

1 MAY 1999



Safety

**NUCLEAR WEAPON SYSTEM SAFETY
STUDIES, OPERATIONAL SAFETY REVIEWS,
AND SAFETY RULES**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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OPR: HQ AFSC/SEWO
(Lt Col Mark K. Roland)
Supersedes AFI 91-102, 6 April 1994.

Certified by: HQ USAF/SE
(MGen Francis C. Gideon, Jr.)

Pages: 12
Distribution: F

This instruction implements AFD 91-1, *Nuclear Weapons and Systems Surety*. It defines the procedures for conducting safety studies and operational safety reviews; outlines the development and approval process for nuclear weapon system safety rules; describes the functions of the US Air Force Nuclear Weapon System Safety Group (NWSSG); and the responsibilities of affected organizations. It applies to all personnel with nuclear weapon system safety and security responsibilities. Send major command (MAJ-COM) supplements to this instruction to HQ AFSC/SEW, 9700 G Avenue, Kirtland AFB NM 87117-5670 for approval before publication.

SUMMARY OF REVISIONS

Updated information IAW DoD Directive 3150.2, *Nuclear Weapon System Safety Program*, December 23, 1996, and DoD 3150.2-M, *DoD Nuclear Weapon System Safety Program Manual*, December 1996. Clarified NWSSG membership requirements, updated office symbols, established coordination procedures for NWSSG reports and rules packages. Changed the periodic status reports on NWSSG recommendations to AFSC/SEW from quarterly to semiannual and established the requirement for status of NWSSG recommendations reports to ATSD(NCB), DOE, and CJCS. Added priorities of NWSSG recommendations. The reporting requirements in paragraph 9.1., 10, 14.3., 14.3., and 20.9. are exempt from licensing in accordance with paragraph 2.11.5. of AFI 37-124, *The Information Collections and Reports Management Program: Controlling Internal, Public and Interagency Air Force Information Collections.*

Added or changed information is indicated by a (|).

Section A—General Information

1. Terms and Definitions. The terms used in this instruction are defined in AFI 91-101, *Air Force Nuclear Weapons Surety Program*.

2. Department of Defense (DoD) Safety Standards. DoD Directive 3150.2, *Nuclear Weapon System Safety Program*, December 23, 1996, establishes the DoD Nuclear Weapon System Safety Standards.

3. Air Force Goals and Requirements:

3.1. This instruction provides guidelines to ensure nuclear weapons are designed, maintained, transported, stored, and operated in a safe and secure manner. The Air Force supports these goals by:

3.1.1. Convening the NWSSG to evaluate nuclear weapon systems.

3.1.2. Proposing nuclear weapon system safety rules for Secretary of Defense (SECDEF) approval.

3.1.3. Conducting Nuclear Surety Inspections according to AFI 90-201, *Inspector General Activities*.

3.2. Operational units must not perform any nuclear operations without SECDEF-approved safety rules.

3.2.1. Use equipment, software, and procedures certified according to AFI 91-103, *Air Force Nuclear Safety Certification Program*.

3.2.2. Conduct approved actual nuclear weapon operations according to approved plans based on governing directives, technical orders, and the safety rules.

3.3. Records Disposition. Records created as a result of processes prescribed in this instruction must be maintained and disposed of IAW AFMAN 37-139, "*Records Disposition Schedule*."

Section B—NWSSG Functions and Composition

4. NWSSG Functions. The NWSSG:

4.1. Reviews nuclear weapon system designs and operations to determine if they meet the DoD Nuclear Weapon System Safety Standards.

4.2. Proposes safety rules and recommends changes to improve nuclear weapon system surety.

4.3. Doesn't certify nuclear weapon system hardware, software, or procedures. Reference AFI 91-103 for the nuclear safety certification program

5. NWSSG Composition. Agencies appoint permanent members to serve in the NWSSG.

5.1. Permanent Voting Membership:

5.1.1. Chair from HQ AFSC/SEW (votes only to break a tie).

5.1.2. One member each from the Air Force Materiel Command, Defense Threat Reduction Agency (DTRA), Department of Energy (DOE), Air Force Security Forces Center, and US Strategic Command (USSTRATCOM).

