or certification need date.

4.4.4. When tasked by AFSEC/SEW, the AFNWC or other AFSEC approved organization conducts and provides to AFSEC/SEW an independent nuclear surety evaluation. The independent nuclear surety evaluation is intended to confirm that the program provided nuclear surety evaluation is complete and correct, and that all applicable safety design criteria have been satisfied. The independent nuclear surety evaluation must be submitted at least 20 calendar days before the required operational capability or certification need date. **(T-1)** An independent nuclear surety evaluation:

4.4.4.1. Is of sufficient depth to ensure the nuclear surety evaluation is technically correct and complete.

4.4.4.2. Specifically addresses the design requirements.

4.4.4.3. Indicates if the design meets AFMAN 91-118 and AFMAN 91-119 requirements.

4.4.4.4. Includes a recommendation for nuclear safety design certification in accordance with [paragraph A2.1](#) of [Attachment 2](#).

4.4.5. When requirements are not met, the evaluation must include comments and documentation on adequacy of compensatory measures and specify if the reviewing agency concurs with the evaluating agency's recommendation for nuclear safety design certification.

4.4.6. Software Evaluations. For software evaluation requirements see AFMAN 91-119.

4.4.7. For host nation procured support equipment, the independent nuclear surety evaluation is conducted internally during the nuclear surety evaluation development process conducted by AFNWC Engineering Liaison Office.

4.4.8. For host nation owned nuclear weapon systems, the host nation shall submit nuclear safety design certification documentation through the AFNWC Engineering Liaison Office. The Engineering Liaison Office will interface between the host nation and the USAF on all nuclear safety design certification processes and issues.

4.4.9. If the independent nuclear surety evaluation or technical nuclear safety analysis is approved with or without restrictions, AFSEC/SEW will provide a nuclear safety design certification letter to the AFNWC in accordance with AFI 63-125. **(T-1) Note:** Restrictions on the use of items in a nuclear role may be imposed to compensate for design deficiencies or significant operational hazards.

4.5. Critical Components. For nuclear safety design certification of critical components, the organization with program management responsibility:

4.5.1. Initiates the design certification process for hardware and software. **(T-1)**

4.5.2. Provides for a nuclear safety cross-check analysis or nuclear safety analysis and technical evaluation of software critical components in accordance with this instruction, AFMAN 91-118, and AFMAN 91-119 requirements. **(T-1)**

4.5.3. Develops OPCERT and DECERT procedures for hardware critical components and sends the procedures to AFSEC/SEW for approval. **(T-1)** These procedures must adequately verify the system or component functions as design certified and mitigates all credible threats.

4.6. Tamper Detection Indicators.

4.6.1. For certification of tamper detection indicators, the operational MAJCOM or Program Manager determines the need for tamper detection indicator application and sends a request to AFSEC/SEW that:

4.6.1.1. Identifies the critical component requiring tamper detection indicators. **(T-1)**

4.6.1.2. Justifies why a tamper detection indicator is needed. **(T-1)**

4.6.1.3. States whether the tamper detection indicator will be used in an operational system or a nonoperational environment for storage and transportation. **(T-1)**

4.6.2. AFSEC/SEW evaluates the tamper detection indicator application request and sends the approved application to the National Security Agency for development of a suitable tamper detection indicator.

4.6.3. By agreement, the National Security Agency:

4.6.3.1. Develops the appropriate tamper detection indicator based on the parameters and intended-use data provided by the operational MAJCOM.

4.6.3.2. Coordinates tamper detection indicator development with the organization having program management responsibility.

4.6.3.3. Sends the tamper detection indicator data required for application, control, storage, and inspection procedures to AFSEC/SEW for certification.

4.6.4. The requesting MAJCOM maintains responsibility for all procurement actions and costs associated with tamper detection indicator development and integration.

4.6.5. Upon approval of the application, the Program Manager provides the technical requirements to the National Security Agency and develops the nuclear surety evaluation required to obtain certification.

4.7. Special Test and Maintenance Programs.

4.7.1. The Program Manager shall evaluate all aspects of proposed special test and maintenance program(s) for potential nuclear weapons surety degradation. This evaluation includes conditions that could violate AFMAN 91-118 and AFMAN 91-119 requirements, degrade safety and internal security features of the weapon system, or contribute to an AFI 91-106 scenario. **(T-1)**

4.7.2. The Program Manager provides this evaluation and requests approval of the proposed program(s) from AFSEC/SEW. **(T-1)**

4.7.3. AFSEC/SEW bases the approval decision on the findings of the evaluation and an independent review of the proposed program(s) (if required). A special safety study may also be required in accordance with AFI 91-102.

4.8. Technical Orders that Include Nuclear Surety Procedures Certification Process: Technical orders containing nuclear surety procedures must be submitted to AFSEC at least 120 calendar days prior to desired certification date. **(T-1)**

4.9. Additional Requirements. The following additional requirements apply to critical components, tamper detection indicators, special test and maintenance programs, and host nation operated weapon systems and procedures:

4.9.1. Critical components also require OPCERT before use in operational systems to verify the component is functioning as design certified. (Refer to **Chapter 6** of this instruction and AFI 91-106). Certain critical components also require specific procedures for DECERT.

4.9.2. Tamper detection indicators may be used to protect the certification status of critical components if sufficient justification exists for their use. Tamper detection indicators may not be used to substitute two-person concept control of codes, coded devices, or critical components when an operational code that cannot be overwritten passes through it or if the code component or device has no operational decertification procedure. Tamper detection indicators used in an operational system are identified in the safety rules for the affected nuclear weapon system in accordance with **Chapter 5** of this instruction.

4.9.3. Special test or maintenance programs conducted in operational facilities that are not covered by certified procedures must be approved by AFSEC/SEW.

4.9.4. When used with nuclear weapons in Air Force custody, host nation-operated nuclear weapon systems and procedures must satisfy the same nuclear safety criteria required for Air Force systems and procedures.

4.10. Warhead and Bomb Maintenance or Test Procedures.

4.10.1. The Program Manager or equivalent for facilities where maintenance or test procedures will be conducted shall perform an evaluation of all new or revised nuclear weapon maintenance and test procedures to ensure facility features and compensatory measures are adequate. (T-1) The Program Manager shall similarly review all procedures not specifically approved for any given facility. (T-1)

4.10.2. AFSEC/SEW must approve implementation of all new or revised nuclear weapon maintenance or test procedures that will be accomplished in Air Force facilities, as well as approve the performance of current procedures not currently approved for a given facility. Examples include:

4.10.2.1. Procedures to accomplish weapon alterations and modifications.

4.10.2.2. Any procedures that require bypassing or disabling any weapon safety features.

4.10.2.3. Procedures that introduce new or significant potential safety hazards, e.g., sources of electrical energy, fire hazards.

4.10.3. The AFGSC/A4Z must notify AFSEC/SEW of warhead and bomb alterations or modifications and any other new or revised maintenance or test procedures accomplished in Air Force facilities.

4.10.3.1. The notification via a statement of intent will initiate an Air Force safety review/evaluation of the proposed procedures in relation to the facility where they are to be performed and must:

4.10.3.1.1. Provide background information and describe the maintenance action to be performed.

4.10.3.1.2. Identify any proposed temporary removal, bypass, or disablement of the surety features of the weapon itself, and provide general information concerning the susceptibility present due to the temporary removal, bypass, or disablement of these surety features.

4.10.3.1.3. Specify the Air Force facility where the procedures will be performed.

4.10.4. For product change proposals, the AFGSC/A4Z will submit the notification statement of intent no later than 180 days before scheduled maintenance. For special procedures and retrofit orders, submit the notification when it is distributed for Air Force review/coordination.

4.10.5. AFSEC approval (via formal documentation) must be obtained before implementation of procedures described in paragraphs 4.10.2 and 4.10.3 of this instruction. (T-1)

4.11. Facility Lifting and Suspension Systems.

4.11.1. The lead/using command performs a nuclear surety evaluation and sends a certification request to AFSEC/SEW, in accordance with [paragraph 4.4.4](#) of this instruction.

4.11.2. A design or civil engineering agency evaluates the facility that will support the lifting or suspension system to determine if the structure meets the design requirements in AFMAN 91-118. This evaluation and appropriate analysis that the structure is safe for the rated load and meets the required margins of safety, in accordance with AFMAN 91-118, must be included with the lead/using command's nuclear surety evaluation. (T-1)

4.11.3. An inspection and maintenance cycle for each certified facility lifting system will be established in accordance with AFMAN 91-203, *Air Force Occupational Safety, Fire and Health Standards*.

4.11.4. The lead/using command is authorized to use suspended load-frame assemblies at 100 percent of their rated load. Inspect and test nuclear certified hoisting systems in accordance with AFI 91-203 at the required intervals.

4.11.5. The lead/using command evaluates item or facility support structure modifications to determine their impact on the certification status.

4.11.6. AFSEC/SEW nuclear safety design certifies the facility lifting system and notifies the AFNWC. The AFNWC will then update the Master Nuclear Certification List accordingly.

4.12. Nuclear Safety Design Decertification.

4.12.1. AFSEC/SEW may remove nuclear safety design certification for items that have demonstrated inadequate safety through analysis, testing, or operational performance.

4.12.2. Any Air Force agency may send a recommendation for removal of nuclear safety design certification to AFSEC/SEW. The recommendation must identify the item as listed in the Master Nuclear Certification List and include documentation that supports the recommendation.

4.12.3. Removal of nuclear safety design certification is done via a formal notification letter from AFSEC/SEW to the AFNWC, with courtesy copies forwarded to MAJCOM Safety Office.

4.12.4. An individual nuclear safety design certified item may be restricted from use with nuclear weapons any time for any reason (e.g., damage, modifications, or changes to intended usage). Such restrictions do not constitute removal of nuclear safety design certification. Appropriate documentation in historical or permanent records is required to preclude inadvertent use. Submit requests via memorandum to AFSEC/SEW to restrict specific item(s) from use. AFSEC/SEW will notify the AFNWC to update the Master Nuclear Certification List accordingly and provide a courtesy copy of notification to MAJCOM Safety Offices.

4.13. Operational Decertification.

4.13.1. Critical components that have been improperly stored or not maintained in accordance with **Chapter 6** of this instruction require decertification if the resulting mishap investigation does not positively rule out tampering. Decertification is also required if a critical component is connected to an uncertified interface (i.e., not certified via OPCERT procedures or through nuclear safety design certification approval as described in this publication).

4.13.2. Lead/using commands may decertify critical components if they use approved decertification procedures (when applicable) and the intended life cycle for the critical component does not specifically prohibit decertification.

Chapter 5

NUCLEAR SURETY TAMPER CONTROL AND DETECTION PROGRAMS

5.1. Tamper Control Program. In the Air Force, the two-person concept is central to nuclear surety tamper control measures. It is designed to minimize and detect opportunities for a lone individual to perform an incorrect act or unauthorized procedure on a nuclear weapon, nuclear weapon system, or critical component.

