

**BY ORDER OF THE
COMMANDER
MACDILL AIR FORCE BASE**

MACDILL AIR FORCE BASE INSTRUCTION 48-100

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Aerospace Medicine

INSTALLATION RADIATION SAFETY PROGRAM



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This instruction provides guidance, procedures, precautionary measures, and responsibilities for the control of radioactive materials (RAM) and radiation-producing devices. This instruction incorporates and implements AFI 40-201, *Managing Radioactive Materials in the US Air Force*; AFI 48-148, *Ionizing Radiation Protection*; AFOSH Standard 48-9, *Electro-Magnetic Frequency (EMF) Radiation Occupational Health Program*; AFI 48-139, *Laser and Optical Radiation Protection Program*; and AFMAN 48-125, *Personnel Ionizing Radiation Dosimetry*. It applies to all activities, to include partner units and contractors, who possess, use, handle, or store sources of radiation within the on MacDill Air Force Base (AFB). Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF IMT 847, *Recommendation for Change of Publication*; route AF IMT 847s from the fields through the appropriate functional's chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at <https://afrims.amc.af.mil/>.

SUMMARY OF CHANGES

This document has been completely revised and should be reviewed in its entirety. Major changes include inclusion of Electromagnetic Frequency radiation and Laser radiation processes and procedures.

1. Responsibilities:

1.1. 6th Air Mobility Wing Commander:

1.1.1. Appoint, in writing, qualified members of the Bioenvironmental Engineering (BE) Flight as the Installation Radiation Safety Officers (IRSOs) and Installation Laser Safety Officers (ILSOs). Required qualifications for IRSO and ILSO can be found in AFI 48-148 and AFI 48-139, respectively.

1.1.2. Support integrated implementation of this standard throughout the wing.

1.1.3. Delegates authority to the IRSO to suspend installation operations involving ionizing radiation sources that pose a significant health risk to personnel, are in clear violation of regulations or requirements, or can negatively impact AF operations, materiel, or real estate.

1.1.4. Delegates authority to the ILSO to suspend installation operations involving the operation of laser or other optical radiation sources that pose a significant health risk to personnel, are in clear violation of regulations or requirements, or can negatively impact AF operations, materiel, or real estate.

1.2. All Unit Commanders:

1.2.1. Develop and maintain policies and procedures to implement this instruction at the unit level.

1.2.2. Ensure unit personnel who receive, possess, distribute, use, transfer, or dispose of Radioactive Material (RAM) observe the requirements of this instruction, federal, local, and USAF policies and regulations.

1.2.3. Appoint in writing a Unit Radiation Safety Officer (URSO) if their unit or workplace uses and/or possess radioactive material or radiation-producing devices. Send a copy of this appointment letter to the IRSO.

1.2.4. Ensure appointed URSOs submit Generally Licensed Device (GLD) inventories to the IRSO semi-annually or upon request if their unit possesses GLDs.

1.2.5. Establish a unit ionizing radiation safety awareness training program if their unit or workplace uses and/or possess ionizing radiation-producing devices or equipment containing radioactive material. Ensure As Low As Reasonably Achievable (ALARA) training is held annually for those units designated as requiring ALARA training by the IRSO.

1.2.6. Appoint in writing a Unit Laser Safety Officer (ULSO) if their unit or workplace uses and/or possess American National Standards Institute (ANSI) Class 3B or Class 4 lasers or military-specific lasers. Send a copy of this appointment letter to the ILSO.

1.2.7. Establish a unit laser safety awareness training program if their unit or workplace uses and/or possess ANSI) Class 3B or Class 4 lasers.

1.2.8. Ensure appointed ULSOs attend all MacDill AFB Laser Safety Committee meetings.

1.2.9. Establish a unit EMF safety awareness training program if their unit or workplace uses and/or possess EMF-producing devices.

1.3. 6th Contracting Squadron:

1.3.1. Ensure implementation of this standard by government contractors through appropriate procurement action. Contracts should state who is responsible for occupational safety and health surveillance of the contract employees working on Air Force facilities with government equipment. Whenever possible, new contracts should include compliance requirements of this AFOSH standard.