5.2. Additional Voting Membership:

5.2.1. One member each from the Air Mobility Command, Air Combat Command, US European Command, United States Air Forces in Europe, and Air Force Space Command when the group addresses topics in their organization's area of responsibility.

5.2.2. A member from another Air Force agency or military service that uses the weapon system being evaluated. The Chair must approve each additional voting member.

5.3. Nonvoting Technical Advisors. Engineers, technical experts, and contractors may attend the NWSSG evaluations when requested by the Chair, the Executive Officer, or a voting member. The Chair decides how many technical advisors go on field trips.

5.4. Nonvoting Support Staff. The support staff includes the NWSSG Executive Officer and project officers. AFSC/SEW provides the Support Staff.

5.5. Member Training. NWSSG members are encouraged to complete the applicable curriculum of the safety training program in Chapter 9 of DoD 3150.2-M, *DoD Nuclear Weapon System Safety Program Manual*, December 1996.

6. Qualifications and Duties of Members:

6.1. Air Force members must meet these qualifications to serve as a voting member in the NWSSG:

6.1.1. Field grade rank or civilian equivalent. Exceptions will be approved by the Chair.

6.1.2. Recent nuclear weapons experience.

6.1.3. Full understanding of their agency's responsibilities for the nuclear weapon system being reviewed.

6.1.4. No direct responsibility for designing, developing, or producing the nuclear weapon system being reviewed.

NOTE: The DTRA and DOE must appoint members who meet these qualifications as closely as possible.

6.2. Voting Member Duties. Voting members must:

6.2.1. Exchange information with the NWSSG.

6.2.2. Help the NWSSG schedule field trips.

6.2.3. Ensure that their agencies provide documents and briefings needed during an NWSSG function.

6.2.4. Request any essential technical support from their agency.

6.2.5. Review background material to prepare for NWSSG functions.

6.2.6. Send a list of their technical advisors' security clearances to HQ AFSC/SEW at least 5 workdays before the NWSSG function.

6.2.7. Send their personal security clearance to HQ AFSC/SEW every year or as required.

6.2.8. Vote during NWSSG meetings and sign the NWSSG report.

7. Visitor Participation. Visitors approved by the Chair or the Executive Officer may attend NWSSG meetings.

7.1. Send requests to HQ AFSC/SEW at least 5 workdays before the meeting. Include this information:

- 7.1.1. Full name, rank or civilian grade, Social Security number, and civilian employee or military identification card number.
- 7.1.2. Organization, address, and telephone number (Defense Switched Network [DSN] number, if available).
- 7.1.3. Security clearance and any special access, such as North Atlantic Treaty Organization, critical nuclear weapon design information, and Unauthorized Launch access.
- 7.1.4. Visit dates and specific NWSSG activities you want to attend.
- 7.1.5. Justification for visit.
- 7.1.6. Telephone number (DSN, if available) of the office that can verify the security clearance and special access.

Section C—Processing Reports and Evaluations

8. Types of Evaluations. DoD 3150.2-M describes the types of evaluations the Air Force must conduct at a minimum.

9. Report and Safety Rules Processing . DoD 3150.2-M requires prompt report processing.

9.1. HQ AFSC/SEW prepares the coordination copy of the NWSSG report. Within 2 weeks of completing the study, HQ AFSC/SEW will forward sufficient copies of the coordination copy to HQ USAF/SEI for Air Staff coordination and approval.

9.2. Within 3 weeks of receipt of the coordination copy, Air Staff agencies review, provide comments, and/or coordinate and return coordination to HQ USAF/SEI. HQ USAF/SEI will consolidate Air Staff reviews and provide them to HQ AFSC/SEW for publishing of the final report.

9.3. HQ AFSC/SEW publishes the final NWSSG report within 2 weeks of receipt of the Air Staff approval. HQ AFSC/SEW will distribute the final report to appropriate agencies to include: voting members, OPRs for approved recommendations, appropriate commands/agencies, and NWSSG advisors.

9.3.1. Upon receipt of the final NWSSG report, MAJCOMs may distribute the rules package for training purposes and preparation for implementation of the SECDEF-approved weapon system safety rules.