5.2. Two-Person Concept Requirements.

5.2.1. Clearly mark all no-lone zones at internal entry control points. Do not post signs or devices externally to identify areas, aircraft or facilities requiring two-person concept. **(T-1)**

5.2.2. Implement procedures to limit entry to authorized persons who meet the requirements of [paragraph 5.2.6](#) of this instruction. **(T-1)**

5.2.3. Enforce the two-person concept while performing a task or operation and continue to enforce it until you are either relieved by authorized personnel or you have secured the nuclear weapon, nuclear weapon system, or critical component. **(T-0)**

5.2.4. Take immediate, positive steps to prevent or stop an incorrect procedure or unauthorized act. **(T-0)**

5.2.5. Report deviations immediately to the appropriate supervisor. **(T-0)**

5.2.6. A two-person concept team consists of at least two individuals authorized by the commander and verified by their supervisor to meet the following requirements (Refer to [paragraph 5.5.1](#) of this instruction for criteria on foreign nationals):

5.2.6.1. Are certified under the Personnel Reliability Assurance Program, as specified in DoDM 5210.42_AFMAN 13-501 and AFI 31-117. **(T-0)**

5.2.6.2. Know the nuclear weapons surety requirements of the task they perform. **(T-0)**

5.2.6.3. Can promptly detect an incorrect act or unauthorized procedure. **(T-0)**

5.2.6.4. Have successfully completed nuclear weapons surety training in accordance [paragraph 3.6](#) of this instruction. **(T-0)**

5.2.6.5. Are designated to perform the required task. **(T-0)**

5.3. Two-Person Concept Violations and Reporting. All personnel are required to report a two-person concept violation if they detect that a lone individual in a no-lone zone has had the opportunity to tamper with or damage a nuclear weapon, nuclear weapon system, or critical component. **(T-0)** Refer to AFMAN 91-221 for reporting guidance.

5.3.1. If two-person concept is maintained by more than two persons, a lone individual may be temporarily obscured from sight or not directly observed by the remaining two-person concept team. The two-person concept is not violated if the lone individual is in a location that would preclude the ability to perform an incorrect act or unauthorized procedure that could affect the nuclear weapons, the weapon system, or critical components. The two-person concept team must maintain awareness of the location and justification for the lone individual to be temporarily out of sight (e.g., an individual on the Personnel Reliability Assurance Program or non-Personnel Reliability Assurance Program member under escort may enter a

lavatory or other sealed compartment within a no-lone zone without continuous direct observation by the remaining two-person concept team as long as that compartment does not afford access as previously described).

5.3.2. A momentary breach of the no-lone zone is not a violation if no individual had the opportunity to perform an incorrect act or unauthorized procedure. In performing certain tasks, team members may lose sight of each other or be far apart. One team member may be briefly out of sight to perform a specific task if it is unsafe or physically impossible to maintain constant observation.

5.4. Authorized Deviations. Deviation from the two-person concept is authorized when:

Note: Any deviation from the criteria in [paragraph 5.4.3.1](#) and [paragraph 5.4.3.2](#) is unauthorized and constitutes a two-person concept violation.

5.4.1. The weapon system safety rules specifically authorize a deviation.

5.4.2. An emergency presents an immediate threat to the safety of personnel or the security of a nuclear weapon, nuclear weapon system, or critical component. War plan exercises are not considered emergencies. This type of an occurrence is to be reported to the Wing Weapons Safety Office in accordance with AFMAN 91-221.

5.4.3. All critical components are removed from a Launch Control Point and the Security Control Center service lift room door is monitored by one two-person concept qualified member, the entrance is secured with two General Services Administration approved combination locks, and at least one of the following two methods are used: **Note:** The Minuteman III weapon system refers to the Launch Control Point as the Launch Control Center.

5.4.3.1. If the two-person concept qualified member monitoring the door is in possession of one lock combination: **(T-0) Note:** At no point will an individual team member be permitted to have knowledge of both lock combinations. **(T-0)**

5.4.3.1.1. The maintenance team must seal the door with a National Security Agency-provided and AFSEC approved serialized wire loop seal placed on their corresponding door hasp. **(T-0)**

5.4.3.1.2. Lock combinations for the locks described in [paragraph 5.4.3](#) of this instruction shall be split between the two-person concept qualified member and the maintenance team throughout the duration of site maintenance. **(T-0)**

5.4.3.1.3. The maintenance team shall verify the seal serial number with an off-site entity (e.g., Secondary-Launch Control Point or unit codes flight) upon sealing and purposeful break. **(T-0)**

5.4.3.1.4. Unused seals shall not be stored or maintained on-site. **(T-0)**

5.4.3.1.5. Seals shall be issued daily to the maintenance team. **(T-0)**

5.4.3.1.6. Upon initial entry and prior to sealing the Security Control Center service lift room door, the maintenance team will ensure the Security Control Center service lift room external access door is properly secured. **(T-0)**

5.4.3.2. If the two-person concept member monitoring the Security Control Center service lift room door does not possess either of the two split lock combinations: **Note:** In this method the Launch Control Point no-lone zone extends to the Security Control Center service lift room door.

5.4.3.2.1. The maintenance team will designate team members and split lock combination knowledge. Split knowledge of the lock combinations shall remain in place until completion of site configuration and maintenance. **(T-0) Note:** At no point will an individual maintenance team member be permitted to have knowledge of both lock combinations. **(T-0)**

5.4.3.2.2. At no point will the two-person concept qualified member monitoring the door be permitted to have knowledge of either lock combination for the duration of site configuration and maintenance. **(T-0)**

5.4.3.2.3. Upon initial entry and prior to securing the Security Control Center service lift room door, the maintenance team will ensure the Security Control Center service lift room external access door is properly secured. **(T-0)**

5.5. Additional Conditions:

5.5.1. Per DAFI 91-112 for US custodial units at allied installations, foreign nationals may be part of a two-person concept team if the host nation provides personnel subject to equivalent Personnel Reliability Assurance Programs. **Note:** When the host-nation pilot is the Sole Vouching Authority, a US custody agent or custody force member shall always be present in the exclusion areas to ensure US custody is continuously maintained until authorized release. **(T-0)**

5.5.2. The two-person concept applies to entry control personnel into a no-lone zone. Entry controllers may not form a two-person concept team with personnel inside the no-lone zone.

5.5.3. Couriers ensure that the host installation meets two-person concept requirements and no-lone zones are delineated around nuclear logistics aircraft.

5.5.4. Two interim-certified individuals may not form a two-person concept team. Also, an interim-certified member may not pilot a single-seat aircraft loaded with nuclear weapons.

5.5.5. An individual who does not qualify as a member of a two-person concept team may enter a no-lone zone to perform a specific task only if escorted by a two-person concept team. Escorts must be capable of detecting incorrect acts or unauthorized procedures. Escort procedures will be accomplished in accordance with the applicable directive(s) governing the nuclear weapon system or critical component defining the no-lone zone.

5.5.6. Personnel granted DOE Sigma 14 access are prohibited from being part of a two-person concept team that may afford access to a nuclear weapon. **(T-0)** For additional information on DOE Sigma categories and requirements, see DoDD 3150.02.

5.5.7. Personnel with the Assignment Limitation Code “M” are prohibited from being part of a two-person concept team that may afford access to a nuclear weapon. For additional information on Assignment Limitation Code “M”, see AFI 91-106.

5.6. Sealing Methods. Certain items must be sealed because either weapon system safety rules require it, or the seals protect the certification status of critical components while in storage or

during transportation, as specified in **Chapter 6** of this instruction. **(T-0)** Authorized sealing methods include:

5.6.1. Safety Wiring and Sealing. Two types of seals are authorized. The first method consists of seals composed of a malleable material installed with a crimping device and controlled die to form an impressed distinctive mark or unique identifier (determined locally). The second method consists of seals applied with self-locking, non-reversible feature with a singularly unique wing identifier or serial number, as well as a color control system. Both types of seals are connected to certain switches, covers, handles, or levers. Breakage or alteration of the wire or seal provides evidence/detection of possible unauthorized acts, access or tampering. Use this method only in no-lone zones.

5.6.1.1. Destroy all distinctive markings on malleable seals after removal.

5.6.1.2. Direct personnel to verify seal integrity immediately following installation.

Note: For aircraft only, verify seals before and after any task or operation performed in the immediate area of the seal. Do not verify aircraft seals before an operation or task during alert crew member exercises or actual responses but do verify the seals after the exercise or alert.

5.6.2. The Maintenance Squadron commander shall prescribe a course of action when an installed seal is found broken or shows evidence of tampering. At a minimum:

5.6.2.1. Coordinate with the Weapons Safety Manager for investigation of the event and mishap reporting in accordance with AFMAN 91-221. **(T-1)**

5.6.2.2. Establish procedures to maintain control of the system until the situation is resolved. **(T-1)**

5.6.2.3. Check the integrity of the weapon system and reseal if integrity is assured. **(T-1)**

5.6.2.4. Seals broken on accident, while performing authorized actions, do not require a mishap report. **(T-1)**

5.6.3. Training seals shall be easily distinguished from, and shall not be used as operational seals. **(T-0)**

5.6.4. Tamper detection indicators. If tamper indicators are used, an approved tamper detection indicator is placed so it will indicate if someone has activated or had access to the interior of a critical component. Once the tamper detection indicator is installed, evidence of tampering must be visible to the naked eye or can be detected using special equipment. Tamper detection indicators and other authorized sealing methods proposed for use in nuclear weapons systems will be properly certified prior to use according to AFI 63-125.

Chapter 6

CRITICAL COMPONENTS

6.1. Designating Critical Components. Critical components must receive nuclear certification in accordance with AFI 63-125 and be listed in the Master Nuclear Certification List. **(T-0)**

6.1.1. Items designated as a critical component will be clearly identified as a critical component in the Master Nuclear Certification List.

6.1.2. The National Security Agency may request critical component designation for National Security Agency produced software and hardware used with a nuclear weapon or nuclear weapon system. The National Security Agency provided software and hardware items receive certification equal to that provided by the Air Force and therefore do not need additional Air Force design certification.

6.2. Marking Critical Components. Organizations possessing critical components shall:

6.2.1. Affix the label or tag to the outside of the critical component and the component's shipping container. **(T-0)** Intercontinental ballistic missile code components will be tagged while outside of shipping containers. **(T-0)**

6.2.2. Cover the label or tag when the component is not certified for operational use. **(T-0)**

6.2.3. Ensure no external markings are made which identify areas, facilities, aircraft, or equipment as containing critical components (e.g., adding identifying paint stripe). **(T-0)**

6.3. Two-Person Concept. The two-person concept protects a part of each critical component's life cycle. This minimizes the possibility that an unauthorized or inadvertent act could degrade the nuclear weapons surety of a nuclear weapon or nuclear weapon system. Two-person concept for a critical component may begin at the time of production and continue until the critical component's destruction or may occur during any interim period. Complete the following tasks:

6.3.1. Handle and control the component following the guidelines for operationally certified critical components in **Chapter 5** of this instruction. **(T-0)**

6.3.2. Keep code components or devices under two-person concept or store them according to the methods described in **paragraph 6.5** of this instruction when an operational code that cannot be overwritten passes through it. **(T-0)** Two-person concept applies if the code component or device has no operational decertification procedure and continues until all embedded codes are superseded or in accordance with controlling authority, per Emergency Action Procedures-Strategic (EAP-STRAT), Volume 16, *ICBM Code Component Control Policy and Procedures*.

