

**BY ORDER OF THE
SECRETARY OF THE AIR FORCE**

AIR FORCE INSTRUCTION 91-108

14 MAY 2020



Safety

**AIR FORCE NUCLEAR WEAPONS
INTRINSIC RADIATION AND 91(B)
RADIOACTIVE MATERIAL SAFETY
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*. It contains guidance needed to carry out Intrinsic Radiation (INRAD) Safety Program requirements and to ensure that routine or planned exposure of personnel to INRAD is “as low as reasonably achievable” (ALARA) and does not exceed the maximum permissible dose. It provides guidance on the management of both 91(b) radioactive material (RAM) associated with current nuclear weapons maintenance operations and residual 91(b) RAM from legacy maintenance, nuclear weapon accidents or incidents, and Air Force 91(b) reactors located in the United States. The term “91(b)” refers to RAM covered under Section 91(b) of the Atomic Energy Act (AEA) of 1954. It applies worldwide to all Regular Air Force, Air Force Reserve, and Air National Guard units with a nuclear mission and personnel engaged in the maintenance, upload, download, transport, or storage of nuclear weapons, associated RAM, or components, as well as organizations that possess residual 91(b) RAM, excluding material covered under AFMAN 91-110, *Nuclear Safety Review and Launch Approval for Space or Missile Use of Radioactive Material and Nuclear Systems*. Refer recommended changes and questions about this publication to the office of primary responsibility using the AF Form 847, *Recommendation for Change of Publication*. Route AF Form 847s from the field through the appropriate functional chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Instruction (AFI) 33-322, *Records Management and Information Governance Program*, and disposed of in accordance with the Air Force Records Disposition Schedule located in the Air Force Records Information Management System. Send

major command (MAJCOM) supplements to this instruction to AFSEC/SEW, 9700 Avenue G, Kirtland AFB NM 87117-5670 for coordination before publication. The authorities to waive wing/unit level requirements in this publication are identified with a Tier (“T-0, T-1, T-2, T-3”) number following the compliance statement. See AFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the requestor’s commander for non-tiered compliance items. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule located in the Air Force Records Information Management System.

SUMMARY OF CHANGES

This document has had only minor changes. A key change was implementation of a requirement to monitor for tritium releases during maintenance activities handling containers with gaseous tritium.

Chapter 1

INTRODUCTION

1.1. Purpose.

1.1.1. This instruction provides specific guidance for operations involving radioactive material (RAM) covered by the Atomic Energy Act of 1954, 42 United States Code (USC) § 2011 et seq., commonly termed Section 91(b). RAM under the 91(b) designation within the scope of this instruction are: RAM associated with current nuclear weapons operations, legacy nuclear weapons maintenance wastes, residuals from nuclear weapons accidents, residuals from atmospheric testing of nuclear weapons on AF installations, residuals from nuclear reactor operations, and some defense-related material supporting current AF missions.

1.1.2. This instruction does not apply to RAM covered under AFMAN 40-201, *Radioactive Materials Management*, or 91(b) RAM covered under AFMAN 91-110. **Note:** This instruction references AFMAN 40-201 as some processes from that instruction may be applicable to INRAD safety.

Note: Pursuant to recent National Defense Authorization Acts, the Defense Health Agency is assuming responsibility for many medical activities from the individual Services. Therefore, ensure individual provisions in this publication regarding medical services are accurate, as they are subject to change at any time.

1.2. Overview.

1.2.1. Implementation of the INRAD safety program and the ALARA concept must consider weapons safety, security, reliability, and operational mission requirements. The ALARA concept is further defined and explained in AFI 48-148, *Ionizing Radiation Protection*.

Note: Most Technical Order (TO) procedures have inherent ALARA principles that reduce the potential for exposure.

1.2.1.1. Nuclear-capable units, as defined by unit Designed Operational Capability (DOC) Statement, including units with a contingency or limited nuclear mission, must comply with the ALARA concept.

1.2.1.2. Host installations that support nuclear-capable tenants or geographically separated units (GSUs) must comply with this instruction.

1.2.2. Units that generate radioactive waste and/or mixed (i.e., chemical and radioactive) waste from nuclear weapons maintenance procedures must comply with this instruction.

