

**BY ORDER OF THE COMMANDER  
42D AIR BASE WING (AETC)**

**MAXWELL AFB INSTRUCTION 48-105**

**29 MAY 2014**



**Aerospace Medicine**

**RADIATION PROTECTION PROGRAM**

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This instruction implements AFI 40-201, *Managing Radioactive Materials in the US Air Force*, AFI 48-148, *Ionizing Radiation Protection* and AFMAN 48-125, *The USAF Air Force Personnel Dosimetry Program*. It establishes procedures and responsibilities involved with the control and use of radio-active material (RAM) and radiation-producing devices (RPD). It also describes necessary procedures for the implementation of an effective radiation safety program at Maxwell Air Force Base (MAFB). It requires control of radioactive materials and machines or devices producing ionizing radiation to safeguard the health of the military and civilian population, while permitting maximum benefits from their use. Subordinate units must use this publication as described and may not develop additional implementing publications. Waivers are not authorized. This document applies to all assigned, attached and tenant units as well as contractors who possess, use, handle or store sources of radiation within the confines of MAFB. This instruction describes the Radiation Safety and 'As Low As Reasonably Achievable' (ALARA) Program on MAFB. Ensures all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule.

**SUMMARY OF CHANGES**

This document has been substantially revised and must be completely reviewed. It updates responsibilities; guidance on permits and generally licensed devices; training; ordering, shipping and receiving radiation sources guidance; RAM work procedures; response procedures and reporting requirements.

## 1. Responsibilities:

### 1.1. Commander, 42d Air Base Wing (42 ABW/CC), or designated representative:

1.1.1. Ensures all installation personnel comply with this instruction. This includes military personnel, civilian employees, contractor personnel and visitors.

1.1.2. Appoints, in writing, the Bioenvironmental Engineer Officer as the Installation Radiation Safety Officer (IRSO). In absence of a Bioenvironmental Engineer Officer, the IRSO should be a 7level Bioenvironmental Engineer Craftsman (4B071) or an Air Force civilian employee who meets requirements in AFI 48-148, paragraph A3.2.1.

1.1.3. Ensures all installation activities comply with applicable federal and Air Force directives covering: the usage of radiation-producing devices; the permitting, procurement, storage, handling, accountability for and disposal of RAM; and the reporting of incidents or accidents to the appropriate authorities.

1.1.4. Ensures the IRSO is notified of all planned uses of RAM and RPD on the installation.

### 1.2. The Commander, 42d Medical Group (42 MDG/CC):

1.2.1. Recommends to the 42 ABW/CC personnel be relieved from duties which could involve further radiation exposure when individuals have been or are likely to be exposed to ionizing radiation in excess of limits specified in 10 CFR 20, *Standards for Protection Against Radiation*.

1.2.2. Provides the IRSO, Bioenvironmental Engineering (BE), Flight and Operational Medicine Clinic and Optometry Clinic the resources necessary to carry out the provisions in this instruction.

1.2.3. Ensures pregnant workers in potential occupational radiation exposure environments are referred to the IRSO for assessment and possible enrollment in the dosimetry program on a monthly monitoring frequency.

### 1.3. IRSO/BE:

1.3.1. Advises the 42 ABW/CC on all significant radiation safety-related activities.

1.3.2. Acts as the central point of contact for all requests to use RAM or RPD.

1.3.3. Terminates any operation which poses a substantial radiation safety hazard to personnel or the environment. A report of such actions will be made immediately to the 42 ABW/CC.

1.3.4. Reviews plans for facilities to be used for RAM or RPD which could require shielding.

1.3.5. Provides preliminary hazard evaluations for proposed uses of RAM or RPD.

1.3.6. Ensures the receipt, shipment and transfer of RAM are properly monitored and identified.

1.3.7. Maintains all necessary records of the MAFB radiation safety program including inventory.

1.3.8. Identifies to the individual users and their supervisors the protective equipment and facilities necessary for the safe conduct of projects and programs involving the use of radiation.

1.3.9. Implements an effective personnel dosimetry program in accordance with AFMAN 48-125.

1.3.10. Monitors the radiation safety training program. Radiation safety training will be approved by BE on an annual basis.

1.4. Commanders of organizations which use RAM or RPD.

1.4.1. Appoint, in writing, a qualified unit radiation safety officer.

1.4.2. Ensure accurate and timely notification of accidents or incidents involving RAM or RPD to the IRSO within 24 hours.

1.4.3. Ensures the radiation safety training program is approved by the IRSO annually. Training shall be conducted annually, documented on the AF Form 55, *Employee Safety and Health Record*, or equivalent and submitted to the IRSO within 7 days of training.

1.5. Individuals using RAM or RPD.

1.5.1. Learn and implement the rules of radiation safety as described in applicable federal, Air Force and MAFB instructions as well as in organizational operating instructions.