6.4. Shipping Requirements. If using a two-person concept team or National Security Agency approved tamper detection indicators to protect the certification status, use the DoD Courier Service to transport operationally certified critical components. **(T-0)**

6.5. Storage Requirements and Operational Use of Critical Components. These storage requirements apply to certified critical components. Decertified critical components require that storage conditions meet security classification requirements, in accordance with CG-W-5, *Joint DOE/DoD Nuclear Weapons Classification Policy Guide*. **(T-0)** Protect certified critical

components in operational use by keeping them under two-person concept or in a storage facility as specified in [paragraph 6.5.1](#) of this instruction. **(T-0)**

6.5.1. Use one of the following methods to store certified critical components that are not under two-person concept.

6.5.1.1. Method 1. Store components in an approved reinforced concrete vault or storage container and apply the following: **(T-0)**

6.5.1.1.1. Store the component in a no-lone zone. **(T-0)**

6.5.1.1.2. Secure every entrance to the no-lone zone with two General Services Administration General Field Service Padlocks, ensuring no individual can open both locks, or a General Services Administration approved combination lock which requires two separate combinations to be dialed out for it to be unlocked ensuring no lone individual can gain access to the no-lone zone. **(T-0)**

6.5.1.1.3. Use volumetric motion detectors and door detectors with the capability to cover all facility openings greater than 96 square inches; all detectors must report independently to a remote, continuously staffed location. **(T-0)**

6.5.1.1.3.1. Incorporate a line supervision scheme within the alarm reporting circuits for the storage area that detects tampering and reports it to the remote monitoring facility. **(T-0)**

6.5.1.1.3.2. Keep at least one person focused on physical security functions at the alarm monitor location. **(T-0)**

6.5.1.2. Method 2. Protect components with tamper detection indicators approved in accordance with [Chapter 5](#) of this instruction.

6.5.2. Unless they are protected by method 2, keep temporarily-stored certified critical components (e.g., uncoded Minuteman missile guidance sets remaining overnight at Missile Alert Facilities) in a no-lone zone. **(T-0)** Protect the components as their classification warrants. **(T-0)** See EAP-STRAT Volume 16, for procedures concerning code components.

6.6. Targeting. For the purpose of safety design, targeting data received through National Command Channels is considered valid upon receipt and shall be protected as critical data by the weapon system.

Chapter 7

TROUBLESHOOTING AND MAINTENANCE OPERATIONS

7.1. Introduction. Weapon system designers must apply safety criteria established by the DoD and Air Force when developing technical orders or other certified procedures for troubleshooting and maintaining loaded nuclear weapon systems (that is, a combat delivery-capable platform with one or more nuclear weapons mechanically and electrically connected in a normal operational configuration). Field-level maintenance personnel must use these criteria to perform troubleshooting and maintenance operations. This document serves as the parent document to the 91-1XX publications stated in [paragraph 1.1.2](#) and is to be used in conjunction to those documents.

7.2. Faults. When a fault occurs on a loaded nuclear weapon system, the primary consideration is to ensure the system is safe and weapons are not subjected to inadvertent power application or control signals.

7.3. Allowable Operations. Weapon system designers must define allowable troubleshooting and maintenance operations for loaded nuclear weapon systems in applicable weapon system technical orders or other certified procedures. Troubleshooting and maintenance operations must:

7.3.1. Prohibit using any nuclear weapon as a troubleshooting tool. **(T-0)**

7.3.2. Only use nuclear certified equipment listed in the Master Nuclear Certification List and published technical procedures. **(T-1)** Common use items, as identified in AFMAN 91-118, may be used.

7.3.3. Be consistent with applicable nuclear weapon system safety rules and approved technical data. **(T-0)**

7.3.4. Require nuclear weapons be immediately and safely isolated from potential danger while maintaining appropriate physical security when a malfunction occurs. **(T-1)**

7.4. Inadequate Operations. If the authorized procedures do not adequately address the specific fault, the MAJCOM using the procedures must consult with the System Program Office, AFNWC, and AFSEC/SEW.

7.5. Field-level Maintenance Personnel. Field-level maintenance personnel must not perform maintenance operations that affect the nuclear weapon system's structural, propulsion, electrical, or hydraulic power systems unless the Air Force has established specific procedures for these operations. **(T-0)** The purpose of this restriction is to protect against the possibility of exposing nuclear weapons to an adverse environment, particularly if a safety-related incident occurs.

7.6. Prohibited Operations Request. The operating MAJCOM must request approval from AFSEC/SEW to conduct other maintenance operations prohibited by these criteria if required to satisfy a valid operational requirement.

7.7. Criteria Unique to Aircraft Systems.

7.7.1. Nuclear System Faults. When a nuclear system fault occurs on a loaded nuclear combat aircraft, personnel will cease current operation and take appropriate actions to identify, locate, and correct the fault if permitted in accordance with technical guidance. **(T-1)** The System Program Office determines whether the system fault is critical by conducting a technical

assessment of its potential impact on the nuclear weapons or the weapon system's primary nuclear safety features and the possible hazards associated with troubleshooting the fault. The System Program Office's determination is the basis for any technical order procedure that permits troubleshooting. Troubleshooting procedures must use built-in test system capabilities, rather than determinations by field-level personnel, to identify faults and use only initial fault detection data to identify the fault and prohibit diagnostic testing to identify the fault while nuclear weapons are electrically mated.

7.7.1.1. Critical Faults. For critical faults, personnel will isolate the affected nuclear weapons from the fault before initiating troubleshooting. **(T-0)** The way weapons are isolated depends on the type of fault and the potential for inadvertent application of power or control signals to the weapon interface. Ways to isolate weapons include downloading the weapons; de-mating the electrical signal lines to the weapons and making the release system mechanically safe; and de-mating the electrical signal lines to both the weapons and the release system.

7.7.1.1.1. If authorized procedures are insufficient or inappropriate or if uncertainty exists about nuclear weapon impacts or the proper maintenance response, the operating MAJCOM must:

7.7.1.1.1.1. Consult with AFGSC/A4Z through the Unsatisfactory Reports system to determine the appropriate course of action.

7.7.1.1.1.2. Declare weapons non-operational that could have been affected by the fault.

7.7.1.1.1.3. Keep weapons in non-operational status and do not load them on combat delivery platforms until authorized by AFGSC/A4Z.

7.7.1.1.1.4. Prohibit performance of electrical checks on these weapons unless directed by AFGSC/A4Z or until the original fault is resolved and the weapons have been returned to operational status.

7.7.1.1.2. Nuclear weapons must remain isolated until the fault is identified, located, corrected, or the fault is isolated to a launcher assembly/nuclear weapon. **(T-1)** Only then can the aircraft be operationally certified (that is, tested to verify system operability and safety) as being mission capable. When personnel cannot identify the cause of the fault, the unit must receive authorization from the operating MAJCOM to operationally certify the aircraft. **(T-1)** Upon receipt of proper command authority, the aircraft may be declared operationally certified if each of these conditions are met:

7.7.1.1.2.1. A substitute aircraft is not available.

7.7.1.1.2.2. Nuclear weapon system safety rules and technical order restrictions are not violated.

7.7.1.1.2.3. The fault is isolated to either specific weapon stations or a component associated only with those stations and the faulty stations are not loaded.

7.7.1.1.2.4. The fault cannot cause or contribute to a critical fault on any loaded station. **Note:** As used here, "station" refers to an individual weapon location rather than a carriage store or launcher connection.

7.7.1.1.2.5. Competent authority (not lower than the maintenance group commander or equivalent) approves the loading.

7.7.1.1.3. Personnel will identify faults unmistakably before declaring them non-critical. **(T-1)** If the built-in test system's fault identification is ambiguous or inconclusive or if personnel cannot confidently assess the potential hazards associated with corrective actions, treat the fault as critical.

7.7.1.1.4. Personnel will treat as critical, any nuclear system fault that prevents electrical monitoring of the nuclear weapon's status. **(T-1)** This condition includes hardware and software failures that prevent execution of the monitoring function and failures that prevent proper display of the results of a monitoring function. Treat all other faults as non-critical.

7.7.1.2. Non-critical Faults. For faults that the System Program Office has determined to be non-critical, the nuclear weapons may remain electrically mated during troubleshooting operations. Every attempt should be made to isolate the weapons unless isolating the weapons causes a severe operational impact.

7.7.1.3. Before developing troubleshooting procedures, the System Program Office will delineate specific instructions for each built-in test system fault that verify the reliability and accuracy of built-in test data, assess the potential consequences of the actions for each fault to assure troubleshooting will not adversely impact nuclear safety, and request evaluation and approval from AFSEC/SEW before troubleshooting non-critical faults.

7.7.2. Mechanical Mating Problems. When a mechanical mating problem occurs that prevents load completion, visually verify no obvious damage exists to electrical connections with the aircraft nuclear system before proceeding with the loading operation. **(T-1)**

7.7.2.1. If resolving the mechanical problem does not involve the aircraft nuclear system (for example, an out-of-adjustment bomb rack rigging or a physically incompatible pullout cable), proceed with the loading operation after correcting the mechanical problem. **(T-1)** The aircraft remains operationally certified.

7.7.2.2. If resolving the mechanical problem requires removing and replacing or reinstalling a component in the aircraft nuclear system, operationally certify the aircraft after correcting the mechanical problem. **(T-1)**

7.7.2.3. If mechanical mating problems lead to potential aircraft or weapon damage, complete applicable technical order inspection procedures prior to subsequent mating. **(T-1)**

7.7.3. Electrical Power Application. Keep application of electrical power to a loaded nuclear combat aircraft to a minimum.

7.7.4. Minor Maintenance. Perform only minor maintenance and operational checks not related to the nuclear weapon interface according to approved technical data and the nuclear weapon system safety rules. **(T-1)** Examples of these operations include preflight checks, aircraft servicing, aircraft towing, fuel management actions, operational checks of lighting, navigation, radar, and communications systems, and load software into aircraft control processors prior to application of monitor power.

7.7.5. Non-nuclear System Faults. When a fault occurs outside the nuclear system on a loaded nuclear combat aircraft, perform corrective actions according to specific aircraft technical orders. When corrective actions for a non-nuclear fault require personnel to demate weapons, personnel shall perform all post-load electrical and mechanical checks after re-mating the weapons. **(T-1)** The aircraft remains operationally certified.

7.7.6. Prohibited Maintenance. Observe the restrictions described in Technical Order 11A-1-33, *Handling and Maintenance of Explosive Loaded Aircraft*. In addition, personnel must not conduct these specific maintenance actions on loaded nuclear combat aircraft as well as non-combat delivery platforms (cargo aircraft) with nuclear weapons aboard: **(T-1)**

7.7.6.1. Aircraft engine and Alternate Power Unit changes.

7.7.6.2. Landing gear maintenance requiring fuselage jacking.

7.7.6.3. Major structural repair.

7.7.6.4. Disruptions to fuel system, with the exception of fuel management operations (i.e., topping-off) associated with keeping an aircraft mission ready.