9.4. If there is an Air Staff-approved rules package, HQ AFSC/SEW will prepare the rules package (Parts A, B, and C of the final report) and forward it to HQ USAF/SEI. SEI sends Air Staff-approved rules package to DTRA for coordination.

9.5. After DTRA action on the rules package, SEI will forward the rules package to the Joint Staff (JS) through the appropriate Air Staff agency.

9.6. The JS requests approval from the SECDEF.

9.7. The SECDEF's staff reviews the proposed rules and requests DOE coordination.

9.8. The JS notifies the Air Staff of SECDEF approval. The Air Staff forwards the SECDEF-approved rules to HQ USAF/SEI. HQ USAF/SEI notifies HQ AFSC/SEW of approval of the rules and forwards a copy of the approved rules to HQ AFSC/SEW. Unless otherwise specified,

safety rules and revisions to approved safety rules shall be implemented within 30 days of SECDEF approval.

9.9. HQ AFSC/SEW upon receipt of SECDEF-approved rules will forward copies to the appropriate agencies (responsible MAJCOM safety offices, and system program offices) under HQ USAF/SE signature directing immediate implementation of approved rules. HQ AFSC/SEW will publish the approved safety rules in an Air Force Instruction as soon as possible.

Section D—Supporting Documents and Briefings

10. NWSSG Report. An NWSSG report is an executive summary of NWSSG proceedings. It is not a technical or engineering source document. DoD 3150.2-M, Appendix C, contains the basic report format.

11. Operational Plan Data Document (OPDD). The OPDD is a source document for the Technical Nuclear Safety Analysis (TNSA) or abbreviated TNSA that tells the NWSSG how the command will operate and maintain the nuclear weapon system.

11.1. The OPDD describes:

11.1.1. The nuclear weapon system's concept of operations.

11.1.2. General operations commonly performed regardless of geographical location.

11.1.3. Significant variations of the general operations.

11.1.4. Normal operations in the stockpile-to-target sequence during peacetime, wartime, and periods of increased hostilities.

11.1.5. Operations conducted under contingency plans.

11.2. The operational MAJCOM prepares the OPDD. If the OPDD is new or requires change to support an NWSSG study or review, prepare the OPDD in sufficient time to ensure approval and distribution (see paragraph 11.5.). The MAJCOM must provide the final OPDD to HQ AFSC/SEW 6 weeks before the study begins. If a TNSA is required, the approved OPDD (or change) is required six months before the study is scheduled to begin.

11.3. Because the OPDD is a planning document, don't prepare it with the same level of detail as an operational plan. Summarize each operation and refer to appropriate documents (if available) for greater detail. Include all desired operational capabilities. Include all desired system capabilities in the OPDD. The weapon system safety rules proposed by the NWSSG may not allow all desired capabilities, but they will not even be considered unless included in the OPDD. Commands can't add operational capabilities after the SECDEF approves the safety rules without an NWSSG study.

11.4. Send HQ AFSC/SEW any current documents or plans referred to in the OPDD.

11.5. The MAJCOM submits the OPDD to HQ USAF/SEI and HQ AFSC/SEW for coordination and to HQ USAF/XON for approval. HQ AFSC/SEW reviews the OPDD to ensure the proposed operations do not violate weapon system safety rules. HQ USAF/XON approves or disapproves the OPDD.

11.5.1. If approved, HQ USAF/XON issues an approval memorandum to the MAJCOM and returns the OPDD to HQ USAF/SEI for distribution to AAC/WN and HQ AFSC/SEW for distribution to other agencies deemed appropriate.

11.5.2. If disapproved, HQ USAF/XON returns the OPDD to the MAJCOM for correction and resubmittal, directing the MAJCOM to reaccomplish the review process if necessary.

12. Technical Nuclear Safety Analysis (TNSA). The TNSA is prepared by the Nuclear Weapons Product Support Center (AAC/WN) and is an independent technical analysis of the nuclear weapon system.

12.1. Personnel who prepare the TNSA may not represent organizations directly responsible for designing, developing, producing, maintaining, operating, or providing logistics for the weapon system under evaluation.