1.5.2. Wear personnel monitoring devices as directed by their supervisor and the IRSO.

1.5.3. Become familiar with the radiation safety program, specifically ALARA.

1.5.4. Immediately report accidents/incidents and hazardous conditions to their supervisor, unit radiation safety officer or the IRSO.

1.5.5. Females working in workcenters who use RAM or RPD must contact the IRSO for a briefing to understand risks and program requirements involved in the event of pregnancy.

## 2. Permits and Generally Licensed Devices.

2.1. There are currently no permitted devices on MAFB. Organizations wishing to purchase a device which requires a permit must inform the IRSO prior to purchase.

2.2. Non-Air Force organizations wishing to bring radioactive materials onto or conduct operations involving radioactive material on base must submit an application to the IRSO for approval at least 30 calendar days prior to the planned date for commencement of activities on base. This request must include:

2.2.1. A description of the device, current copy of the applicable Nuclear Regulatory Commission (NRC) or agreement state license and proposed activities.

2.2.2. The procedures established to ensure radiological health and safety of Air Force personnel and the public while on site and the name of the responsible representative.

2.2.3. The inclusive dates work will be conducted.

2.2.4. An acknowledgement the base RSO can make periodic checks to ensure the contractor is following applicable radiological health and safety practices.

### **3. ALARA.**

3.1. The ALARA concept. The ALARA concept is defined as a set of management and administrative actions taken to reduce personnel radiation doses to as low as possible consistent with existing technology, costs and operational requirements. The ALARA concept was developed in response to scientific evidence that no level of radiation exposure is totally risk free.

3.2. Users will provide the IRSO with information concerning newly proposed users of RAM or RPD with sufficient lead time to permit the IRSO to adequately evaluate the proposal. Alternate approaches will be considered in the interest of ALARA.

3.3. Supervisors will brief the ALARA concept to individuals to ensure they understand the concept of ALARA, are adequately trained for the task required and document the training.

3.4. Radiation workers will be instructed annually in the ALARA concept and its applicability to work practices and conditions in their specific workplace.

### **4. Exposure Limits.**

4.1. Personnel working with RAM or RPD. The goal of the radiation safety program is to maintain exposures ALARA. All exposures will be verified under the exposure limits set in AFI 48-148 and 10 CFR 20.

4.2. Workcenters should maintain a copy of the area survey and when equipment or facilities change contact BE within 72 hours.

4.3. Pregnant Female Requirements. A female military member working in a radiation area shall, on becoming aware she is pregnant, notify her workplace supervisor and primary care manager. A non-military member should notify her workplace supervisor. Employees confirmed pregnant will be monitored through dosimetry on a monthly basis.

### **5. Dosimetry:**

5.1. Air Force radiation dosimeters will only be issued to military or civilian government employees or contractors working with government-owned and operated radiation sources. Contractors using contractor-owned and operated radiation sources will be required to provide dosimeters to their personnel. Dosimeters are to remain in the workplace at all times in the designated storage location.

#### **5.2. Supervisor Responsibility.**

5.2.1. Supervisor must inform the IRSO of newly assigned workers as soon as possible but no later than 72 hours after beginning work to request radiation monitoring for individual. Information required for dosimetry program enrollment includes full name, full social security number and birth date.

5.2.2. Each individual monitored will be provided with a radiation safety briefing to include an explanation concerning proper wearing and storage of the dosimeter and the right to review the dosimetry results each month or quarter. All female workers will be provided an additional briefing regarding program requirements due to pregnancy.

5.2.3. The supervisor will not permit anyone to enter a radiation work area or work with RAM or RPD unless the individual has been designated as a radiation worker, been properly briefed and been issued a dosimeter, if appropriate.

### 5.3. Reports.

5.3.1. Monthly or quarterly reports, as applicable, are delivered to the IRSO who reviews the results to determine if the exposures recorded are in compliance with the ALARA program. After review of the report, the IRSO forwards a copy to the supervisors of the personnel monitored. Supervisors sign an acknowledgement of receipt memorandum and results will be made available to radiation workers for review. Results will be kept by the IRSO for 1 year.

5.3.2. Annual radiation results will be provided to each individual monitored. The AF Form 1527-1, *Annual Report of Individual Occupational Exposure to Ionizing Radiation*, will be signed by the individual and the IRSO. The summary will be placed in the individual's medical record.

5.4. Investigative Action Levels. The IRSO has determined investigative action levels for MAFB based on typical doses seen within a quarterly monitoring period.

**Table 5.1. Investigative Action Levels**

Per Monitoring Period	Radiation Workers (millirem)
Whole Body (TEDE) <sup>1</sup>	50
Note 1. The whole body means the head, trunk (including male gonads), arms above the elbow, or legs above the knee. TEDE means the total effective dose equivalent.	