7.7.6.5. Repairing the launcher primary structure or any other structure that directly supports the loaded nuclear weapon or nuclear weapon system.

7.8. Criteria Unique to Ground-Launched Missile Systems.

7.8.1. Approved Procedures. Use only approved procedures to perform troubleshooting and maintenance operations while reentry system containing a nuclear warhead is mated to the missile. **(T-0)** If maintenance personnel cannot identify the fault by using approved procedures, remove the warhead or reentry system before proceeding.

7.8.2. Prohibited Troubleshooting Signals. Prohibit procedures that could send signals to a reentry system, jeopardize the safety of the reentry system, launch system, or launch control system, or arm or bypass safety interlocks. **(T-0)**

7.8.3. Allowable Equipment. Only use equipment listed in the Master Nuclear Certification List and published technical orders to troubleshoot any fault or failure in the missile, its associated equipment, or any component that is part of the command and control of the missile. **(T-1) Note:** Troubleshooting does not include replacing the "most likely to fail" item when personnel replace the item using approved technical data.

7.8.4. Unidentified Faults. When faults occur that personnel cannot identify by using approved procedures, the operating MAJCOM must provide guidance after consulting with the System Program Office, AFGSC/A4Z, and AFSEC/SEW.

7.8.5. Loaded Nuclear Missiles. Do not conduct these maintenance operations on a loaded nuclear missile system: **(T-1)**

7.8.5.1. Welding operations in or on the launcher (unless specifically authorized by the System Program Office).

7.8.5.2. System-level testing that could inject critical commands.

7.8.5.3. Use of uncertified test equipment.

7.8.5.4. Suspension system work (except minor servicing or repair).

7.8.5.5. Ordnance testing or activation.

7.9. Internal Weapons Components. Maintenance operations involving nuclear bombs or warheads where contact with internal weapon components is possible shall only be conducted in maintenance facilities or nuclear safety design certified maintenance vehicles (i.e., Secure Transportable Maintenance System). The following apply when conducting maintenance operations:

7.9.1. Alternating Current (AC) Devices. Use of portable AC devices (i.e., AC powered tools and equipment) is prohibited unless specifically authorized by technical orders. **(T-1)**

7.9.2. Direct Current (DC) Devices. Use of portable DC devices (e.g., battery powered tools and equipment including but not limited to cameras, flashlights, measurement devices) inside or directly above nuclear weapons (bombs and warheads) supporting weapon maintenance operations where contact with installed or uninstalled internal weapon components is possible (e.g., limited life component exchange, alterations, special procedures, modifications) is only authorized if either: **(T-1)**

7.9.2.1. Specifically authorized by technical orders and/or provided by the DOE, National Nuclear Security Administration; or **(T-1)**

7.9.2.2. Meets all the following criteria:

7.9.2.2.1. DC device does not have an electromagnetic radiation emitter (e.g., Bluetooth technology, cellular signaling, or Wi-Fi). **(T-1)**

7.9.2.2.2. DC device has a voltage of less than 50 volts.

7.9.2.2.3. DC device must be in a serviceable condition without exposed conductors or wiring (e.g., rechargeable devices with exposed contacts, which are for ease of charging at a station, batteries; or any equipment with a charged conductive surface are prohibited). **(T-1) Note:** Those having sealed inductive charging capabilities are allowed.

7.9.2.2.4. Direct contact between DC devices and weapon-exposed conductors (e.g., damaged insulation resulting in exposed wires, and bare electro-explosive devices) or electrical connector pins is prohibited unless specifically authorized by technical orders. **(T-1)**

7.9.2.3. A list of DC powered devices meeting [paragraph 7.9.2.2](#) criteria may be maintained by the MAJCOM to help units identify which DC powered devices have been authorized for use.

Chapter 8

NUCLEAR SURETY DEVIATION PROCESS

8.1. General. Nuclear surety deviations are an inclusive term identifying a specific departure from nuclear weapons systems design, Office of the Secretary of Defense policy requirements, or when a certified system becomes inoperable due to failure or scheduled upgrade. An approved deviation either documents approval for deviating from a design requirement or allows a wing/installation commander to continue the use of the nuclear certified system for operational necessity based on strategic and compelling reasons. Nuclear surety deviations are reported on a calendar year basis to the using MAJCOM commander by the using wing.

8.1.1. Nuclear surety deviations are used to communicate:

8.1.1.1. Program Executive Officer's or Program Manager's inability to meet design criteria within the acquisition process.

8.1.1.2. A wing or installation commander's request to continue use of a nuclear facility while a sub-component undergoes some rework within the sustainment process. These deviation requests may be granted at the MAJCOM level or higher. If a MAJCOM grants a deviation, the requesting commander must provide a copy of all pertinent deviation documentation to AFSEC/SEW. **(T-1)**

8.1.1.3. A commander's inability to meet published policy or guidance, and identifies specific departure(s) from 91-series nuclear related publications. These deviation requests may be granted at the MAJCOM level or higher. If a MAJCOM grants a deviation, the requesting commander must provide a copy of all pertinent deviation documentation to AFSEC/SEW. **(T-1)**

8.1.2. DELETED

8.1.3. Nuclear surety deviations require either formal risk acceptance in accordance with [paragraph 1.5](#) of this instruction or compensatory measures deemed adequate by the owner of the requirement being deviated from.

8.2. Deviation Reporting. This chapter provides a methodology for the senior leaders in the Air Force nuclear mission to determine any adverse impacts to nuclear weapons surety that is derived from nuclear surety deviations to policy and guidance. The scope of the Air Force Nuclear Surety Deviation Reporting Program ascertains the risk accepted by the appropriate approval authority with approved nuclear surety deviation(s). The applicability of the Nuclear Surety Deviation Reporting Program prescribes policy and guidance for the nuclear mission that will be utilized to communicate the inability to meet a design, sustainment, or publication requirement(s) that may adversely affect nuclear surety. The Air Force Nuclear Surety Deviation Reporting Program requires MAJCOM commanders, Program Executive Officers or Program Managers, Headquarters Air Force publication OPRs, and wing or unit commanders to track deviations related to nuclear weapons surety throughout the lifecycle of the nuclear weapon system (e.g., facility, nuclear weapon support equipment, non-combat delivery platforms) to Air Force requirements that may have an adverse effect on nuclear weapons surety.

8.2.1. The Air Force Nuclear Surety Deviation Reporting Program:

8.2.1.1. Catalogs and tracks publication deviations that the Headquarters Air Force OPR or MAJCOM determines may present an adverse effect on nuclear weapons surety.

8.2.1.2. Evaluates the potential impact of deviations on entire systems, according to [paragraph 8.8.5](#) of this instruction, since individual deviations by themselves may or may not create vulnerabilities.

8.2.1.3. Ensures adequate compensatory measures are implemented and remain in place until the deviation is no longer required.

8.2.1.4. Ensures timely and aggressive actions are taken to apply resources to implement corrective measures to eliminate deviations.

8.2.1.5. Ensures programmatic and/or operational risks are fully vetted and accepted by the proper risk acceptance authority as determined by AFI 90-802, AFI 63-101/20-101, MIL-STD-882, and this instruction.

8.2.1.6. Provides a feedback mechanism to validate requirements against operational feasibility.

8.2.2. Security Forces units will follow the nuclear security deviation process as outlined in DoDS5210.41-M_AFMAN 31-108. **(T-0)**

8.3. Nuclear Surety Deviation Categories.

8.3.1. Technical. A Technical deviation is a departure from a nuclear weapon and nuclear weapons system related requirement but essentially affords the same level of nuclear weapons surety. Isolated technical deviations do not create vulnerabilities, do not require compensatory measures, and may be approved for an indefinite period.

8.3.2. Temporary. A Temporary deviation is the approved temporary continuation of a non-standard condition which deviates from an established standard and requires compensatory measures. Temporary deviations shall be approved for a period not to exceed 12 months.

8.3.3. Permanent. A Permanent deviation is a departure from a nuclear weapon and nuclear weapons system related publication that creates a vulnerability and the corrective actions are either not feasible or not cost effective. Permanent deviations require compensatory measures. Permanent deviations need only be approved once and do not require an expiration date. The owning MAJCOM will review permanent deviations for validity annually, and whenever criteria or conditions change that may positively or negatively affect them.

8.4. Nuclear Surety Deviation Package.

8.4.1. MAJCOM Deviation Reporting Programs must ensure requests contain sufficient information to support the deviation requests. At a minimum, requests must include:

8.4.1.1. Identification of other deviations approved or submitted on the system or requirement.

8.4.1.2. Risk analysis using an approved methodology, either AFI 90-802 for non-acquisition requests, or MIL-STD-882 or [paragraph 1.5](#) of this instruction, for acquisition requests.

8.4.1.3. Compensatory measures. The intent of the compensatory measure is to mitigate risk to an acceptable level and, in some cases, two or more measures must be used to lower the risk to an acceptable level. Compensatory measures shall be instituted:

8.4.1.3.1. Whenever two or more technical deviations when leveraged together are determined to present a vulnerability.

8.4.1.3.2. For each temporary and permanent deviation.

8.4.1.3.3. For nuclear surety deviation requests from design requirements.

8.4.2. In the event that the DOE supplied item does not meet the probability criteria outlined in [Table 1.1](#) of this instruction or in AFMAN 91-118, then the DOE and DoD shall:

8.4.2.1. Identify appropriate compensatory measures through the Nuclear Weapons Systems Surety Group.

8.4.2.2. Coordinate with OUSD A&S for identification of and routing to the proper risk acceptance authority.

8.5. Submission Process for Nuclear Surety Operational Deviations.

8.5.1. Deviation requests are not required for an existing operational system or component that does not meet current surety criteria implemented after the system or component received its original operational certification. When modifying an existing system or component, current surety criteria will apply, and deviation requests are required as applicable. (T-1) See [Figure 8.1](#) for a flowchart of the nuclear surety operational deviation process.

8.5.2. Facility deviations for currently certified systems will be initiated by the local commander for a critical system that has become non-operational or inoperable. (T-1)

8.5.3. For nuclear safety design related deviations which are deviations from criteria in AFMAN 91-118, or AFMAN 91-119, see [paragraph 8.6](#) and [Figure 8.2](#) of this instruction.

8.5.4. MAJCOMs will ensure deviation requests receive a technical review prior to acquiring signatures on the AF Form 116. The MAJCOM Deviation Reporting Programs will include pertinent Numbered Air Force/Center organizations in the overall staffing process as mandated by MAJCOM policy.