1.3.2. Understand and enforce the following requirements pertaining to contractors bringing Radioactive Material (RAM) onto MacDill AFB or any of its GSUs or partner organizations:

1.3.2.1. Contractors who are required to transport radioactive materials onto MacDill AFB as part of contract performance, or who conduct operations that require the use of radioactive materials on MacDill AFB, must obtain approval from the IRSO. The IRSO is located in the Bioenvironmental Engineering Office, 6th Medical Group. Requests must be in writing and should include the following: a brief description of proposed activities, name, local address, and telephone number of the contractor's local project manager; name, address, and telephone number of the contractor's RSO; a copy of the portion of the contract requiring the use of radioactive material; and the inclusive dates the radioactive material will be on base. A copy of Nuclear Regulatory Commission (NRC) license or State issued license and a NRC Form 241, *Report of Proposed Activities in Non-Agreement States, Areas of Exclusive Federal Jurisdiction, or Offshore Waters*, must also be forwarded to the IRSO.

1.3.2.2. The contractor-operated Hazardous Materials Pharmacy shall identify all type cargo code A and general license items with an issue exception code 9 to allow Bioenvironmental Engineering the opportunity to review and approve the distribution of radioactive materials. It will provide Bioenvironmental Engineering a list of all radioactive material items issued or due out by national stock number, item, quantity and user. This product will be provided quarterly as applicable.

1.3.3. Ensure contracts establishing performance at MacDill AFB inform contractors of the requirement to contact the IRSO at least 30 days prior to the date the material is scheduled to be transported on base and to obtain necessary approval and instructions. All units (including tenants) must delineate this process within contract performance criteria when establishing requirements prior to contract award. Contracts involving use of RAM must have:

1.3.3.1. An NRC or Agreement State license. A copy of the NRC Form 241 must be an adjunct to the Agreement State license for those areas of exclusive Federal jurisdiction. For those areas of concurrent or proprietary jurisdiction in an agreement state, then the respective Agreement State license is a valid authorization; or

1.3.3.2. A valid US Navy or Veterans Affairs (VA) RAM permit; or

1.3.3.3. Written certification from DOE organizations or DOE prime contractors that they are exempt from NRC license requirements; and

1.3.3.4. Written approval from the IRSO to transfer, transport, or use temporary storage areas for RAM on the installation.

1.3.3.5. A clause authorizing the IRSO to suspend unsafe operations involving the use of RAM.

1.4. Installation Radiation Safety Officer (IRSO):

1.4.1. Initiate, supervise, and execute the MacDill AFB Radiation Safety Program and Thermoluminescent Dosimetry (TLD) Program.

1.4.2. Act as central point of contact for all requests to use RAM or radiation-producing devices, including those by contractors.

1.4.3. Coordinate requests for radioactive waste disposal through USAFSAM or recycling through 88 ABW/EM (Wright-Patterson AFB, OH).

1.4.4. Investigate the loss, theft, or spill of RAM, and all real or suspected overexposures to radiation. Report to the USAF Radioisotope Committee (RIC) as applicable.

1.4.5. Identify which units require ALARA training.

1.4.6. Suspend installation operations involving the operation of ionizing radiation sources that pose a significant health risk to personnel, are in clear violation of regulations or requirements, or can negatively impact AF operations, materiel, or real estate.

1.5. Installation Laser Safety Officer (ILSO):

1.5.1. Develop and manage the MacDill AFB laser and optical radiation safety program.

1.5.2. Run the MacDill AFB Laser Safety Committee involving units using ANSI Class 3B and/or Class 4 or military-specific lasers.

1.5.3. Investigate suspected laser accidents/incidents.

1.5.4. Ensure that each unit employing military-specific lasers maintains a copy of the Air Force Laser Systems Safety Review Board (LSSRB) approval letter and hazard evaluation or safety summary for each system type.

