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**Medical Command**

**MCGUIRE AIR FORCE BASE RADIATION  
SAFETY PROGRAM**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This instruction implements AFD 40-2, *Radioactive Materials (Non-nuclear Weapons)*; 10 CFR 20, *Standards for Protection Against Radiation*; 10 CFR 30, *Rules of General Applicability to Domestic Licensing of Byproduct Material*; T.O. 00-110N-2, *Radioactive Waste Disposal*; T.O. 00-110N-7, *Handling and disposition of Radioactive Electron Tubes and Spark Gaps*. The purpose of this instruction is to establish responsibilities and procedures in minimizing personnel exposure to radiation “As Low As reasonably Achievable (ALARA)” at McGuire AFB. It provides local procedures for the procurement, handling, use, storage and disposal of radioactive materials and control of exposure to ionizing radiation from radiation producing devices and radioactive materials at McGuire AFB.

**SUMMARY OF REVISIONS**

This instruction has been updated for minor changes in wording, addresses, and references.

**1. General Information :**

- 1.1. This instruction applies to all Air Force military and civilian personnel working in McGuire AFB facilities whose duties require they supervise work with sources of ionizing radiation or work in areas where exposure to ionizing radiation may occur.
- 1.2. The ALARA concept is defined as that set of management and administrative actions taken to reduce personnel radiation dose to as low a level as possible, consistent with existing technology, cost and operational requirements. While the established maximum permissible dose are conservative and offer a low risk of adverse effects compared to the other hazards of life and occupation, it is prudent that every effort be made to reduce the exposure to the lowest possible level that is reasonably achievable.
- 1.3. Copies of the references listed in this instruction are maintained in Bldg 3457.

## 2. Responsibilities :

- 2.1. The Wing Commander, 305th Air Mobility Wing, McGuire AFB is responsible for:
  - 2.1.1. Ensuring that all base personnel comply with this regulation in keeping all personnel exposures ALARA. This includes military personnel, civilian employees, contractors and visitors.
  - 2.1.2. Designating a Base Radiation Safety Officer (RSO), normally the Chief of the Bioenvironmental Engineering Flight.
  - 2.1.3. Enforcing the rule that non-Air Force organizations, including DoD and Department of Energy organizations and/or contractors will have a Radioactive Material (RAM) permit, license, exemption or written approval from AFMOA/SGZR before using radioactive material on base.
  - 2.1.4. Conducting a base wide radiation safety program under the direction of the Base RSO.
- 2.2. Commanders of organizations that acquire, receive, store, distribute, use, transfer and dispose of radioactive material or use radiation-producing devices must:
  - 2.2.1. Obtain a permit, through the Base RSO, for all radioactive sources exceeding exempt concentrations listed in AFI 40-201, *Managing Radioactive Materials in the USAF*, and enforce compliance with all commitments made in the permit application and conditions listed in the permit.
    - 2.2.1.1. Apply for an amended permit before changing use or storage facilities for radioactive materials or equipment used with radioactive material beyond those authorized in the permit. These applications must go through the Base RSO.
  - 2.2.2. Designate in writing a Unit RSO as the organizational single focal point for radiation safety matters and a Permit RSO as the focal point for permit compliance issues.
  - 2.2.3. Ensure qualified radiological monitors are designated for each functional area authorized to possess and use radioactive material or radiation producing devices.
  - 2.2.4. Assure timely reporting of accidents or incidents involving radioactive material or radiation producing equipment to the Base RSO.
  - 2.2.5. Notify the Commander, Operational Contract Squadron, of any/all requirements to be processed through 305 CONS for products, processes, materials, storage, disposal, or other services, etc., involving the use or handling of radioactive material or ionizing radiation.
- 2.3. The position of Base RSO is mandated by AFI 40-201, in accordance with Title 10 Code of Federal Regulation (CFR), in the issuance of the Masters Material License to the USAF by the Nuclear Regulatory Commission. The base RSO is appointed in writing by the Wing Commander and will:
  - 2.3.1. Ensure all base activities comply with applicable Federal, State and USAF directives covering the usage of radiation-producing equipment, the permitting, procurement, storage, handling, accountability for and disposal of radioactive materials and the reporting of incidents or accidents to appropriate authorities.
  - 2.3.2. Direct, for the Wing Commander, the overall conduct of the Base Radiation Safety Program whose primary goal is to maintain radiation exposures to ALARA and brief the Wing Commander on all significant radiation safety related activities in quarterly Air Force Occupational Safety and Health (AFOSH) Safety Council Meetings, as appropriate.

2.3.3. Investigate, evaluate, and initiate corrective action and report on defects or non-compliance items relating to substantial safety hazards involving radioactive materials or radiation-producing devices.