12.2. The TNSA:

12.2.1. Describes the weapon system in depth.

12.2.2. Has a safety and security compliance matrix that shows how weapon system features meet the DoD Nuclear Weapon System Safety Standards (see [attachment 2](#)).

12.2.3. Contains a comprehensive engineering analysis of the weapon system design.

12.2.4. States how the weapon system does or does not meet the DoD Nuclear Weapon System Safety Standards in both normal and credible abnormal environments.

12.2.5. Identifies deficiencies and recommended corrective actions for the weapon system to comply with AFI 91-107, *Design, Evaluation, Troubleshooting, and Maintenance Criteria for Nuclear Weapon Systems*, or DoD Directive 5210.41, *Security Policy for Protecting Nuclear Weapons*, September 23, 1988.

12.2.6. Assesses physical security features planned for the weapon system. If appropriate, include an examination of security measures for nonfixed site operations, identify security deficiencies, and propose necessary corrective actions.

12.2.7. Includes a qualitative risk assessment of the weapon's likelihood of violating any of the DoD Nuclear Weapon System Safety Standards or causing plutonium scatter.

12.3. Prepare a preliminary TNSA for phase I of an initial safety study. Prepare a final TNSA for phase II of an initial safety study and a preoperational safety study. **NOTE:** An abbreviated TNSA may be used for a special safety study. It is limited in scope and only covers the specific study topic.

12.4. Provide a draft TNSA to NWSSG members, technical advisors, and HQ AFSC/SEW at least 6 weeks before the NWSSG study. Provide a preliminary or final TNSA no later than 2 weeks before the first NWSSG meeting.

13. Support Briefings:

13.1. The operational command, development agency, TNSA authors, and contractors brief the NWSSG.

13.2. HQ AFSC/SEW tells the agencies what topics they must cover in the briefing.

Section E—Actions Required on NWSSG Recommendations Approved by the Air Staff

14. Implementing Air Staff-Approved Recommendations:

14.1. The designated action agencies must implement all safety recommendations approved by the Air Staff.

14.2. Each action agency:

14.2.1. Notifies HQ AFSC/SEW of the agency's office of primary responsibility, telephone number (DSN, if available), and point of contact.

14.2.2. Sets up a schedule to implement the recommendations.

14.2.3. Sends HQ AFSC/SEW a status report of NWSSG Studies and Reviews, Recommendations, and Safety Rules by the 15th of May and November. Begin reporting after receiving the final NWSSG report and include a schedule for completing each action identified in each recommendation.

14.2.4. Asks HQ AFSC/SEW to close the recommendation after implementing the required actions. A recommendation is not closed until HQ AFSC/SEW notifies the action agency in writing.

14.3. HQ AFSC/SEW monitors agency actions and publishes a semiannual status of recommendations. An annual status report is due to ATSD(NCB) with information copies provided to CJCS and DOE on July 1.

14.4. Priority assignments for NWSSG recommendations:

14.4.1. Immediate Action. (USE OF THE NUCLEAR WEAPON SYSTEM IS RESTRICTED.) Reserved for recommendations made to correct deficiencies that prevent the weapon system from meeting one or more of the DoD Nuclear Weapon System Safety Standards. It restricts certain operations of the nuclear weapon system or may completely prohibit use of the system until the recommendation is implemented.

14.4.2. Urgent Action. (USE OF THE NUCLEAR WEAPON SYSTEM IS PARTIALLY RESTRICTED.) Reserved for those recommendations that are considered serious and require prompt corrective action, yet do not violate any of the DoD Nuclear Weapon System Safety Standards. Peacetime restriction of the weapon system is warranted, but use during war is not precluded. Action agencies will ensure proper resources are allocated to complete the recommended action by the assigned completion date.

14.4.3. Time Compliance. (USE OF THE WEAPON SYSTEM IS NOT RESTRICTED.) Reserved for recommendations to enhance nuclear surety. The weapon system may be operated while action is being taken to satisfy a recommendation.

Section F—Responsibilities

15. Air Force Chief of Safety (HQ USAF/SE).

15.1. Oversees the Air Force Nuclear Weapons Surety Program.

15.2. Manages the safety evaluation process.

15.3. Directs HQ AFSC/SEW to appoint the NWSSG Chair, Executive Officer, project officers, selected technical advisors, and to provide administrative support.