1.5.5. Suspend installation operations involving the operation of laser or other optical radiation sources that pose a significant health risk to personnel, are in clear violation of regulations or requirements, or can negatively impact AF operations, materiel, or real estate.

1.6. Unit Radiation Safety Officer (URSO):

1.6.1. Maintain and update and inventory of all radioactive material (RAM), Generally Licensed Devices (GLDs), and radiation-producing devices within their organization. Contact the IRSO immediately when changes in inventory or loss of inventory items occur.

1.6.2. Coordinate shipment, receipt, and transfer of all RAM, GLDs, and radiation-producing devices through the IRSO.

1.6.3. If their unit possesses GLDs, submit GLD inventories to the IRSO semi-annually or upon request.

1.6.4. Coordinate with the IRSO to establish a written unit ionizing radiation safety training program. The IRSO will include ALARA training into this program if their unit was identified as needed ALARA by the IRSO.

1.6.5. Report any incident in which personnel are potentially exposed to ionizing radiation in excess of exposure limits must be immediately reported to the IRSO, 6 AMDS/SGPB, building 1078 (Medical Clinic), DSN 827-9570. Exposure incidents that occur during non-duty hours will be reported to the on-call Bioenvironmental Engineering Emergency Operations Center phone, 813-624-9324.

1.7. Unit Laser Safety Officer (ULSO):

1.7.1. Maintain and update an inventory of all lasers within their organization. Contact the ULSO immediately when changes in inventory or loss of inventory items occur.

1.7.2. Coordinate with the IRSO to establish a written unit laser safety training program.

1.7.3. Ensure supervisors and workers are aware of and follow laser and other optical radiation safety procedures described in AFI 48-139, Concepts of Operations/Employment (CONOPS/CONEMPS), Tactics, Techniques, and Procedures (TTPs), SOPs, TOs, manuals, unit instructions and other applicable guidance documents.

1.7.4. Maintain a copy of the AF LSSRB approval letter and hazard evaluation for each type of military-specific laser acquired by the unit (if applicable).

1.7.5. Report any incident in which personnel are potentially exposed to laser or optical radiation in excess of exposure limits must be immediately reported to the ULSO, 6 AMDS/SGPB, building 1078 (Medical Clinic), DSN 827-9570. Exposure incidents that occur during non-duty hours will be reported to the on-call Bioenvironmental Engineering Emergency Operations Center phone, 813-624-9324.

1.8. 6th Aerospace Medicine Squadron, Bioenvironmental Engineering (BE) Flight:

1.8.1. Maintain a proficient level of knowledge, training and experience in assessing Electromagnetic Frequency (EMF), laser, and ionizing radiation hazards in the workplace.

1.8.2. Perform required radiation measurements, and respond to health issues raised by workers, installation residents, and the general public.

1.8.3. Provide guidance and recommendations regarding engineering controls, personal protective equipment and warning devices, posting requirements, and other administrative controls as necessary.

1.8.4. Investigate all alleged or suspected overexposures. Complete final reports of investigations as described in applicable Air Force Instructions.

1.9. 6th Medical Support Squadron, Medical Equipment Repair Center:

1.9.1. Notify the IRSO of any newly installed or modified x-ray systems.

1.9.2. Notify the IRSO upon replacement of any major component of an x-ray system to determine the need for a radiation protection survey

1.10. **6th Civil Engineering Squadron, Environmental Flight:** Assist the RSO with characterizing mixed wastes.

1.11. **Workplace Supervisors:**

1.11.1. Coordinate all new and revised OIs pertaining to ionizing radiation, laser, or EMF safety with the IRSO, ILSO, or BE, respectively, prior to publishing.

1.11.2. Inform the IRSO and Unit RSO immediately of new radiation sources or radiation-producing devices, or changes to existing sources, to ensure all radiation hazards in the workplace are evaluated.

1.11.3. Assist URSO and ULSO with implementing safety procedures and training into the workplace. Document all training appropriately.

