

**BY ORDER OF THE COMMANDER
911 AIRLIFT WING**

911 AIRLIFT WING INSTRUCTION 40-102

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Medical Command

RADIATION SAFETY



COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements Air Force Policy Directive (AFPD) 40-2, *Radioactive Materials (Non-Nuclear Weapons)*. It establishes responsibilities and specifies procedures for implementing regulations established by the US Nuclear Regulatory Commission (USNRC) concerning the use of radioactive materials licensed by the USNRC and the US Air Force Radioisotope Committee (RIC). It also covers and provides guidance of the overall radiation safety program including X-Ray, Laser and Electro-Magnetic Frequency (EMF) radiation sources and/or devices. This instruction applies to all 911 Airlift Wing personnel. 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 Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS) located at https://www.my.af.mil/afirms/afirms/afirms/rds/rds_series.cfm." Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using Air Force (AF) Form 847, Recommendation for Change of Publication; route AF Forms 847 from the field through the appropriate functional's chain of command. See **Attachment 1** for a Glossary of References and Supporting Information.

SUMMARY OF CHANGES

This document is substantially rewritten and must be completely reviewed. Updates references; Air Force organizations; renumber paragraphs; and adds Electro-Magnetic Frequency (EMF) information. EMF was previously referred as Radio-Frequency (Rf) radiation.

1. Introduction. Current Air Force policy is to keep exposures to ionizing radiation as low as reasonably achievable (ALARA). The following guidance is to ensure ionizing radiation, laser and Electro-Magnetic Frequency (EMF) producing sources, devices, and/or equipment are obtained, operated, utilized, stored and disposed of, in a manner that will minimize personnel exposures. While ALARA principles are generally associated with ionizing radiation; laser and EMF emitter producing devices are areas of concern for 911 AW personnel. Therefore, the most stringent safety and health guidelines shall be utilized to prevent or limit exposures to 911 AW personnel and the general public. Each workplace identified in this instruction shall assign a Unit (or Section) Radiation Safety Officer (Unit RSO) who will be the focal point for ionizing, laser and/or EMF radiation.

1.1. Copies of this regulation and the other cited Air Force regulations are maintained and available for review in Bioenvironmental Engineering Services Office, Bldg. 218. Referenced sections of Title 10, Chapter I, Code of Federal Regulations and the Radioactive Materials Permit(s) are maintained and available for review. A copy of this regulation shall be available within the immediate area where activities involving the use of radioactive materials, radiation-producing devices, lasers and EMF emitters are conducted.

2. Responsibilities.

2.1. The Commander, 911 AW, shall appoint, in writing, an Installation Radiation Safety Officer (IRSO) and any alternate Radiation Safety Officers necessary to manage the Radiation Safety Program and has executive authority over the base radiation safety program.

2.1.1. The Commander shall be informed of any item of noncompliance with USNRC or USAF regulations or any defect in facilities or equipment that may result in a substantial safety hazard such that there is a major reduction in the degree of protection provided to public health and safety.

2.2. **The IRSO. :** The IRSO is charged with ensuring all devices, which produce ionizing radiation, radioactive materials, lasers and EMF emitters are used safely and in compliance with USNRC criteria and USAF regulations. The IRSO is charged with the conduct of the base radiation safety program and has the authority to enforce applicable Federal, Air Force, and installation rules, and regulations relating to radiation safety. The IRSO has the authority and responsibility to terminate any operation that poses a substantial radiation safety hazard except in those instances where such action could place the safety and well-being of patients or others in greater danger than that posed by the radiation hazard.

2.3. **Unit RSO.** This individual(s) designated by the unit commander serves as the focal point for radiation protection matters. More than one Unit RSO may be designated; the unit commander may appoint personnel whose training and experience are specific to their work areas (such as x-ray, EMF emitters, and lasers).

2.3.1. The Unit RSO ensures that all safety, operational and security procedures, notification, reporting and training requirements are followed. The Unit RSO notifies the IRSO in the event of any additions, deletions, or changes associated with radiation producing sources, devices and/or equipment assigned to a workplace. The Unit RSO is also responsible to notify the IRSO prior to shipment and/or transfer of radioactive material. The Unit RSO will assist the IRSO in investigation of suspected or actual over exposures.

2.4. **Supervisors.** Shall notify the IRSO or the Bioenvironmental Engineering Services (BES) prior to ordering, obtaining, and/or when receiving ionizing or non-ionizing radiation producing sources, devices and/or equipment to ensure that all applicable regulatory guidance and training is followed.