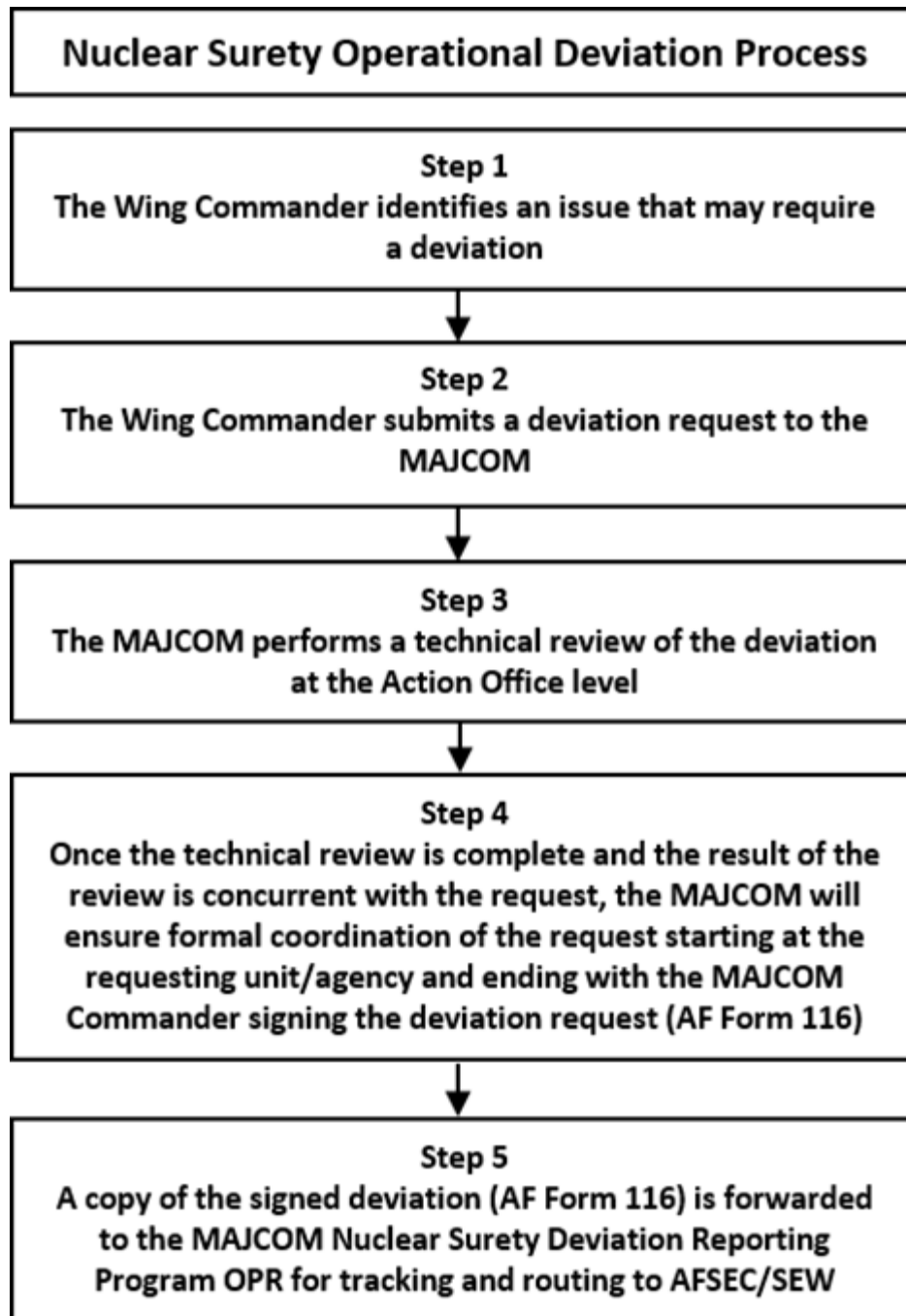
8.5.5. The technical review should be conducted at the action officer level. This ensures a thorough review of the deviation package and if applicable, collective deviations on a singular system do not establish an overall system vulnerability greater than the designated compensatory measures.

8.5.6. Following a complete technical review, the MAJCOM will ensure the nuclear surety deviation requests receive formal coordination that starts at the deviation request originating unit or agency. (T-1) This requires necessary staff coordination for MAJCOM commander approval in accepting the operational risk of the deviation.

8.5.7. A copy of the signed nuclear surety deviation must be forwarded to the MAJCOM Nuclear Surety Deviation Reporting Program OPR to update tracking status and routing to AFSEC/SEW.

8.5.8. If the MAJCOM commander approves a deviation not endorsed by AFSEC, nuclear safety design certification may be removed or denied.

Figure 8.1. Nuclear Surety Operational Deviation Process.



8.6. Deviations to Nuclear Safety Design. Deviations related to the design of a nuclear weapon system shall follow established processes in accordance with AFI 10-601, *Operational Capability Requirements Documentation and Validation*, AFI 63-101/20-101, AFI 63-125, and DoDM 5030.55_AFMAN 63-103. See [Figure 8.2](#) for a flowchart of the nuclear safety design deviation process.

8.6.1. If the design conflicts with criteria in AFMAN 91-118 or AFMAN 91-119:

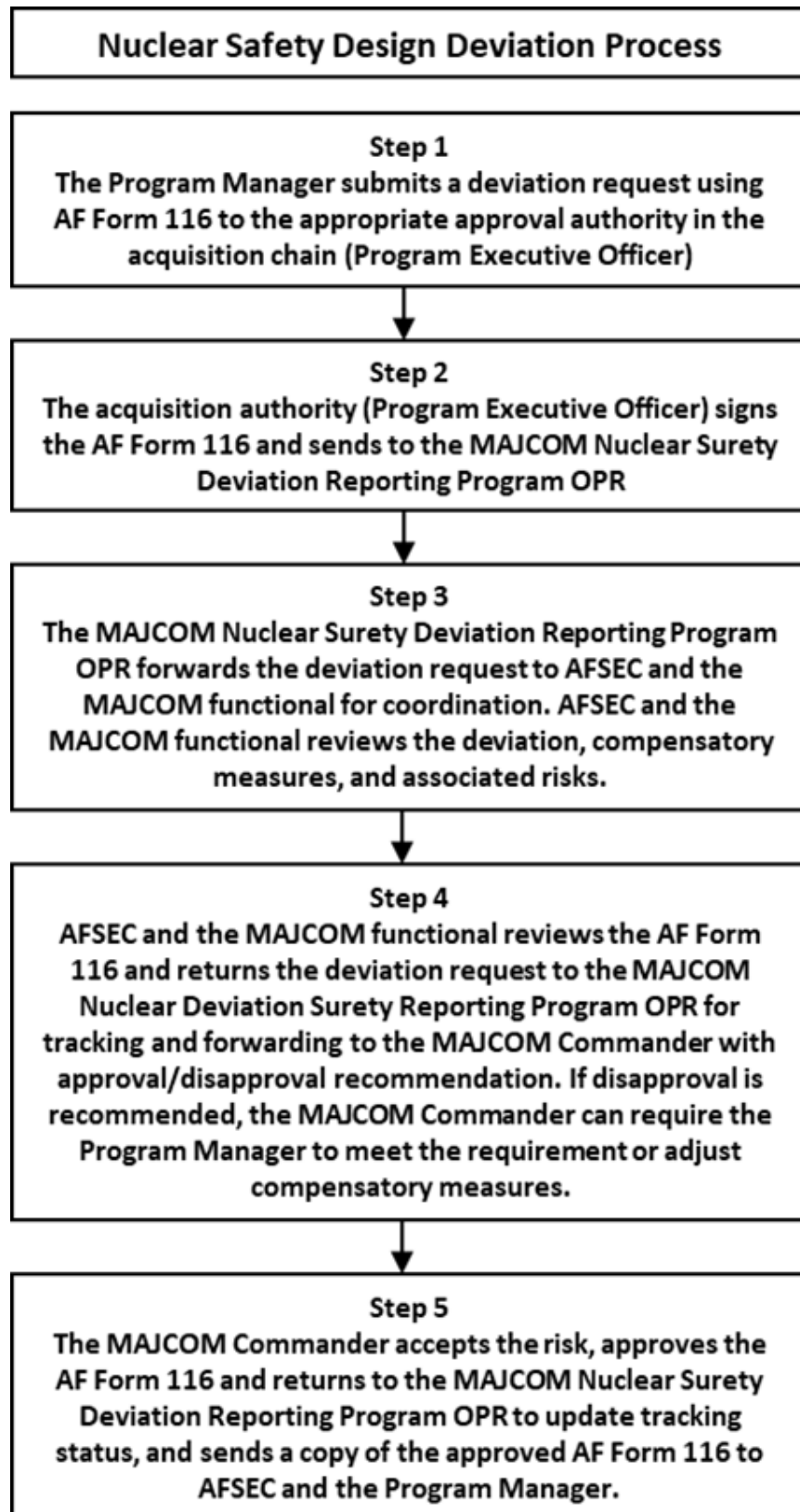
8.6.1.1. Program Managers may submit a notification via memorandum to the lead/using command Nuclear Surety Deviation Reporting Program OPR for coordination detailing, at a minimum, the conflicts with identified requirements, impact to surety, and compensatory measures. The MAJCOM Nuclear Surety Deviation Reporting Program OPR will return the notification to the Program Manager and annotate if the MAJCOM supports or does not support the Program Manager's position. **(T-1)** The Program Manager will then submit the notification to AFSEC/SEW requesting disposition. **(T-1)**

8.6.1.2. If the Program Manager does not submit a memorandum, then the Program Manager shall submit an AF Form 116 through the lead/using command to AFSEC/SEW for disposition. **(T-1)**

8.6.2. AFSEC/SEW shall specify to either comply with the requirement(s), obtain a deviation to the requirement(s), or to initiate changes to systems and/or documents as appropriate. **(T-1)**
Note: The AF Form 116 process does not alleviate the requirement to document the deviation, risk, risk assessment, mitigations and formal risk acceptance in the nuclear surety evaluation as specified in AFI 63-125.

8.6.3. If a publication change is required, the Program Manager will submit an AF Form 847 to AFSEC/SEW. **(T-1)**

Figure 8.2. Nuclear Safety Design Deviation Process.



8.7. Cancellation Process.

8.7.1. The deviation originating agency/unit must submit a new AF Form 116 summarizing the corrective actions and request cancellation of the deviation to the MAJCOM Deviation Reporting Program. **(T-1)** The MAJCOM Deviation Reporting Program will ensure this process conforms to all MAJCOM coordination policy directives. **(T-1)**

8.7.2. Following a technical review, the MAJCOM Deviation Reporting Program will ensure the nuclear surety deviation request receives formal coordination that starts with the deviation originating agency or unit. **(T-1)** This requires necessary coordination for MAJCOM commander approval to cancel the deviation.

8.7.3. Following MAJCOM commander approval, the MAJCOM Deviation Reporting Program will update the tracking status and route cancelation to AFSEC/SEW.

8.8. Annual Report. To support the AF/SE annual deviation analysis report to the Chief of Staff of the Air Force, MAJCOM Deviation Reporting Programs must submit a MAJCOM commander approved annual report certifying the previous year's active and closed deviations as well as approval and/or cancellation submissions that are in coordination. **(T-1)** The reporting period is 1 January through 31 December. Required documents and timeline are as follows:

8.8.1. AFSEC/SEW will provide a template report for MAJCOM by 15 October of the reporting year. **(T-1)**

8.8.2. US Air Forces in Europe and Air Forces in Africa shall report North Atlantic Treaty Organization approved deviations through US European Command directly to AFSEC/SEW, as required in DoDS5210.41-M_AFMAN 31-108.