1.2.3. Installations located in the United States that possess residual 91(b) RAM-contaminated buildings, burial sites, etc. from past (legacy) nuclear weapons accidents, incidents or maintenance, dismantled/decommissioned 91(b) nuclear reactors (still under AF possession), or other residual 91(b) RAM must comply with this instruction.

1.3. Program Objectives.

1.3.1. Limit the risk of radiation-induced effects to a reasonable level in relation to the requirements of the USAF mission, other societal or military risks, benefits gained, and economic factors.

1.3.2. Manage 91(b) RAM to ensure health, safety, and regulatory compliance.

Chapter 2

ROLES AND RESPONSIBILITIES

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

2.1.1. Ensure Program Managers and acquiring activities address potential INRAD exposures to workers and the public early and throughout the acquisition cycle of new or modified nuclear weapon systems.

2.1.2. Inform Air Force Safety Center, Weapons Safety Division (AFSEC/SEW) of the development of new weapon systems or weapon arrays which may involve INRAD sources (and of any INRAD measurement data taken during the research, development, test, and evaluation cycle).

2.2. The Assistant Secretary of the Air Force for Installations, Environment, and Logistics shall:

2.2.1. Provide guidance, direction and oversight for all matters pertaining to the formulation, review and execution of plans, policies, programs, budgets and AF positions regarding federal and state legislation and regulations related to radiation safety and radioactive materials management.

2.2.2. Coordinate on AF policies regarding radiation safety and radioactive materials management prior to publication.

2.3. Air Force Chief of Safety shall:

2.3.1. Oversees the INRAD and 91(b) RAM safety program.

2.4. Air Force Safety Center, Weapons Safety Division (AFSEC/SEW) shall:

2.4.1. Develop INRAD and 91(b) RAM safety criteria and directive guidance.

2.4.2. In accordance with 42 USC § 2121 et seq., *Military Application of Atomic Energy*, regulate 91(b) RAM for military-unique applications not contained in current nuclear weapon system components.

2.4.3. Issue permits to installations for the possession, use, characterization, and remediation of residual 91(b) RAM from past nuclear weapon accidents, incidents, maintenance activities, and dismantled/decommissioned reactor 91(b) RAM still under AF possession in the United States. RAM associated with current stockpiled nuclear weapons and current maintenance residuals are not subjected to permitting, as management of these wastes are covered under AFMAN 21-204, *Nuclear Weapons Maintenance Procedures*.

2.4.4. Coordinate with Air Force Inspection Agency, Medical Operations Division, on inspection criteria and compliance requirements for 91(b) permits.

2.4.5. Coordinate with the Air Force Surgeon General and the Air Force Medical Readiness Agency, Bioenvironmental Engineering Division, on radiation safety policy issues related to INRAD, 91(b) regulatory status of RAM in AF possession, and exposure estimates for Veterans Administration radiation-health claims from nuclear weapon-related exposures.

2.4.6. Coordinate with Air Force Global Strike Command/A4Z, Nuclear Stockpile Division, on occupational safety and health issues related to INRAD exposures and on 91(b) RAM wastes generated from current nuclear weapon operations.

2.4.7. Establish INRAD measurements or calculation requirements, in addition to those in AFMAN 48-125, *Personnel Ionizing Radiation Dosimetry*, and AFI 48-148, *Ionizing Radiation Protection*.

2.4.8. Coordinate with the Defense Threat Reduction Agency for inclusion of relevant INRAD measurement information in Technical Order (TO) 11N-20-7, *Nuclear Safety Criteria*.

2.4.9. Coordinate with the United States Air Force School of Aerospace Medicine (USAFSAM), field units, and any other appropriate organizations for monitoring and evaluating potential human exposure hazards associated with weapon systems, weapon arrays, special operations, and operational weapon systems not yet measured and listed in TO 11N-20-7. Arranges for the execution of any appropriate radiation site surveys needed to support health risk assessments accomplished by USAFSAM.

2.4.10. Coordinate with AF-associated organizations on issues relating to 91(a). **Note:** Section 91(a) of the AEA of 1954 refers to RAM under authority of the Department of Energy; some cases exist for use of these materials related to AF operations.

2.4.11. Review and approve work plans for characterization, remedial actions, and final status surveys on sites containing permitted residual 91(b) RAM. Recommend remedial endpoints and radiation safety criteria consistent, as practical, with those applied to AF non-91(b) sites (e.g., 10 Code of Federal Regulations 20, *Standards for Protection Against Radiation*, AFMAN 40-201, and other industry accepted standards or recommendations).