2.4.1. Supervisors shall ensure that all required initial and annual radiation safety training is completed by their assigned personnel. The IRSO or Bioenvironmental Engineering/Public Health Services (BE/PHS) will assist the supervisor, as needed, with establishing and/or updating their radiation safety program. Coordinate with BE/PHS regarding pregnant females who work with ionizing radiation. Ensure that a Unit RSO has been appointed for those areas that operate, store, maintain, or deploy radiation producing sources, devices and/or equipment.

2.5. **Workers.** Each individual involved with the use of ionizing or non-ionizing radiation producing sources, devices and/or equipment has a responsibility to comply with applicable USNRC and USAF regulations for the protection of their own health and safety and that of others. Each individual is also responsible for reporting promptly any violation of USNRC and USAF regulations, or any defect in facilities or equipment that may affect health and safety. All workers who receive occupational exposure to ionizing or non-ionizing radiation will follow ALARA principles and maintain exposures ALARA to the greatest extent possible.

2.5.1. Women who work with ionizing radiation are responsible for informing supervisors of any possible pregnancy. This will be discussed later in this regulation.

3. Requests for and Notification of Radioactive Materials, Radiation Producing Devices, and Facility Modifications.

3.1. The IRSO shall be notified and approve of requests for new radioactive material (RAM) or equipment containing RAM; new uses of RAM; or changes in the area of use of RAM prior to the material being ordered or the change taking place. Approval may be requested by forwarding a letter to the IRSO which states the intended use of the new RAM or a description of the change in use, the radionuclide and activity involved; the form of the radionuclide; the name of the supplier; the proposed use and/or location(s).

3.1.1. A USAF RAM permit may be required for requests of new RAM or equipment containing RAM; a USAF RAM permit must be obtained IAW AFI 40-201 from the USAF Radioisotope Committee (RIC) prior to purchasing, receiving, storing, distributing, using, transferring, or disposing of RAM or equipment containing RAM.

3.2. The IRSO shall be notified and approve of requests prior to ordering, obtaining, and/or when receiving x-ray units, lasers, and EMF emitters to ensure that all applicable regulatory guidance, safety precautions, and training requirements are established and followed.

3.2.1. The IRSO shall be notified immediately when ionizing or non-ionizing radiation producing sources, devices and/or equipment is received as part of a unit's mission or response package (i.e. equipment mass buy program); or equipment upgrade. Notification is required before the ionizing or non-ionizing radiation producing sources, devices and/or equipment is put in use or operated so that the IRSO can ensure that all applicable regulatory guidance, safety precautions, and training requirements are established and followed.

3.3. The IRSO shall be notified, review and approve of all facility modifications taking place in areas where radioactive materials or radiation producing devices are currently used prior to the modification and work taking place. Approval may be requested by forwarding a letter to the RSO that thoroughly describes the intended modification. The requester and the RSO will ensure that this approval has been received prior to work commencing.

4. Contractor Use of Radioactive Material and/or Radiation Producing Devices.

4.1. The 911 AW Commander has designated the IRSO or alternate as the approval authority for bringing radioactive material and radiation producing devices onto the 911 AW.

4.2. Contractor use of radioactive material must be approved by the IRSO or alternate prior to bringing the equipment on base IAW AFI 40-201. These requirements are relayed to contractors via statements of work (SOW) and during pre-construction conference established by the Contracting Office (911 AW/LGC).

4.2.1. The contractor must submit a copy of the company's NRC License; the contact information of the local representative and the RSO named on the NRC License; copy of the most recent swipe/leak test of the RAM or equipment containing RAM; copy of the training and certification of personnel using the RAM and/or equipment. This information must be provided to IRSO or alternate at least 30 days prior to bringing the RAM onto the base.

4.3. Radiation producing devices include lasers; radar or other EMF emitting devices; x-ray units; electron beams; neutron utilizing devices. The IRSO must be notified and give approval before any of these radiation producing devices are brought and used on the base. This is to ensure that all safety and applicable regulatory guidance is followed to prevent and limit exposures to base personnel.

5. Areas of Use.

5.1. Registered generally licensed devices (GLD) containing RAM are stored in the 911 MSG/CEX, Emergency Management (EM); 911 Security Forces Squadron (SFS).

5.2. X-Ray radiation producing equipment is routinely used in the 911 ASTS Dental Clinic, and the 911 Maintenance Squadron (MXS) Nondestructive Inspection's (NDI) Shop.