16. Air Force Chief of Security Forces (HQ USAF/XOF). Oversees the Air Force Security Program.

17. Office of the Chief of Safety, Issues Division (HQ USAF/SEI):

17.1. Is the Air Force point of contact on nuclear surety matters. (NOTE: HQ USAF/XOJ is the formal point of contact for all JS issues. HQ USAF/SEI forwards requests for action or information from JS, including requests for approval of proposed safety rules, through HQ USAF/XOJ.)

17.2. Monitors all nuclear surety activities and takes part in actions as directed by HQ USAF/SE.

17.3. Coordinates nuclear surety activities within the Air Staff and with other government agencies.

17.4. Staffs NWSSG reports sent for Air Staff approval.

17.5. Obtains DTRA coordination on nuclear weapon system safety rules.

17.6. Gives HQ AFSC/SEW the status of proposed safety rules.

17.7. Makes initial notification of approved safety rules.

17.8. Staffs the proposed rules need date for new weapon systems, modified weapon systems, or new or modified operational concepts and informs HQ AFSC/SEW of approved dates. HQ USAF/SEI notifies HQ AFSC/SEW of changes to the rules need date.

18. Director of Nuclear and Counterproliferation (HQ USAF/XON):

18.1. Approves or disapproves the OPDD after consulting with appropriate Air Staff offices.

19. Commander, Air Force Security Forces Center. Designates an NWSSG voting member to represent HQ USAF/SF interests during studies as determined by the NWSSG Chairman.

20. The NWSSG Support Staff:

20.1. Ensures that the NWSSG conducts the scheduled studies and reviews.

20.2. Schedules NWSSG evaluations and coordinates support with appropriate agencies, and publishes a semiannual NWSSG schedule and a 5-year forecast annually. The NWSSG Chair convenes the evaluations according to the schedule.

20.3. Prepares the draft report for NWSSG evaluations.

20.4. Sends NWSSG recommendations and proposed nuclear weapon system safety rules to the Air Staff for coordination through USAF/SEI.

20.5. Maintains the status of proposed nuclear weapon system safety rules.

20.6. Reviews weapon system modifications, changes in operational procedures, or proposed tests to determine if nuclear surety is affected. The support staff requests an OPDD, or OPDD change, and schedules an NWSSG study when nuclear surety is affected.

20.7. Budgets and funds all NWSSG field trips for voting members (except DOE, DTRA, USEUCOM, and USSTRATCOM) and one TNSA writer. **NOTE:** Each command must budget for additional temporary duty expenses in support of NWSSG activities. The Chair determines funding requirements if an NWSSG study calls for additional expertise.

20.8. Serves as the Air Force focal point for DOE field reviews of nuclear weapon system safety rules.

20.9. Publishes a semiannual report containing the status of NWSSG recommendations due to ATSD(NCB) by the 1st of January and July with information copies to CJCS and DOE.

20.10. Assigns an Air Force member to nuclear safety studies or operational safety reviews conducted by other military Services if the Air Force also uses the weapon system under evaluation.

21. MAJCOM:

21.1. Ensures that MAJCOM-developed procedures comply with approved nuclear weapon system safety rules and agree with Air Force-approved operational and technical procedures.

21.2. Evaluates proposed modifications, procedural changes, tests, or other activities involving nuclear weapons and then takes the following actions as applicable:

21.2.1. Proceeds with the modification, procedural change, or test after coordinating with the appropriate engineering organizations to verify that nuclear surety isn't affected.

21.2.2. Sends evaluations to HQ AFSC/SEW (with an information copy to AAC/WN) for further analysis when unable to determine the nuclear surety status.

21.2.3. Proceeds with the modification, procedural change, or test when HQ AFSC/SEW doesn't require a special safety study.

21.2.4. Revises the OPDD and requests a special safety study when appropriate.

21.2.5. Requests an NWSSG evaluation for reasons other than those listed here. Fully explain the request to HQ AFSC/SEW. HQ AFSC/SEW determines the need, scope, and priority of the proposed evaluation.