## 6. Training.

6.1. All individuals using RAM or RPD must be trained prior to assuming duties or working in the vicinity of radiation sources, annually and when there is a significant change in duties or radiation safety requirements.

6.2. All radiation safety training program material will be approved by the IRSO to ensure all requirements are included in the material. ALARA training will be documented and sent to the IRSO upon completion as well as documented on the individual AF Form 55.

## 7. Ordering, Shipping and Receiving Radiation Sources:

7.1. Ordering. Prior to ordering any RAM or RPD, supervisors must contact the IRSO prior to submission to procurement. The IRSO can be contacted during duty hours at 953-5848 or through the MAFB Command Post at 953-7474 after duty hours.

7.2. Shipping. Supervisors shipping RAM or RPD must contact the IRSO prior to shipment to ensure Department of Transportation requirements for shipping RAM have been met. Requirements exist for RAM or RPD testing prior to packaging as well as after packaging. Supervisors must ensure the RAM or RPD is available for testing in both modes.

7.3. Receiving. Special precautions must be taken when receiving and opening packages which contain RAM:

7.3.1. Visually inspect the package and, if damaged, notify the IRSO immediately.

7.3.2. Measure the exposure rate at the package surface and, if greater than expected, contact the IRSO. If equipment is not available to measure exposure rate, contact the IRSO or BE office at 953-5848.

7.3.3. Verify contents with the packing slip.

7.3.4. As specified in 10 CFR 20.1906, *Notices, Instructions and Reports to Workers: Inspection and Investigations*, packages containing in excess of certain specified quantities of RAM must be monitored for external radiation and contamination within 3 hours of receipt during working hours and within 3 hours from the beginning of the next working day if it is received after working hours.

**8. RAM Work Procedures.** Each work center using RAM or RPD will maintain individual workcenter plans approved by the IRSO. At a minimum, the following procedures will be incorporated:

8.1. Disposable Gloves. Wear disposable gloves at all times while handling unsealed RAM.

8.2. Mixed Storage. Do not store food, drink or personal effects in areas where RAM are stored or used.

8.3. Wearing Personnel Monitoring Devices. If issued, wear personnel monitoring devices at all times while in areas where RAM are used or stored.

8.4. Disposal. Dispose of radioactive waste only in designated, labeled and properly shielded containers. If unsure of disposal process, contact the IRSO.

8.5. Hand Washing. Wash hands before eating, drinking, smoking or leaving work area.

**9. Response Procedures.**

9.1. Spills. The material must be confined to prevent further contamination and individuals/environment may require decontamination.

9.2. Radiation Field. Individuals must be removed from the radiation field or the radiation source must be interrupted (e.g., turning off the X-ray machine or shielding the irradiator source).

9.3. Protection of Individuals and Environment. The primary concern is first, the protection of individuals in the vicinity including emergency response personnel and second, the protection of the environment. Lifesaving activities always take priority over other considerations. Essential first aid always takes precedence over decontamination.

**10. Reporting Requirements.** Any abnormal occurrence involving RAM or RPD shall be reported by the using organization to the IRSO immediately after the abnormal occurrence becomes known. Based on the severity of the occurrence, the IRSO shall notify individuals specified in AFI 91-204, *Safety Investigations and Reports* and AFI 40-201.

TRENT H. EDWARDS, Col, USAF  
Commander, 42d Air Base Wing

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

10 CFR Part 19, *Notices, Instructions and Reports to Workers: Inspection and Investigations*

10 CFR Part 20, *Standards for Protection Against Radiation*

DoDI 6055.8, *Occupational Ionizing Radiation Protection Program*, 15 December 2009

AFPD 40-2, *Radioactive Materials (Non-Nuclear Weapons)*, 15 March 2007

AFPD 48-1, *Aerospace Medical Enterprise*, 23 August 2011

AFI 40-201, *Managing Radioactive Materials in the US Air Force*, 16 March 2011

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

AFI 48-148, *Ionizing Radiation Protection*, 21 September 2011

AFI 91-204, *Safety Investigations and Reports*, 24 September 2008

***Adopted Forms***

AF Form 55, *Employee Safety and Health Record*

AF Form 847, *Recommendation for Change of Publication*

AF Form 1527-1, *Annual Report of Individual Occupational Exposure to Ionizing Radiation*

***Abbreviations and Acronyms***

**ABW/CC**—Air Base Wing Commander

**ALARA**—As Low As Reasonably Achievable

**BE**—Bioenvironmental Engineering

**IRSO**—Installation Radiation Safety Officer

**MAFB**—Maxwell AFB

**MDG/CC**—Medical Group Commander

**NRC**—Nuclear Regulatory Commission

**RAM**—Radioactive Material

**RPD**—Radiation Producing Device

**RPO**—Radiation Protection Officer

**RSO**—Radiation Safety Officer

**TEDE**—Total Effective Dose Equivalent