5.3. Electro-Magnetic Frequency (EMF) emitters are used and/or maintained by the 911 Combat Squadron (CS), 911 MXS Communication/Navigation/Doppler shop, and 911 SFS. EMF emitters include ground and aircraft radio/satellite communication, radar/doppler, and Perimeter Surveillance Radar systems.

5.4. Lasers: The 911 MXS Electronic Counter Measure (ECM) shop installs on C-130 aircraft and ground test the Large Aircraft Infra-Red Counter Measure (LAIRCM) Class 4 laser system. 911 MXS shops use Class 3R/4 (with/without enclosure) laser etcher to mark their shops tools. The 911 MXS NDI shop uses a Class 3R laser to align the x-ray tube head. 911 Civil Engineering Prime Beef Engineering Assistant section has and train with Class 2 and 3R laser levels to perform site surveys. 911 SFS Raven Team have Class 3R laser sights on M9 pistols. 911 SFS and CATM have AN/PEQ-15 Advanced Target Pointer Illuminator Aiming Light (ATPIAL) which has multiple position laser settings Class 1, 3R, or 3B. CATM personnel only uses the AN/PEQ-15 ATPIALs in the Class 1 position at the 911 AW firing range for night vision training of SFS and CES personnel; the Class 3R and 3B

positions are not used on the installation. The 911 SFS AN/PEQ-15 ATPIALs are in storage and are for deployments.

6. Generally Licensed Devices.

6.1. GLDs have sealed RAM sources and are required to be swipe tested and inventoried semiannually by the IRSO or designee. The IRSO obtains and mail the swipe samples to USAFSAM/OEHHL for analyses. Upon receipt of the results the IRSO or designee will review the swipe results and provide a copy to the owning organization; IRSO also maintains copies of the swipe sample results. If any of the results are not within acceptable limits the IRSO will provide recommendations and/or corrective actions.

6.2. The GLDs at EM and SFS are currently not in use and are awaiting disposition guidance for turn in or disposal.

7. NDI and Dental X-Rays.

7.1. The NDI Shop conducts shielded x-ray operations at building 409; and unshielded x-ray operations at building 417 (when required) after normal duty hours to control access and prevent exposure to the base population. Building 417 is currently the only location on the 911 AW installation approved for unshielded x-ray operations. Unshielded x-rays cannot be performed at any other location on the 911 AW without approval of the IRSO.

7.2. The Dental Clinic conducts shielded panoramic and bitewing x-rays of assigned reservist personnel at building 220 (rooms 130D/130E).

7.3. Personnel who work with x-ray producing devices may be exposed to radiation during the performance of their duties. It is the goal of the radiation safety program to maintain all radiation exposures ALARA to personnel performing x-ray operations and the general public. All NDI and Dental personnel are required to have initial and annual training on ALARA and radiation safety.

7.4. NDI and Dental personnel are currently entered in the quarterly USAF Thermoluminescent Dosimetry (TLD) program. The action investigation level for TLD participants is 125 mRem per quarter.

7.4.1. The area supervisor is responsible to ensure that all personnel performing x-rays who are enrolled in the TLD program wear the dosimeters correctly. Personnel that have not been entered in the TLD program cannot perform any x-ray operations or be in the area.

7.4.2. When not in use, dosimeters must be stored in the designated area and not left attached to garments; stored in desk drawers; or taken home.

7.4.3. The dosimeters are collected each quarter by the IRSO or designee and sent to the USAF Radiation Dosimetry Laboratory (RDL) at Wright-Patterson AFB, OH for analyses. The RDL publishes a quarterly Occupational Radiation Exposure Report (RDL Listing 1499-1 Current and 1499-2 Summary) that lists the exposures recorded on the dosimeters. The IRSO reviews the report to determine if the exposures recorded are in compliance with the ALARA program. The reports are then forwarded to the area supervisors.

8. Electro-Magnetic Frequency (EMF) Emitters.

8.1. EMF radiation is electro-magnetic energy emitted at frequencies from 3 kilohertz (kHz) to 300 Gigahertz (GHz). AFOSH Std. 48-9, Electro-Magnetic Frequency (EMF) Radiation Occupational Health Program is the Air Force standard that governs the EMF health and safety protection program.

8.1.1. The procedures and context of the base and unit EMF health and safety protection program are stated in AFOSH Std. 48-9.

8.2. BES will develop an inventory of EMF radiation emitters used on the 911 AW. BES will assist the Unit RSO with establishing/updating their unit EMF program. BES will also investigate any incidents of alleged or actual overexposures to EMF radiation. Public Health Services (PHS) will provide occupational health training on EMF radiation.