2.4.12. Determine Permit Radiation Safety Officer (RSO) qualifications for 91(b) permits.

2.5. Air Force Surgeon General shall:

2.5.1. Establish force health protection and medical surveillance policy for Secretary of the Air Force approval to ensure compliance with relevant federal policy, AF policy and accepted scientific practice.

2.5.2. Assist AFSEC/SEW in defining regulatory authority status for Nuclear Regulatory Commission-regulated RAM and 91(b) RAM, under the AEA of 1954.

2.6. Air Force Inspection Agency, Medical Operations Directorate shall:

2.6.1. Maintain a staff qualified health physicist (Bioenvironmental Engineering subspecialty), with appropriate security clearance, to conduct 91(b) RAM permit inspections.

2.6.2. Conducts inspections to assess permittee compliance with the terms and conditions of their 91(b) permit, applicable AFIs, and applicable federal regulations. Inspections shall be conducted in a similar manner to those conducted under the authority of AFMAN 40-201.

2.6.3. Distribute inspection reports and information affecting 91(b) RAM permit compliance to the permittee, installation commander, AFSEC/SEW, and the AF/SG according to AFI 90-201, *The Air Force Inspection System*.

2.7. Air Force Director of Civil Engineers shall.

2.7.1. Maintain a USAF Radioactive Waste Site Registry in accordance with AFMAN 40-201, including those sites with potential for containing residual 91(b) RAM from past nuclear weapons accident, incidents, maintenance, and dismantled or decommissioned 91(b) nuclear reactors still in AF possession.

2.8. Air Force Director of Logistics shall.

2.8.1. Establish policy and assign responsibilities for training, briefing and collecting 91(b) waste while conducting nuclear weapons maintenance procedures in AFI 21-204, as noted in paragraphs 2.4.11 and 2.11.1.2.5 of this AFI.

2.9. MAJCOMs:

2.9.1. The MAJCOM Chief of Safety (SE) shall:

2.9.1.1. Ensure command actions relating to nuclear weapons and associated components comply with this instruction.

2.9.1.2. Ensure installation-level programs support the objectives of the INRAD safety program.

2.9.1.3. Send installation-level requests for INRAD measurements of new weapon systems, new weapon arrays, special nuclear weapons operations, operational weapon systems not yet measured and listed in TO 11N-20-7, or other operational situations to AFSEC/SEW.

2.9.1.4. Report INRAD or 91(b) RAM-related incidents or mishaps to AFSEC/SEW in writing.

2.9.1.5. Ensure installation legacy sites possessing residual 91(b) RAM and the potential for co-mingled explosives residuals are properly managed according to AFMAN 91-201, *Explosives Safety Standards*.

2.9.2. Command Surgeon shall ensure installation-level radiation safety programs support the objectives of the INRAD safety program.

2.9.3. Inspector General shall inspect INRAD safety program in accordance with AFI 90-201.

2.9.4. Air Force Materiel Command (AFMC) additional requirements.

2.9.4.1. Through the AFMC Surgeon, shall ensure the United States Air Force School of Aerospace Medicine (USAFSAM) plans, programs, budgets and sustains capability to:

2.9.4.1.1. Provide subject matter expert guidance on the control of INRAD exposures.

2.9.4.1.2. Assist in the determination of radiation exposures, through dosimetry and/or field measurements, for new INRAD conditions, when requested by an Installation RSO or HQ AFSEC/SEW.

2.9.4.1.3. Provide on-site surveys and consultation to perform human health risk assessments of current workers, as requested, to determine whether operating procedure(s) or equipment is effective in keeping personnel exposures ALARA.

2.9.4.1.4. Provide health risk assessments for current workers and/or members of the public on radiologically-impacted sites.

2.9.5. Air Force Global Strike Command (AFGSC) additional requirement. Through AFGSC/A4, technical content managers will ensure that tritium hazards under the scope of TO 11N-20-7 are addressed in Joint Nuclear Weapon Publication technical order documents.

2.10. General Requirements for Installations and Unit/Squadrons:

2.10.1. This section applies to wings, groups, tenant organizations, and GSUs that support a nuclear weapon mission as well as organizations that possess residual 91(b) RAM.