21.2.6. Proposes a rules need date, including a justification, to HQ AFSC/SEW. Send information copies to HQ USAF/SEI. Normally, the rules need date will be at least 60 days before the weapon system safety rules are actually needed to begin operations with nuclear weapons.

21.2.7. Designates an individual to serve as an NWSSG member consistent with paragraphs 5.1, 5.2, and 6.1.

21.2.8. Provides AAC/WN or OL-EL/ELO the technical support and data needed to prepare the TNSA or abbreviated TNSA.

21.2.9. Provides required support to HQ AFSC/SEW and the MAJCOM's NWSSG voting member.

21.2.10. Hosts and arranges NWSSG field trips to MAJCOM facilities and supports HQ AFSC/SEW on DOE field reviews.

21.2.11. Implements applicable Air Staff-approved NWSSG recommendations.

FRANCIS C. GIDEON, JR., Maj General, USAF
Chief of Safety

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFI 91-101, *Air Force Nuclear Weapons Surety Program*

DOD Directive 3150.2, *Nuclear Weapon System Safety Program*

AFI 90-201, *Inspector General Activities*

AFI 91-103, *Air Force Nuclear Safety Certification*

AFMAN 37-139, *Records Disposition Schedule*

Abbreviations and Acronyms

DOE—Department of Energy

DSN—Defense Switched Network

DTRA—Defense Threat Reduction Agency

NWSSG—Nuclear Weapon System Safety Group

OPDD—Operational Plan Data Document

SECDEF—Secretary of Defense

TNSA—Technical Nuclear Safety Analysis

USSTRATCOM—US Strategic Command

Attachment 2**SAMPLE FORMAT FOR DOD NUCLEAR WEAPON SYSTEM SAFETY STANDARDS
MATRIX**

We are submitting the F-15E/B61 Safety Compliance Matrix according with AFI 91-102, *Nuclear Weapon System Safety Studies, Operational Safety Reviews, and Safety Rules*. The matrix indicates features of the weapon system that meet the intent of particular DoD Nuclear Weapon System Safety Standards (figure A1.1). We cover physical security (4th standard) in a separate supplement to the Technical Nuclear Safety Analysis.

The matrix analyzes eleven types of positive nuclear safety features or measures:

1. Power Isolation.
2. Signal Characteristic.
3. Electrical Isolation.
4. Mechanical Restraint.
5. Reversibility.
6. Two-Person Concept Control.
7. Monitor.
8. Code Entry.
9. Data Control.
10. Environmental Parameter.
11. Personnel Reliability Program Control.

The matrix shows how to apply types 1 through 11 in 5 phases of system operations on the ground and in flight, as affected by aircraft power, logic power, aircraft monitoring and control (AMAC) power, AMAC state, and release state. A number in bold, italicized type indicates primary means of control. A dash indicates "not applicable."

Table A2.1. Safety Compliance Matrix.

DoD Standard Concern	Loading	A Ground-Power OFF	B Ground-Logic OFF	C Ground-Safe AMAC ON	D Flight-Safe/ LOCKED	E Flight-Arm/ UNLOCKED
Accidental Yield (1st Standard)	1 2 3 -- ----- 10-	1 2 3 -- ----- 10-	- 2 3 -- ----- 10	- 2 3 -- 6 - 8 - 10-	- 2 3 -- ----- 10-	----- 5 ----- 10-
Unauthorized Prearm (2d Standard)	1 ----- 6 ----- 11	1 ----- 6 ----- 11	-- 3 -- 6 ----- 11	----- 6 7 8 -- 11	----- 6 7 8 -- -	----- ----- -
Inadvertent Prearm (3d Standard)	1 2 3 -- ----- -	1 ----- ----- -	-- 3 -- ----- -	- 2 3 - 5 6 7 8 9 10 -	- 2 3 - 5 6 7 8 9- -	----- ----- -
Inadvertent Release (3d Standard)	1 - 3 4 - 6 ----- -	1 -- 4 - ----- -	-- 3 4 - ----- -	-- 3 4 5 6 7 - 9 - -	-- 3 4 5 6 7 - 9 - -	----- --- 9 - -

NOTE: This example is adapted from an actual matrix for illustrative purposes only.