2.3.3.1. Terminate any operation, which in the opinion of the Base RSO, poses substantial radiation safety hazard to personnel or the environment. A report of such actions will be made immediately to the Wing Commander.

2.3.4. Ensure appropriate personnel involved with ionizing radiation are enrolled in the thermoluminescence device (TLD) program; also ensure area monitoring, the receipt, shipment and transfer of radioactive materials are properly monitored and identified as required by applicable rules and regulations.

2.3.5. Provide emergency radiation safety operations in the event of accidents/ incidents involving radioactive materials or radiation producing devices.

2.3.6. Provide preliminary hazard evaluations for proposed uses of radioactive material or radiation producing devices and review plans for facilities to be used for radioactive material or radiation producing devices, which could require shielding.

2.3.7. Maintain all necessary records of the Base radiation safety program, USAF Radioactive Material (RAM) permits, waste disposal receipts, including documentation in support of USAF and federal regulations, licenses and permits.

2.3.8. Monitor the radiation safety training program for Permit RSOs, supervisors, radiation monitors, users of radioactive materials and radiation producing devices and emergency response team members. The base RSO will approve radiation safety training provided by others such as permit RSOs and supervisors.

2.3.9. Annually ensure appropriate organizations receive intrinsic radiation (INRAD) training.

#### **2.4. Permit and Unit RSOs will:**

2.4.1. Establish a Radioactive Permit Binder and ensure all requirements of their permit (i.e., inventory check and leak test) are accomplished in a timely manner, results coordinated through the Base RSO and documented in the binder.

2.4.2. Coordinate the radiation survey or hazard evaluation survey with the Base RSO and perform those radiation safety duties at the organizational level that are commensurate with training and experience.

2.4.3. Assure the timely reporting and assist with the investigation of accidents or incidents involving radioactive materials or radiation producing devices to the Base RSO and organizational commander.

2.4.4. Ensure radiation areas and locations where radioactive material are properly posted and radiation monitoring devices, when required, are issued and worn correctly by all individuals.

2.4.5. Perform or arrange with the Base RSO, to conduct initial and annual radiation training of newly assigned employees, students or workers who may be occupationally exposed to radiation. Ensure all users are familiar with radiation safety OIs and procedures and the Base ALARA program.

- 2.4.6. Coordinate with the Base RSO before initiating any project including procurement, use, storage or disposal of radioactive materials or radiation producing devices or any changes to include working conditions or activities which could affect the radiation safety program. All coordination will be accomplished prior to initiation of the project.
- 2.4.7. Submit to the Base RSO for review any new or revised Operating Instruction (OI), Standard Operating Procedures (SOPs) or unit regulations impacting the radiation safety program prior to implementation.
- 2.4.8. Receive periodic dosimetry results from the Base RSO for their radiation workers. Have the radiation workers acknowledge receipt, and return the result listing to the Base RSO.
- 2.4.9. Reporting incidents/accidents and hazardous conditions immediately to the Base RSO.
- 2.5. Each individual using radioactive materials or radiation producing devices is responsible for:
  - 2.5.1. Becoming familiar with the ALARA program, which is designed to minimize exposure to ionizing radiation ALARA, and learn those rules of radiation safety as described in applicable federal, Air Force and MAFB instructions as well as in organizational OIs in accomplishing this goal.
  - 2.5.2. Wearing personal monitoring devices, appropriate protective clothing and equipment if directed by their supervisors or the Base RSO.
  - 2.5.3. Reporting incidents/accidents and hazardous conditions immediately to their supervisor, the Unit RSO or the Base RSO.
  - 2.5.4. Informing their supervisor of any changes in equipment, procedures or other factors involving radioactive material or radiation producing devices which may alter the radiation work environmental or radiation levels in uncontrolled areas.
  - 2.5.5. Acknowledging receipt of periodic dosimetry results.
  - 2.5.6. Reporting any off-duty employment involving ionizing radiation.

### **3. Permits For the Possession and Use of Radioactive Materials and Radiation Producing Devices**

- 3.1. The USAF has been issued a Master Materials License by the US Nuclear Regulatory Commission. This licensee authorizes the USAF Radioisotope Committee (RIC) to grant Radioactive Permits to Air Force organizations for possession and use of byproduct, source and special nuclear materials normally controlled by the US NRC.
- 3.2. Organizations located on MAFB and contractors performing work at MAFB must obtain a US NRC Radioactive permit, Agreement State License, a USAF RAM permit, or approval from the Base RSO in order to possess or use radioactive materials or radiation producing devices:
  - 3.2.1. Radioactive material includes any item that emits radiation without external power. Examples are byproduct, source and special nuclear material as defined in Title 10 of the Code of Federal Regulations. Also included are accelerator-produced materials such as cobalt-57, as well as naturally occurring isotopes such as radium.
  - 3.2.2. A radiation-producing device is any piece of equipment that emits ionizing radiation, regardless of intent, when energized by an external source. For example: medical x-ray machines.
- 3.3. Request for any radioactive permits, to include renewals and amendments, must be submitted through the Base RSO in a timely manner, 90 days in advance of expiration.