8.8.3. MAJCOMs will submit current year AF Forms 116 to AFSEC/SEW no later than 1 February.

8.8.4. MAJCOMs will submit their annual nuclear weapon deviation reports no later than 15 February to AFSEC/SEW.

8.8.5. AFSEC/SEW shall consolidate MAJCOM reports, evaluate the impacts to nuclear weapons surety, and provide an analysis of the deviation reports to the Chief of Staff of the Air Force through AF/SE by 15 March. This analysis will contain an overall assessment of the impact to nuclear weapons surety resulting from the aggregate of all deviations.

JOHN T. RAUCH
Major General, USAF
Chief of Safety

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

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Abbreviations and Acronyms

AF—Air Force

AFB—Air Force Base

AFGSC/A4Z—Air Force Global Strike Command, Nuclear Stockpile Division

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFNWC—Air Force Nuclear Weapons Center

AFPD—Air Force Policy Directive

AFSEC—Air Force Safety Center

AFSEC/SEW—AFSEC, Weapons Safety Division

AFSEC/SEWN—AFSEC/SEW, Nuclear Weapons Branch

AF/SE—Air Force Chief of Safety

CJCSI—Chairman of the Joint Chiefs of Staff Instruction

DAFI—Department of the Air Force Instruction

DAFPD—Department of the Air Force Policy Directive

DECERT—Operational DecertificationNote: This abbreviated term is uniquely distinct from the Operational Decertification term without this abbreviation.

DESR—Defense Explosives Safety Regulation

DoD—Department of Defense

DoDD—Department of Defense Directive

DoDI—Department of Defense Instruction

DoDM—Department of Defense Manual

DOE—Department of Energy

EAP-STRAT—Emergency Action Procedures-Strategic

EOD—Explosive Ordnance Disposal

MAJCOM—Major Command

MIL-STD—Military Standard

OPCERT—Operational CertificationNote: This abbreviated term is uniquely distinct from the Operational Certification term without this abbreviation.

OPR—Office of Primary Responsibility

OUSD A&S—Office of the Secretary of Defense, Under Secretary for Acquisition and Sustainment

US—United States

USAF—United States Air Force

USSF—United States Space Force

Prescribed Forms

None

Adopted Forms

AF Form 116, *Request for Deviation from Security Criteria*

AF Form 847, *Recommendation for Change of Publication*

Terms

Abnormal Environment—Environments as defined in a weapon’s Stockpile-to-Target Sequence and Military Characteristics in which a nuclear weapon or a nuclear weapon system is not expected to retain full operational reliability.

Accident—An unexpected event involving destruction of, or serious damage to, nuclear weapons, nuclear weapon systems, or nuclear components resulting in an actual or potential threat to national security or to life and property.

Air Force Nuclear Weapons Surety Program—Air Force policies, procedures, and safeguards used to comply with DoD nuclear weapon system surety standards.

Aircraft Monitoring and Control—Equipment installed in aircraft to permit monitoring and control of safing, arming, and fuzing functions of nuclear weapons or nuclear weapon systems.

Air Force Nuclear Surety Deviation Reporting Program—The avenue for recording deviations from nuclear safety design requirements and the subsequent reporting of the deviations to the proper authorities.

Ally-Operated Nuclear System—A nuclear weapon system used by a US-allied nation but remaining in USAF custody.

Arm/Disarm Device—A mechanical or electromechanical device providing a positive interruption of the firing circuit to prevent initiation of an explosive or pyrotechnic train before the device’s commanded closure.

Arming—Readying a nuclear weapon so that a fuzing signal will operate the firing system, includes operation or reversal of safing items.

As Low As Reasonably Achievable—A major philosophy of current radiation protection practice which requires every reasonable effort be made to keep radiation exposures as far below the dose limits as practical when technical, economic, and social factors are taken into account.

Authorization—The critical function preventing unauthorized use of a nuclear weapon system and allowing a device or devices to operate the following critical functions: prearming, arming, launching, and releasing.

Certified Critical Component—A critical component that has successfully completed operational certification according to approved technical order procedures. A component of a nuclear weapon system that, if bypassed, activated, or tampered with could result in or contribute to deliberate or inadvertent authorizing, prearming, arming, or launch of a combat delivery platform carrying a nuclear weapon, or the targeting of a nuclear weapon to other than its planned target.

Code Component—Any device, assembly material, software, or information so designated by the National Security Agency.

Cognizant Agent—A clandestine agent, with authorized access to a classified system, who conducts or supports an attack against the system. Also, a person whose normal duties afford the knowledge and opportunity to tamper with certified critical components, codes, or the nuclear command and control system of a nuclear weapon system.

Combat Delivery Platform—A platform, with its installed equipment and components, used to deliver a nuclear weapon to a target.

Command and Control—The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission.

Command Disable—A feature which allows manual activation of the nonviolent disablement of critical weapon components. This system may be internal or external to the weapon.

Compensatory Measure—An action designed to mitigate risk to an acceptable level.

Concept of Operations—A verbal or graphic statement that clearly and concisely expresses what the joint force commander intends to accomplish and how it will be done using available resources.

Credible Abnormal Environment—An Abnormal Environment that has a plausible and reasonable probability of occurrence under a given set of circumstances.

Credible Threat or Scenario—A threat or scenario, fitting the assumptions and ground rules in AFI 91-106, that a federal agency responsible for establishing policy with regard to the type of vulnerability identified in the threat or scenario (i.e., National Security Agency when addressing code components) has determined to be credible.

Critical—A term describing a function, circuit, or activity that directly controls the authorizing, prearming, arming, or launching or releasing of a nuclear weapon, or the targeting of a ground-launched nuclear weapon system.

Critical Component—A component of a nuclear weapon system that if bypassed, activated, or tampered with could result in, or contribute to, deliberate or inadvertent authorizing, prearming, arming, or launch of a combat delivery platform carrying a nuclear weapon, or the employment of a nuclear weapon against anything other than an authorized target.

Critical Data—Data that is used in the operation of the weapon system which, if not properly protected, could cause an unauthorized activation or mismanagement of a Critical Signal.

Critical Fault—Any nuclear weapon system malfunction that results in inadvertent application of control signals or power to the bomb, warhead, or missile propulsion system; degradation in the integrity of prearm, launch, or release primary safety features; unintentional issuance of critical function command signals; or inability to determine weapon system safe status.

Critical Function—A function that readies a nuclear weapon for use (e.g., authorization, prearming, launching, releasing, arming, and navigation validation).

Critical Nuclear Safety Features—Design features that constitute the safety theme for the National Nuclear Security Administration-provided warhead or bomb.

Critical Signal—Action or information transfer that intentionally contributes to some part of the weapon system engaging or activating a critical function in the proper manner.

Critical Software—Weapon system applications and associated data that is provided to or loaded into a weapon system which is used in the operation of the weapon system; if not properly protected, the applications or data could cause an unauthorized activation or mismanagement of a Critical Signal.

Custodial Unit—A US unit designated to maintain custody of nuclear weapons.

Custody—The responsibility for the control of, transfer and movement of, access to, and maintenance of accountability for weapons and components.

DECERT—Action by proper authority to remove a certified critical component from operational use. When it becomes necessary to remove an operationally certified critical component from the operational weapon system, DECERT is accomplished prior to removing two-person control. DECERT consists of removal of classified/code material and the subsequent removal from nuclear certified control. **Note:** This abbreviated term is uniquely distinct from the Operational Decertification term without this abbreviation.

Deficiencies—A deviation from procedures or criteria prescribed in pertinent technical publications or other Service publications that directly implement DoD requirements.

Design Certification—occurs when each of four components is accomplished for the weapon system: Compatibility Certification, Nuclear Safety Design Certification, Weapon System Safety Rules Approval, and Technical Orders Approval.

Design Decertification—Action by proper authority to remove a system or component from design certification.

Development Organization—A group of persons independent of the Verification Organization that is responsible for designing, implementing, modifying, testing, or maintaining critical software that undergoes Nuclear Safety Design Certification, including auxiliary activities such as configuration management or quality assurance.

Deviation—A specific departure from nuclear weapons systems design/Office of the Secretary of Defense policy requirements or when a certified system becomes inoperable due to failure or scheduled upgrade. The deviation is requested for operational necessity based on strategic and compelling reasons.

Discrepancy Report—Documentation of a requirement non-compliance originated by the Verification Organization.

Dynamic Load—An external force or combination of forces (i.e., g-loads, vibration loads, shock loads, and centrifugal loads) that result in acceleration of an object.

Electrical Isolation—Separation of electrical circuits, signals, or data by physical isolation or the use of any property (i.e., time, phase, amplitude, or frequency) that distinguishes one electrical signal from all others to preclude ambiguity, interference, or altered information.

Electromagnetic Compatibility—The ability of systems, equipment, and devices that use the electromagnetic spectrum to operate in their intended operational environments without causing or suffering unacceptable degradation or unintentional degradation because of electromagnetic radiation or response.

Electromagnetic Interference—Any electromagnetic disturbance, induced intentionally or unintentionally, that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics and electrical equipment.

Electromagnetic Pulse—The electromagnetic radiation from a strong electronic pulse, most commonly caused by a nuclear explosion that may couple with electrical or electronic systems to produce damaging current and voltage surges.

Electromagnetic Radiation—Radiation made up of oscillating electric and magnetic fields and propagated with the speed of light. Includes gamma radiation, X-rays, ultraviolet, visible, and infrared radiation, and radar and radio waves.

Emergency Action Message—The medium through which actions involving nuclear weapons are authorized. These messages are encrypted and then sent to lower-echelon units for action. The messages have different formats and may require authentication with sealed code cards depending on the intent of the message.

Engineering Liaison Office—The office that interfaces between a host nation from US Air Forces in Europe and the USAF on all nuclear safety design certification processes and issues.

Essential Facility Systems—Systems and sub-systems that are determined to affect the four DoD Surety Standards directly, within a facility.

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

Explosive Ordnance Disposal Procedures—Those particular courses or modes of action Explosive Ordnance Disposal personnel take for access to, diagnosis, rendering safe, recovery, and disposal of explosive ordnance or any hazardous materials associated with an Explosive Ordnance Disposal incident.

Facility Lifting and Suspension Systems—Equipment (i.e., a hoist, crane, or suspended load frame) installed in a facility that is used to lift or support nuclear weapons.

Fail-Safe—A characteristic of a fuze system, or part thereof, designed to result in a dud round when one or more safety features malfunction. A design feature of a nuclear weapon system or component that ensures a critical function or weapon damage will not occur because of a failure in the system or component.

Failure—Any condition that would result in damage to the weapon or weapon system or have any degradation in the performance of the weapon or weapon system.

Firmware—Combination or executable computer programs and data (software) stored in any form of read-only memory that will be unalterable during program execution.

Fresh Media—Unused physical media that has not been subject to recording operations since leaving the factory.