2.10.2. Commander or Director shall designate a qualified unit RSO to work with the installation RSO at the parent installation in managing the GSU's INRAD safety program. **(T-3)**

2.10.2.1. Installation RSOs shall:

2.10.2.2. Issue radiation dosimeters to all members of the 2W2, *Nuclear Weapons Specialist*, career field with duties that require them to perform tasks with radiation exposure potential (e.g., maintenance, inventory, inspection, supervision, etc.). **(T-1)** Do not issue radiation dosimeters to members of 2W2 assigned to duties that do not have the potential for INRAD exposure (e.g., administrative positions).

2.10.2.3. Issue radiation dosimeters to all other nuclear weapons personnel who have the potential to exceed the general public dose limit of 100 millirem in a year as demonstrated by INRAD measurements, calculation based on TO 11N-20-7 referenced dose rates, or calculations conducted by AFSEC/SEW or USAFSAM. It is recommended that the process of evaluating potential exposure be done jointly with the unit RSO. The evaluation should take into consideration known or calculated dose rates, expected length of exposure, and any comparable dosimetry results. **(T-1)**

2.10.2.4. In accordance with AFI 48-148, determine when to issue radiation dosimeters to visitors. **(T-1)**

2.10.2.5. Dosimeters issued for monitoring INRAD must be capable of quantifying both photon and neutron radiation fields. **(T-0)** **Note:** Refer to AFMAN 48-125 for more details on the dosimetry supported by USAFSAM.

2.10.2.6. Coordinates with base civil engineer to ensure installation hazardous materials emergency response plans include provisions for the theft, loss, sabotage, or release of 91(b) RAM consistent with AFI 10-2501, *Air Force Emergency Management (EM) Program*. The installation RSO shall be included in the development and exercise of all installation plans. **(T-1)**

2.10.2.7. Provide an annual INRAD safety program review to the installation commander.

Note: This can be accomplished as part of Environment, Safety, and Occupational Health Council briefing. **(T-3)**

2.10.2.8. Provide, or designate someone to provide, radiation safety training (commonly referred to as ALARA training) to workers that have the potential for combined occupational ionizing radiation exposures in excess of the general public exposure limit specified in AFI 48-148, and all personnel assigned radiation dosimetry monitoring, dictated by this AFI. **(T-1)**

2.10.3. Supervisors shall:

2.10.3.1. Coordinate with the unit and/or installation RSO to ensure that workers with exposure potential to 91b radioactive materials receive radiation safety training. Ensure worker training is conducted prior to duties with radiation exposure potential. **(T-1)**

2.10.3.2. Restrict declared pregnant females from duties requiring occupancy in rooms where tritium gas-containing component handling operations are being performed. If operational requirements of the unit make it necessary for pregnant females to work in areas where tritium gas-containing components are being handled, then the unit commander shall review the exposure potential. The unit commander shall consult the worker's Primary Care Manager in conjunction with the installation RSO, and/or AFSEC/SEWN. **(T-3)**

2.11. Additional requirements for Installations and Unit/Squadron with Current Nuclear Missions. This section applies to wings, groups, tenant organizations, and GSUs that support a nuclear weapon mission.

2.11.1. Nuclear-Capable Unit/Squadron Commanders shall establish procedures to:

2.11.1.1. Notify the installation RSO and SEW of any new weapon systems, new weapon arrays, special operations, TO changes, or proposed facility modifications where weapon systems will be located, so that AFSEC with the assistance of USAFSAM and the Defense Threat Reduction Agency can evaluate potential personnel exposure. Send requests for evaluations to AFSEC through the MAJCOM. **(T-1)**

2.11.1.2. Inform the Chief of Safety, MAJCOM/SEW and installation RSO of any INRAD or 91(b) RAM-related mishaps per AFI 91-204, *Safety Investigations and Reports*. **(T-1)**

2.11.1.3. Ensure the unit RSO, in conjunction with the unit safety office, informs AFSEC/SEW through Air Force Safety Automated System of any abnormal exposures and/or suspected overexposures to personnel or the public from a mishap involving INRAD or 91(b) RAM. **(T-1)**

2.11.1.4. Report 91(b) RAM-related incidents or mishaps in accordance with AFI 91-204. **(T-1)**

2.11.2. Installation RSOs (in addition to Section 2.10.2) shall:

2.11.2.1. Coordinate with installation SEW to ensure integration of the INRAD safety program into the overall installation nuclear surety program and radiation protection program. **(T-3)**