8.3. Unit Commanders will appoint a Unit RSO who will be the focal point for EMF protection matters. Unit Commanders who have personnel working in the vicinity of EMF radiation emitters will establish unit EMF Safety awareness training program.

8.4. Unit RSOs will prepare unit Operating Instructions (OIs) to identify and control personnel access to areas where EMF radiation emitters are operated and could have hazardous EMF radiation levels. The Unit RSO will send the OIs to the IRSO for review before implementation or publication. The Unit RSO will review the OIs annually and send any changes to the IRSO.

9. Laser Hazard Control Program.

9.1. Information is designed to supplement the information contained in AFI 48-139, Laser and Optical Radiation Protection Program.

9.2. All people responsible for procurement, operation and/or maintenance of laser systems must be familiar with the requirements of AFI 48-139 and the requirements of this regulation.

9.2.1. All requests to order laser-producing devices must be routed through the IRSO for approval. Before operating any laser on base, the laser must be added to the inventory, classified, and the proposed operation reviewed by the IRSO. Use of any laser without these steps being completed will be immediately terminated by the IRSO.

9.3. The IRSO and BES personnel will inventory lasers used on base; Class 3R, 3B, and 4 lasers used by 911 AW personnel will be evaluated. The user must inform the IRSO when new systems are installed; current systems are modified, are moved to another location, or terminated.

9.4. Unit Commanders will appoint a Unit RSO who will be the focal point for the Laser Hazard Control Program. The Unit RSOs will prepare unit OIs or SOPs (Standard Operating Procedures) to identify and control personnel access to areas where lasers are operated. The Unit RSO will send the OIs/SOPs to the IRSO for review before implementation or publication. The Unit RSO will review the OIs/SOPs annually and send any changes to the IRSO.

9.5. All newly assigned personnel who are to operate Class 3B or 4 lasers systems; currently the 911 AW MXS laser etchers and LAIRCM systems, are required to have an eye examination IAW DoD 6055.05-M before assignment to these duties.

9.5.1. Upon termination of Class 3b or 4 laser duties (PCS/PCA, retirement, separation, or assignment to duties that no longer involve lasers) the individual must have a termination examination. This examination should be as soon as practical following termination of laser duties.

10. Training.

10.1. All personnel that work with or operate RAM, x-ray radiation, EMF radiation emitters, and lasers are required to have initial and annual radiation training, specific to their radiation exposure.

10.2. BE/PHS will assist the Unit RSO with establishing shop specific radiation safety training.

11. Women Receiving Occupational Exposure to Ionizing Radiation.

11.1. Each female who may be occupationally exposed to ionizing radiation shall immediately notify her supervisor if she suspects she is pregnant. The individual will be given the opportunity to ask questions and will be required to acknowledge in writing that she has been advised of this policy. Documentation will be maintained.

11.2. A female who is occupationally exposed to radiation is responsible for controlling exposures to the fetus/embryo. She must declare, in writing, to both her immediate supervisor and the IRSO, her pregnancy and must include an estimated date of conception. The BE/PHS will then evaluate the individual's specific duties involving exposure to radiation. This evaluation will include consideration of the workplace and the source of radiation, the individual's history of exposure to radiation as documented by personnel dosimetry records, current radiation measurements applicable to her specific tasks, current exposure histories of coworkers, and likely exposures that would be incurred in the event of a credible accident.

11.3. The Radiation Safety and ALARA training for NDI and Dental specifically addresses women who work with ionizing radiation and has the Declaration of Pregnancy form attached.

CRAIG C. PETERS, Col, USAFR
Commander

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

AFI 40-201, *Managing Radioactive Materials in the US Air Force*

AFPD 40-2, *Radioactive Materials (Non-Nuclear Weapons)*

AFI 48-148, *Ionizing Radiation Protection*

AFMAN 48-125, *Personnel Ionizing Radiation Dosimetry*

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

AFOOSH STD 48-9, *Electro-Magnetic Frequency (EMF) Radiation Occupational Health Program*

DoD 6055.05-M, *Occupational Medical Examinations and Surveillance Manual*

RDL 1499-1, *Occupational Radiation Exposure Report (Current)*

RDL 1499-2, *Occupational Radiation Exposure Report (Summary)*

AF 1527, *Annual Occupational and Exposure History to Ionizing Radiation*

USNRC Rules and Regulations, Title 10, Code of Federal Regulations, 10 CFR Parts 19 and 20

Adopted Forms

AF Form 847, Recommendation for Change of Publication, 22 Sep 2009