Global Variables—Software variables that are placed in a high-level scope and are directly accessible across many different separately-scoped software components.

Guided Flight—When the weapon is in the control or influence of the guidance system including the delivery platform.

Hardware—The generic term dealing with physical items as distinguished from its capability or function such as tools, implements, instruments, devices, sets, fittings, trimmings, assemblies, subassemblies, components, and parts. The term is often used in regard to the stage of development, as in the passage of a device or component from the design stage into the hardware stage as the finished object. In data automation, the physical equipment or devices forming computer and peripheral components.

Hardwire—A dedicated discrete electrical circuit.

Inadvertent Programmed Launch—The unintentional entry into terminal countdown or launch countdown and the resultant launch of a missile to a predetermined target.

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.

Independent Nuclear Surety Evaluation—An optional, third-party analysis that is performed to identify whether a program submitted nuclear surety evaluation is technically correct and complete.

Integrated Surety Visit—A technical visit by AFSEC subject matter experts to review areas for compliance with directives and policies rated during nuclear surety inspections. Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3263.05 identifies areas to be reviewed. Visits are at the request of unit commanders and the results will only be provided to the requesting commander.

Integrity—Capable of providing intended functionality.

Intrinsic Radiation—Ionizing radiation emitted through the weapon surface or directly from exposed components of nuclear weapons.

Ionizing Radiation—Particulate (alpha, beta, and neutron) and electromagnetic (X-ray and gamma) radiation of sufficient energy to displace electrons from atoms, producing ions in its passage through matter.

Isolation—A means of preventing the transfer of direct current and unwanted alternating current between two parts of a system while still enabling signal and power transfer between those two parts.

Jettison—The intentional separation of an unarmed weapon from its delivery platform or transport carrier in response to an emergency.

Latching—A mechanism that cannot be undone without acknowledgment and action.

Launching—Propulsion of a missile with a nuclear warhead into flight beyond the immediate area of the launching site.

Launch Control Point—The control center from which system operators control, monitor, and launch a ground-launched missile. Also known as the Launch Control Center.

Launch Point—The geographical area or facility from which a ground-launched missile is launched.

Lead Command—The MAJCOM that serves as the operator's interface with the PM for a weapon system as defined by DAFFD 10-9, *Lead Command/Lead Agent Designation and Responsibilities for United States Air Force Weapon Systems, Non-Weapon Systems, and Activities*, or applicable Program Action Directive. This term is not to be confused with that MAJCOM designated by AF/A5R as OPR for authoring a requirements document (i.e., this MAJCOM would be the "Using Command"). Although, in most cases, the MAJCOM designated by AF/A5R to sponsor a requirement becomes the "Lead Command" for a weapon system.

Limited Life Component—A weapon component that deteriorates in some respect over time, and must be replaced periodically during weapon stockpile life; principle classes of these components are reservoirs, neutron generators, and parachutes.

Line Replaceable Unit—A part that is removed and replaced in the weapon system to return it to operational capability.

Master Nuclear Certification List—Identifies equipment, hardware, facilities and software that are certified in accordance with AFI 63-125. The Master Nuclear Certification List is the sole source for verifying the nuclear certification status of nuclear certified equipment (system, hardware, software).

Military Characteristics—A DoD document submitted to Department of Energy that specifies performance requirements and physical characteristics for a nuclear warhead, bomb, or basic assembly to be compatible with a specific weapon system or systems.

Multiplexed System—A signal transmission system in which two or more signals share one transmission path.

Navigation—Operations to identify the current position and state vector of a guided system.

Navigation Validation—The process that compares the authorized targeting data with the navigation solution to ensure that weapon kinematics will deliver a weapon to an authorized target.

No-Lone Zone—An area where the two-person concept must be enforced because it contains a nuclear weapon, nuclear weapon system, or critical component.

Non-Combat Delivery Platform—Any platform, other than combat platforms, used to move nuclear weapons.

Non-specialized Equipment—Equipment used with nuclear weapons but not specifically designed for that purpose.

Normal Environment—The expected logistical, storage, and operational environments defined in the Stockpile-to-Target Sequence document that the weapon system is required to survive without degradation in operational reliability.

Nuclear Cargo—A nuclear weapon or nuclear component (except limited life components) prepared for Nuclear Logistics Movement.

Nuclear Certification Impact Statement—Document issued by the Program Manager to initiate the certification process of an item, software, etc. This statement advises the AFNWC that a new weapon system or a change to an existing weapon system, equipment item, software, facility, or procedure needs to be evaluated for its impact to the nuclear certification status of a weapon system. The Nuclear Certification Impact Statement must be submitted at least 45 days before the release of a request for proposal or an equivalent program milestone.

Nuclear Certified Equipment—Support equipment that is nuclear certified in accordance with AFI 63-125 and identified in the Master Nuclear Certification List. Nuclear Certified Equipment is a subset of Nuclear Certified Items which includes vehicles; aerospace ground equipment; munitions materiel handling equipment; facility lifting and suspension equipment; test equipment; automatic test equipment (when used in a support function); organizational, field, and depot support equipment; and related computer program software.

Nuclear Certified Item—Procedures, equipment, software, facilities, systems, subsystems or components which are nuclear certified in accordance with the nuclear certification process outlined in AFI 63-125.

Nuclear Component—A major subassembly of a nuclear explosive that contains Special Nuclear Material in quantities sufficient to fuel a nuclear explosion (e.g., pit or canned subassembly). **Note:** Subassemblies containing tritium, as the only nuclear material, are not nuclear components.

Nuclear Consent Function—A function implemented by a deliberate act that provides two-person control over the release system unlock and nuclear weapon prearm functions.

Nuclear Logistics Movement—The transport of nuclear weapons in connection with supply or maintenance operations. Under certain specified conditions, combat aircraft may be used for such movements.

Nuclear Non-Critical Fault—Any fault within a nuclear weapon system that a System Program Office determines is not critical.

Nuclear Mission—The Air Force nuclear mission consists of the people, organizations, processes, procedures, and systems conducting, executing, and supporting nuclear operations, and developing and implementing nuclear policy and guidance. Refer to AFI 13-500, *Air Force Nuclear Mission Responsibilities*, for a description of the major deliberative bodies of the Air Force Nuclear Governance Structure and a description of key nuclear mission functions.

Nuclear Safety Analysis and Technical Evaluation—Software evaluation process performed by a Verification Organization independent of the Development Organization, focused on ensuring that the software complies with established nuclear safety design criteria as found in AFMAN 91-119.

Nuclear Safety Analysis Report—Any report or compilation of reports submitted by a Program for a Nuclear Weapon Systems Surety Group safety study that evaluates a given nuclear weapon system's compliance to nuclear weapons surety requirements.

Nuclear Safety Cross-Check Analysis—Software evaluation process performed by a Verification Organization independent of the Development Organization, focused on ensuring that

the software complies with established nuclear safety design criteria as found in AFMAN 91-119 and that the software does not perform unintended functionality, in particular, malicious actions.

Nuclear Safety Design Certification—A component of design certification that evaluates facilities, hardware, and/or software associated with nuclear weapon systems for compliance with nuclear safety design and evaluation criteria. The purpose is to validate that the system; item of equipment; or nuclear maintenance and storage facility can be used safely in support of nuclear mission operations.

Nuclear Safety Design Criteria—Evaluation criteria for ensuring nuclear safety is a basic system engineering and procedural requirement in nuclear weapon and logistics systems.

Nuclear Safety Regression Testing—Software evaluation process that involves the selective retesting of a software system that has been modified, to ensure the proper operation and functionality of all Critical Signals from initiation through execution.

Nuclear Surety Culture—A critical body of supporting knowledge which frames and explains the supporting concepts and broader national and international importance of our nation’s nuclear deterrence mission as well as the criticality of the mission our nuclear professionals perform each day. It includes the “whys” of nuclear weapons surety, essential strategy/policy elements, reasons for having pride in their mission, current nuclear issues related to allies and adversaries and system sustainment and modernization information. It is vitally important to shaping individual and institutional attitudes that Airmen across the Air Force have toward a variety of key nuclear mission issues. It also plays a critical role in the nuclear mission’s overall professional development and individuals’ desire to make the “nuclear business” their long-term career.

Nuclear Surety Evaluation—An evaluation performed by a nuclear weapons program to document compliance (or lack of compliance) to all the nuclear safety design certification requirements identified in the respective certification requirements plan.

Nuclear Surety Procedures—Uniquely coded technical procedures applied to specific steps within technical orders/checklists that must be performed as written in order to protect against degrading or rendering ineffective, the critical nuclear safety features of the weapon system as determined by Air Force Safety Center’s Weapons Safety division or other appropriate engineering authority.

Nuclear Weapon—The nuclear, Department of Energy-provided component(s) coupled with the non-retrievable hardware that leaves a delivery platform intended for approved targets.

Nuclear Weapon Accident—An unexpected event due to accidental circumstances involving US 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 US forces, or US-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 weapons accidents, incidents, unauthorized detonation, hazardous exposure of radioactive materials to the environment, 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 specialized support equipment, facilities, procedures, personnel, and any vehicles peculiar to the system used for weapon transport.

Nuclear Weapon System Surety Group—A group that conducts all nuclear weapon system safety studies and operational safety reviews to evaluate Air Force nuclear weapon systems and ensure the DoD nuclear weapon system surety standards are met in weapon system design and operations. Refer to AFI 91-102 for all Nuclear Weapon System Surety Group details.

Off-Nominal Testing—Software evaluation that focuses on abnormal scenarios and events that the system should detect and how the system reacts when it detects that these scenarios or events have occurred.

OPCERT—The process of verifying a system or critical component is functioning as design certified and all credible threats and scenarios are mitigated. OPCERT procedures are accomplished on all critical components prior to installation in the operational weapon system or whenever two-person control has been lost, the component has been decertified, or when directed by higher authority. **Note:** This abbreviated term is uniquely distinct from the Operational Certification term without this abbreviation.

Operational Certification—This occurs when the lead/using command qualifies its personnel to perform the mission, certifies them in the Personnel Reliability Assurance Program, trains them in nuclear weapons surety, and assigns a “Ready” rating on an Initial Nuclear Surety Inspection.

Operational Decertification—Action by proper authority to remove a system or component from operational use.

Operational Plan Data Document—A document that describes normal nuclear weapon system operations in the Stockpile-to-Target Sequence during peacetime and periods of increased tension. The operational plan data document serves as a source document for the Technical Nuclear Safety Analysis. The operational data plan document describes: the nuclear weapon system’s current or proposed (for new or significantly modified weapons systems) concept of operations; general operations commonly performed regardless of geographical location; significant variations of the general operations; and normal operations in the Stockpile-to-Target Sequence during peacetime, wartime, and periods of increased hostilities.

Opportunity—In the context of the two-person concept, the time and physical proximity needed to tamper with or damage a nuclear weapon, nuclear weapon system, or critical component.

Permanent Deviation—A departure from a nuclear weapons and nuclear weapons systems related publications that exceeds 48 months and that creates vulnerability. The corrective actions are either not feasible or not cost effective. Permanent deviations require compensatory measures.