2.11.2.2. Review unit operating instructions for the control of INRAD exposure and make appropriate work practice and control method recommendations to unit radiation safety officers, supervisors and workers to ensure exposures are ALARA. **(T-1)**

2.11.2.3. Conduct and document joint annual review with the unit RSO of the INRAD safety program to ensure program requirements are met. **(T-3)**

2.11.2.4. Know the INRAD hazards associated with the local weapon systems and identify those hazards to the unit RSO. **(T-1)**

2.11.2.5. Validate the unit-specific INRAD safety training program, if applicable. **(T-3)**

2.11.2.6. For individuals requiring INRAD training, follow the minimum training content located at <https://kx.health.mil/kj/kx5/radiationprograms/Pages/home.aspx>. (T-0)

2.11.2.7. Maintain copies of MAJCOM Nuclear Surety Inspection INRAD safety-related inspection reports for a minimum of three years. (T-3)

2.11.2.8. Review the qualifications of the unit commander's nominee for unit RSO, and verify the individual satisfies the requirements specified in this instruction. (T-3)

2.11.3. Unit RSO/Squadrons shall:

2.11.3.1. Be knowledgeable of INRAD safety program requirements, have familiarity with routine nuclear weapon maintenance operations from a supervisory role or as an individual performing maintenance, and hold a rank of at least E-5 with a seven-skill level. (T-1)

2.11.3.2. Know the INRAD hazards associated with applicable unit weapon systems and be knowledgeable of applicable Air Force instructions and Manuals. (T-1)

2.11.3.3. Coordinate with supervisors of INRAD workers, the installation RSO, and the installation hazardous waste manager on radiation safety and waste management issues. (T-3)

2.11.3.4. Coordinate with the Installation RSO on workplace changes affecting radiation exposure conditions. (T-3)

2.11.3.5. Assist installation RSO in the evaluation of radiation exposures of personnel and members of the public for limits specified in AFI 48-148, and ensure exposures are ALARA. (T-3)

2.11.3.6. Adhere to procedures established by unit commander as required by para. 2.11.1.2 of this instruction. (T-1)

2.11.4. Supervisors (in addition to Section 2.10.3) shall:

2.11.4.1. Know the INRAD hazards associated with applicable unit weapon systems and be knowledgeable of applicable Air Force Instructions and Manuals. Review INRAD exposure hazards with workers and ancillary personnel. (T-1)

2.11.4.2. Implement installation RSO's recommendations to keep INRAD exposures below applicable limits and ALARA. (T-1)

2.11.4.3. Ensure all workers that receive INRAD exposure as a part of their routine duties receive radiation safety training specified for INRAD exposures (within 90 days of assignment, but prior to INRAD exposures) and similar refresher training (at least every 15 months). Document initial and retain most-current training in unit and individual records (e.g. within Integrated Maintenance Data System or by other suitable method). (T-1)

2.11.5. Individuals shall:

2.11.5.1. Know the INRAD hazards associated with applicable unit weapon systems. (T-1)

2.11.5.2. Follow recommendations of installation RSO, unit RSO, and/or supervisor on how to keep INRAD exposures below applicable limits and ALARA. (T-1)

2.11.6. Base Civil Engineer shall:

2.11.6.1. Provide advice to generating units, the installation radiation safety officer (IRSO), and Air Force Radioactive Recycling and Disposal (AFRRAD) office on applicable federal, state and local environmental regulations (primarily 42 USC, Ch. 82, Sec. 6901 et seq., *Resource Conservation and Recovery Act (RCRA)*) pertaining to the identification, handling, storage, treatment, transport and disposal of 91(b) mixed waste as hazardous waste. **(T-1)**

2.11.6.2. Oversee compliance with applicable federal, state and local environmental regulations including installation-specific (if any) permit requirements (primarily in regards to the RCRA) pertaining to the identification, handling, storage, transport and treatment or final disposal of 91(b) mixed waste as hazardous waste. For installations located outside the United States, oversee compliance with applicable international agreements (e.g., status of forces agreements, defense cooperation agreements). Coordinate with the installation RSO and the AFRRAD office as necessary. **(T-1)**

2.12. Additional Requirements for Installations and Units with Residual 91(b) RAM Not Associated with Current Nuclear Missions.