1.11.4. Prepare an EMF safety awareness training plan to provide initial training for newcomers and refresher training for system operators, maintenance personnel, and other workers assigned to duties in Upper Tier as well as action level environments. Ensure the EMF safety awareness training plan includes the topics required by AFOSH Std 48-9.

1.11.5. Coordinate EMF survey and measurement activities with command and supervisory personnel and ensure these individuals are kept informed of the status of all such activities, particularly during investigations of suspected or actual overexposures.

1.11.6. Inform BE and request a hazard assessment survey for each new EMF system prior to operation. Notify BE of any physical or operational changes that could increase the power density of the field generated by the emitter.

1.11.7. Ensure personnel involved in radiological operations use all reasonable means available (i.e., time, distance, and shielding) to minimize potential radiation exposure from all ionizing radiation sources.

1.12. **Fire and Emergency Services:** Notify the IRSO of fires in facilities containing radioactive material.

1.13. **6th Logistics Readiness Squadron, Packing and Crating and Cargo Movement:**

1.13.1. Immediately inform IRSO of radioactive shipments that are shipped or received for technical and regulatory assistance, support, oversight, and survey.

1.13.2. Ensure packages are in compliance with 49 *CFR* 17 through 199, and AFD 24-2.

2. Ionizing Radiation Investigation Action Levels: Locally established radiation exposure limits less than the Air Force established criteria; used to flag exposure above normal or higher than expected which justifies further investigation. The MacDill AFB Investigation Action Levels were set by the Installation Radiation Safety Officer using both Thermoluminescent Dosimeter (TLD) monitoring results and Table 8-2 in the Bioenvironmental Engineer's Guide of Ionizing Radiation. ALARA investigation action levels for all areas are as follows:

2.1. Total Effective Dose Equivalent (TEDE) Exposures: 0.5 rem/year, 0.13 rem/quarter, and 0.042 rem/month.

2.2. Extremity Exposures: 5 rem/year, 1.3 rem/quarter, and 0.42 rem/month.

SCOTT V. DeTHOMAS, Colonel, USAF
Commander

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

10 CFR Part 20, *Standards for Protection Against Radiation*, 6 July 2012

10 CFR Part 31.5, *NRC General License Requirements*, 19 Dec 2014

29 CFR 1910.1096, *Ionizing Radiation*, 20 June 1996

49 CFR Parts 171 through 199, *Transportation Requirements*, 22 December 2014

AFI 40-201, *Managing Radioactive Materials in the USAF*, 17 September 2014

AFMAN 48-125, *Personnel Ionizing Radiation Dosimetry*, 4 October 2011

AFI 48-148, *Ionizing Radiation Protection*, 20 November 2014

AFI 84-103, *Museum System*, 27 October 2004

AFI 91-204, *Safety Investigations and Reports*, 12 February 2014

AFOOSH Std 48-109, *Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program*, 1 August 2014

AFI 48-139, *Laser and Optical Radiation Protection Program*, 30 September 2014

AFPD 24-2, *Preparation and Movement of US Air Force Material*, 27 April 2011

Prescribed Forms

None

Adopted Forms

AF IMT 847, *Recommendation for Change of Publication*

NRC Form 241, *Report of Proposed Activities in Non-Agreement States, Areas of Exclusive Federal Jurisdiction, or Offshore Waters*

Abbreviations and Acronyms

AFB—Air Force Base

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFRIMS—Air Force Records Information Management System

ALARA—As Low As Reasonably Achievable

BE—Bioenvironmental Engineering

CFR—Code of Federal Regulations

ILSO—Installation Laser Safety Officer

IRSO—Installation Radiation Safety Officer

NRC—Nuclear Regulatory Commission

OPR—Office of Primary Responsibility

RDS—Records Disposition Schedule

TDY—Temporary Duty

TEDE—Total Effective Dose Equivalent

TLD—Thermoluminescent Dosimeter

ULSO—Unit Laser Safety Officer

URSO—Unit Radiation Safety Officer