Permissive Action Link—A device included in or attached to a nuclear weapon system in order to preclude arming and/or launching until the insertion of a prescribed, discrete code or

combination. It may include equipment and cabling external to the weapon or weapon system that can activate components within the weapon or weapon system.

Personnel Reliability Assurance Program—A portion of operational certification within the Air Force Nuclear Weapon Center’s nuclear certification program outlined in DoD Manual 5210.42_AFMAN 13-501. This program continuously evaluates individuals working with nuclear weapons with the intention of protecting the nuclear deterrent from insider threats.

Positive Measure—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.

Positive Safety Features—Features that enhance security and reduce the likelihood of an accident, an unauthorized act or a deliberate threat used collectively or individually to enhance nuclear safety.

Prearm Command Signal—A signal to the weapon that the personnel controlling the weapon want it to function and produce a nuclear detonation.

Prearming—Nuclear weapon system operations that configure a nuclear weapon so that arming, launching, or releasing will start the sequence necessary to produce a nuclear detonation.

Prime Nuclear Airlift Force—Those aircrews, aircraft, and other functions provided for peacetime support of logistical airlift of nuclear weapons and nuclear components.

Production-Equivalent—Hardware that is functionally identical to the final production hardware, even though the structure of the hardware may have a different layout or a different set of components.

Program Executive Officer—One of a few key individuals in the US military acquisition process. A Program Executive Officer may be responsible for a specific program (e.g., the Joint Strike Fighter), or for an entire portfolio of similar programs (e.g., the Air Force Program Executive Officer for Fighters and Bombers, who is responsible for acquisition programs of Air Force strike aircraft). Program Executive Officers are typically delegated Acquisition Category II and III Milestone Decision Authority for programs in their portfolios.

Program Manager—The designated individual with responsibility for and authority to accomplish program objectives for development, production, and sustainment to meet the user’s operational needs. The Program Manager shall be accountable for credible cost, schedule, and performance reporting and analysis, and have responsibility and authority to accomplish objectives for the total life cycle of the program.

Programmable Logic Device—Electronic component whose circuits can be reconfigured through the use of digital programming files.

Radioactive Material—Any material or combination of materials that spontaneously emit alpha, beta, gamma, X-ray, or neutron radiation.

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

Reliability—The ability of a system and system parts to perform their mission without failure, degradation, or demand on the support system.

Render Safe—Explosive ordnance disposal procedures that interrupt functions or separate essential components of unexploded ordnance to prevent an unacceptable detonation.

Reversion—The process or event of returning to the original state, phase, or condition.

Risk—The probability and severity of effect on, or adverse impact to, nuclear weapons surety produced by the aggregate deviations from nuclear weapons and nuclear weapons systems related publications.

Safe Haven—Temporary storage provided to Department of Energy classified shipment transporters at DoD facilities in order to assure safety and security of nuclear material and/or non-nuclear classified material. Also includes parking for commercial vehicles containing Class A or Class B explosives.

Safe/Safing—The act of placing a nuclear weapon in a safe state, a state such that the receipt of the final irreversible action does not cause a nuclear detonation.

Safe State—A condition where the current operational state and the process taken to get to the current operational state can be proven.

Scrolling—In a multifunction control and display system, the replacement of the active nuclear weapon system function with a nonnuclear function.

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.

Security (Internal)—Design features internal to the nuclear weapon system or nuclear weapon that prevent unauthorized use (i.e., use control).

Security (Physical)—That part of security concerned with physical measures designed to safeguard personnel; to prevent unauthorized access to equipment, installations, material, and documents; and to safeguard them against espionage, sabotage, damage, and theft. In communications security, the component that results from all physical measures necessary to safeguard classified equipment, material, and documents from access thereto or observation thereof by unauthorized persons.

Significant Nuclear Yield—The energy released through nuclear fission or fusion that is equivalent to or greater than the energy released by detonation of four pounds of TNT.

Simultaneous Presence—The storage of nuclear weapons and conventional munitions in the same facility.

Single Session—Recordable media that may only have data recorded on the media once, as compared to media that can have data recorded multiple times.

Software—Sequential instructions used to control a digital processor, or reconfigurable logic implementations.

Software Configuration—The combination of source code, object code, build environment, critical data, and test data that represent everything needed to build the software product, load the software product into the weapon system, and operate the software product.

Software Developer—Organization responsible for implementing software, including all phases - Requirements, Design, Implementation, Testing - and tasks - Artifact Creation, Configuration Management, Quality Assurance, etc.

Specialized Equipment—Equipment designed specifically for use with nuclear weapons.

Split-Handling—A stringent procedure used to maintain a launch function separation that was intentionally designed into two or more different critical components. This procedure prevents a single individual or two-person concept team from having access to the entire launch function.

Split-Knowledge—The separation of information contained in the complete critical component so an individual or two-person concept team is denied knowledge of the total information.

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. Alternatively, 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.

Stores Management System—The portion of the aircraft system that provides weapon control, release, and monitor functions.

Support Equipment—Includes all equipment required to perform the support function, except that which is an integral part of the mission equipment. It does not include any of the equipment required to perform mission operation functions. Support equipment should be interpreted as tools, test equipment, automatic test equipment (when used in a support function), organizational, field, and depot support equipment, and related computer programs and software.

System Program Office—The office of the program manager and the single point of contact with industry, government agencies and other activities participating in the system acquisition process.

Tamper—To knowingly perform an incorrect act or unauthorized procedure involving a nuclear weapon, nuclear weapon system, or critical component.

Tamper Detection Indicators—A sealing method that provides evidence in the event a critical component has been tampered with or inadvertently activated.

Targeting—The process of selecting targets and matching the appropriate weapon to them by taking account of operational requirements and capabilities.

Targeting Data—Information that identifies an authorized target and contains the geographical location and target parameters (height of burst, yield, etc.).

Technical Deviation—A departure from a nuclear weapons and nuclear weapons systems related publication but essentially affords the same level of nuclear weapons surety. Technical deviations do not create vulnerabilities and, as such, do not require compensatory measures, and may be approved for an indefinite period of time.

Technical Nuclear Safety Analysis—An independent technical analysis of a nuclear weapon system undertaken for a Nuclear Weapon System Surety Group Safety Study. The Technical Nuclear Safety Analysis should address the following areas: (1) description of the weapon system to include a comprehensive engineering analysis of the weapon system design, (2) an analysis of compliance with all nuclear weapons surety requirements, (3) an analysis of weapon system

response to normal and credible abnormal environments, and (4) identification of all nuclear weapons surety requirements deficiencies and proposed corrective actions.

Temporary Deviation—The approved temporary continuation of a non-standard condition which deviates from established publications and requires compensatory measures. Temporary deviations shall be approved for a period not to exceed 12 months.

Time-Division Multiplexing—The transmission of information from several signal channels through one communication system with different channel samples staggered in time to form a composite pulse train.

Troubleshooting—The tracing and correction of faults in a mechanical or electronic system.

Two-Person Concept—Designed to ensure that a lone individual is denied access to nuclear weapons, nuclear weapon systems or critical components, never allowing the opportunity for tampering, damage, or an unauthorized act to go undetected. The two-person concept requires the presence at all times of at least two authorized persons, each certified under Personnel Reliability Assurance Program, knowledgeable in the task to be performed, familiar with applicable safety and security requirements and each capable of promptly detecting an incorrect act or improper procedure with respect to the task to be performed. Both members must have completed required nuclear weapons surety and Personnel Reliability Assurance Program training.

Unauthorized Launch—A deliberate launching or releasing of a nuclear missile or bomb (except jettisoning) before execution of an emergency war order.

Unbounded Recursion—The repeated application of a function with no built-in logical limit.

Uninitialized Variables—Variables that are not assigned a value at instantiation.

Unique Signal—A digital or analog signal that operates only one specific and corresponding critical function by allowing the receiver to discriminate this signal from all other signals in the nuclear weapon system and from those signals that may be generated accidentally or applied from outside the nuclear weapon system.

Unused Code—Code that is untestable due to software construct (incorrect conditional statements, for example) or code that is not tested by the developer.

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, internal security, and system safety rules.

Using Command—The MAJCOM operating a system, subsystem, or item of equipment. Generally applies to those operational commands or organizations designated by Headquarters, US Air Force to conduct or participate in operations or operational testing (e.g., ACC, AFGSC, USAFE).

Verification Organization—A group of persons independent of the Development Organization that is responsible for verifying software for Nuclear Safety Design Certification.

Volatile Memory—A storage medium that loses information when power is removed from the system.

Vulnerability—The characteristics of a system that cause it to suffer a definite degradation (incapability to perform the designated mission) as a result of having been subjected to a certain level of effects in an unnatural (man-made) hostile environment.

Weapon Transient Area—Any area other than a maintenance or storage area where nuclear weapons or warheads are being staged for one shift or less or are being transported.

Weapon Storage Area—A specific location that is used to house nuclear weapons, warheads and nuclear components.

Weapon Generation Facility—One or multiple buildings used for maintenance and storage of nuclear weapons, the associated physical security features, and supporting infrastructure located within continental US based weapon storage areas.

Weapon System Safety Rules—Operational restrictions or requirements designed to assure nuclear weapon systems are compliant with the four DoD nuclear weapons surety standards.

Weapons Safety Manager—An individual who manages a base, wing, or equivalent safety program consisting of explosives safety, missile safety, nuclear weapons surety, or any combination of these.

Withdraw (Human Intent)—Reverse the action which enabled a Critical Signal, by a physical action - throwing a switch, pushing a button, etc. The ability to withdraw human intent is only valid up through the final irreversible action, which is launch or release of the weapon.

Attachment 2

RECOMMENDED OUTLINE FOR THE NUCLEAR SURETY EVALUATION

A2.1. Certification Action.

A2.1.1. Recommend certification or certification with restrictions (to meet the requirements of this instruction).

A2.2. Item Identification. For hardware or software (as applicable) provide:

A2.2.1. DELETED

A2.2.2. Nomenclature or common name.

A2.2.3. National item identification number.

A2.2.4. Manufacturer and code.

A2.2.5. Model and part number.

A2.2.6. Computer program identification number.

A2.2.7. Item manager (include the functional address symbol and telephone number).

A2.3. Uses and Description. Provide information on:

A2.3.1. DELETED

A2.3.2. Equipment uses.

A2.3.3. Weapons.

A2.3.4. Weapon types (as considered in the analysis).

A2.3.5. Top-level description.

A2.4. Summary of Engineering Analysis (Evaluation and Test):

A2.4.1. Identify the specific AFI 91-101, AFI 91-106, AFMAN 91-118 and/or AFMAN 91-119 criteria used in the design and evaluation process for the item.

A2.4.2. Discuss the certification approach used (compliance verification methods).

A2.4.3. Identify or reference the specific test and analysis procedures used.

A2.4.4. Summarize the results of the certification analysis, and discuss any discrepancies identified during the evaluation and their disposition.

A2.5. Recommended Restrictions.

A2.5.1. Provide any recommended restrictions needed to compensate for uncorrected design deficiencies or discrepancies.