2.12.1. This section applies to wings, groups, tenant organizations, and GSUs that have legacy 91(b) waste sites.

2.12.2. Installation Commanders shall: ensure sites identified by AFSEC/SEW and the Air Force Director of Civil Engineers with legacy residual 91(b) RAM from nuclear weapons accidents, incidents and maintenance, dismantled or decommissioned 91(b) nuclear reactors (still under AF possession), or other residual 91(b) RAM are permitted by AFSEC, unless previously cleared for unrestricted use or deemed not impacted by AFSEC. AFSEC/SEW provides guidance for permit application. These sites are normally managed under the Installation Restoration Program, per AFI 32-7020, and permit management is typically accomplished by Civil Engineering. **(T-1)**

2.12.2.1. Permittees (Primary Responsible Party) for permitted 91(b) RAM shall:

2.12.2.2. Ensure adherence to permit conditions. **(T-1)**

2.12.2.3. Ensure a qualified permit RSO is assigned to each permit. Permit RSO qualifications are site dependent. AFSEC/SEW provides guidance to permittees on appropriate qualifications for permit RSOs. **(T-1)**

2.12.2.4. Ensure adequate security controls are implemented to preclude unintentional access to 91(b) RAM hazards and unwarranted 91(b) RAM removal. **(T-1)**

2.12.3. Permit RSOs shall:

2.12.3.1. Coordinate with the installation RSO on 91(b) RAM sites, and storage and use areas. For most 91(b) permits, the permit RSO is also the installation RSO. **(T-3)**

2.12.3.2. Ensure conditions of the permit are met. **(T-1)**

2.12.3.3. Request amendments/modification to permit when changes to RAM or operating conditions change. **(T-1)**

2.12.3.4. Ensure that radioactive and mixed waste generated during characterization sampling and remediation have disposal coordinated through the AFRRAD Office. **(T-1)**

JOHN T. RAUCH JR, Maj Gen, USAF
USAF Chief of Safety

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

AFI 10-2501, *Air Force Emergency Management Program*, 10 March 2020

AFI 32-7020, *The Environmental Restoration Program*, 12 March 2020

AFI 33-322, *Records Management and Information Governance Program*, 22 March 2020

AFI 33-360, *Publications and Forms Management*, December 1, 2015, AFI33-360_AFGM2018-02.01, 15 February 2018, Reissued: 14 February 2019

AFMAN 40-201, *Radioactive Material (RAM) Management*, 28 March 2019

AFI 48-145, *Occupational and Environmental Health Program*, 10 July 2018

AFI 48-148, *Ionizing Radiation Protection*, 19 November 2014

AFI 90-201, *The Air Force Inspection System*, 19 November 2018

AFI 91-202, *The US Air Force Mishap Prevention Program*, 11 March 2020

AFI 91-204, *Safety Investigations and Reports*, 26 April 2018

AFPD 91-1, *Nuclear Weapons and Systems Surety*, 23 October 2019

AFMAN 21-204, *Nuclear Weapons Maintenance*, 12 August 2019

AFMAN 33-363, *Management of Records*, March 1, 2008, AFMAN33-363_AFGM2018-01, 30 May 2018

AFMAN 48-125, *Personnel Ionizing Radiation Dosimetry*, 8 January 2019

AFMAN 91-110, *Nuclear Safety Review and Launch Approval for Space or Missile Use of Radioactive Material and Nuclear Systems*, 21 May 2019

AFMAN 91-201, *Explosives Safety Standards*, 20 March 2017, AFMAN91-201_AFGM2018-01, 29 November 2018

Atomic Energy Act (AEA) of 1954, 42 USC § 2121 et seq., *Military Application of Atomic Energy*, as amended

10 Code of Federal Regulations 20, *Standards for Protection Against Radiation*

42 USC, Ch. 82, Sec. 6901 et seq., *Resource Conservation and Recovery Act (RCRA)*

TO 11N-20-7, *Nuclear Safety Criteria*

Prescribed Forms

None

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*, 22 September 2009

Abbreviations and Acronyms

AEA—Atomic Energy Act

AF—Air Force

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFPD—Air Force Policy Directive

AFRRAD—Air Force Radioactive Recycling and Disposal

AFSEC/SEWN—Air Force Safety Center, Weapons Safety Division, Nuclear Weapons Branch

ALARA—As Low As is Reasonably Achievable

INRAD—Intrinsic Radiation

GSU—Geographically Separated Unit

MAJCOM—Major Command

RAM—Radioactive Material

RCRA—Resource Conservation and Recovery Act

RSO—Radiation Safety Officer

SE—Chief of Safety

TO—Technical Order

USC—United States Code

USAF—United States Air Force

USAFSAM—United States Air Force School of Aerospace Medicine

Terms

91(a) Material—Radioactive material exempted from Nuclear Regulatory Commission licensing controls under Section 91(a) of the AEA of 1954, as amended, in the interest of national defense, under the possession of the Department of Energy.

91(b) Material—Radioactive material exempted from Nuclear Regulatory Commission licensing controls under Section 91(b) of the AEA of 1954, as amended, in the interest of national defense, under the possession of the Department of Defense.

Annual—Recurring, done, or performed at least within 365 days of the previous.

As Low As Reasonably Achievable (ALARA)—The act of making every reasonable effort to maintain exposures to radiation as far below established dose limits as is practical and consistent with the purpose for which the licensed activity is undertaken. ALARA takes into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

Declared Pregnant Individuals—All pregnant AF military occupational radiation workers. Also AF civilian occupational radiation workers who have voluntarily informed their workplace supervisor or primary care manager, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant.

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

Ionizing radiation—Any electromagnetic or particulate radiation capable of producing ions, directly or indirectly in its passage through matter. Ionizing radiation includes gamma rays, x-rays, alpha particles, beta particles, neutrons, protons and other particles and electromagnetic waves capable of producing ions.

Legacy RAM Sites—Sites contaminated from historical nuclear weapons maintenance, accidents, or reactor residuals. This covers maintenance on unsealed weapons and accidents that occurred during the 1950s and 1960s.

Mixed Waste—Waste that contains hazardous waste and source, special nuclear, or byproduct material subject to the AEA of 1954 (i.e., material regulated by the Nuclear Regulatory Commission).

Mishap—For purposes of this instruction, a mishap is defined in AFI 91-202. It is an event involving human acts of omission or commission involving a nuclear reactor, radioisotope power system, or radioactive material resulting in a loss of control of radioactive material that presents a hazard to life, health, or property. This includes loss of control that may result in any person in an unrestricted area exceeding the limits for exposure to ionizing radiation as stated in AFI 48-148.

Monitoring (radiation monitoring, radiation protection monitoring)—The measurement of radiation levels, concentrations, surface area concentrations or quantities of radioactive material and the use of the results of these measurements to evaluate potential exposures and doses.

Nuclear-Capable Unit—As defined in unit's Designed Operational Capability Statement for possessing or handling nuclear weapons.

Nuclear Reactor—A facility using fissile materials in a self-supporting chain reaction (nuclear fission) to produce heat or radiation for both practical application and research and development.

91(b) Permit—Written authorization from the Air Force Safety Center for AF organizations to receive, possess, use, store, transport, transfer and dispose of some radioactive materials defined under Section 91(b) of the AEA of 1954. Permits are similar, in function, to USAF Radioactive Materials permits issued by the USAF Radioisotope Committee, as defined under AFI 40-201.

Permit Radiation Safety Officer—In the context of a 91(b) permit, an individual with specific education, military training, and professional experience in radiation protection practice assigned to ensure radiation safety conditions are met for RAM under a specified permit.

Permittee—In the context of a 91(b) permit, the holder of a permit issued by the Air Force Safety Center authorizing possession and/or use of radioactive material. The permittee is typically a squadron commander or higher, or civilian equivalent.

Radiation Safety Officer—An individual with specific education, military training, and professional experience in radiation protection practice. The term "Radiation Safety Officer" is a functional title and does not denote a commissioned status or specialty code.

Radioactive Material (RAM)—An unstable isotope of an element that decays or disintegrates spontaneously, thereby emitting radiation. Transformations emit ionizing radiations: alpha or beta particles, gamma radiation or x-radiation, and/or neutrons.

United States—The several States, the District of Columbia, the Commonwealths of Puerto Rico and the Northern Mariana Islands, American Samoa, Guam, Midway and Wake Islands, the U.S. Virgin Islands, any other territory or possession of the United States, and associated navigable waters, contiguous zones, and ocean waters of which the natural resources are under the exclusive management authority of the United States.