#### **4. Designation of Areas**

4.1. The following definitions are extracted from Title 10 CFR Part 20. The limits in the definitions below are specified in terms of “REM in one hour” not in “REM per hour (rem/hr)”.

4.1.1. “Restricted Area”: Means any area, access to which is limited for the purpose of protecting individuals against undue risk from exposure to radiation and radioactive material.

4.1.2. “Radiation Area”: Means an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005 REM in one hour at 30 centimeters (cm) from the radiation source or from any surface that the radiation penetrates.

4.1.3. “High Radiation Area”: Means an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.1 REM in one hour at 30 cm from the radiation source or from any surface that the radiation penetrates.

#### **5. Dosimetry**

5.1. After an evaluation of the potential hazards, the Base RSO may designate individuals who are routinely exposed to or work in the vicinity of ionizing radiation as a radiation worker. Radiation workers are issued radiation dosimeters that are exchanged on a monthly/quarterly basis.

5.2. Radiation dosimeters will only be issued to military, civilian government employees or contractors working with government owned and operated radiation sources. Contractors using contractor owned and operated sources will be required to provide dosimeters to their own personnel.

5.3. The Armstrong Laboratory (AL) listing 1499, reports each individual's radiation exposure record. This form is provided to supervisors or Unit RSOs at the end of each monitoring period and is to be provided to the radiation worker for acknowledgment of receipt.

#### **6. Training**

6.1. Personnel requiring training in radiation safety commensurate with their duties may include: users, supervisors, radiation monitors, Permit RSOs and ancillary personnel (such as housekeeping) who may perform duties in areas where radioactive material or radiation producing devices may be used.

6.2. Annual radiation training will be provided to individuals who in the course of their duties are likely to be exposed to radiation above background levels. Initial training must be conducted before the individual is permitted to assume duties with or in the vicinity of radiation sources.

6.3. Training will be provided by the permit or Unit RSO, with the assistance of the Base RSO, and will include the ALARA concept and its applicability to work practices and conditions. The sessions will include, but are not limited to, the following:

6.3.1. Applicable regulations and permit conditions and their locations; areas where radiation sources are used or stored; potential hazards from radiation sources; appropriate radiation safety procedures; work rules pertaining to radiation sources; employee obligation to report unsafe conditions or practices; initial response procedures to radiation emergencies and the employees right to be informed of occupational radiation exposure results.

6.4. All radiation safety training will be documented and copies maintained by the Base RSO and Permit/Unit RSO.

## **7. Posting Requirements**

7.1. "NRC Form 3 "Notice to Employees", and "Supplementary Notice to NRC Form 3" will be posted in at least one conspicuous location within each work area where activities involving use of radioactive materials are conducted. The supplemental notice shall state the documents are available for review.

## **8. Control of Contractor Operations Involving Radioactive Material**

8.1. Chief, Operational Contracting Office must determine if a contractor will be using radioactive materials on base and notify the Base RSO, located in Building 3457, prior to allowing the contractors to use radioactive materials on MAFB. All contractors will have either a valid state license, radioactive permit or an exemption before being allowed to work on MAFB.

8.2. The Base RSO will inspect the radioactive material and contractor's radiation safety procedures to ensure compliance with applicable NRC regulations.

8.3. If a contractor is granted approval to use radioactive material on the installation, the Base Contracting Officer will provide the contractor with a copy of the RSO's written approval. The Base RSO will maintain documentation of local approval of contractor activities.

8.4. The Base RSO must be notified of any accidental loss or theft of radioactive materials or exposure to ionizing radiation to Air Force personnel.

8.5. All contracts shall have a clause specifying that the contractor is responsible for the disposal of any radioactive waste generated by them in accordance with 10 CFR 20 subpart K, and 10 CFR 30.34.

## **9. Recyclable Radioactive Material and Radioactive Waste**

9.1. It is forbidden by Federal law to dispose of unwanted radioactive materials as normal waste. Doing so poses a health hazard to military personnel and the public.

9.2. Any recyclable radioactive material or radioactive waste generated by the Air Force must be disposed of in accordance with T.O. 00-110N-2. Generators must contact the Base RSO, located in Building 3457, who will survey the material and request disposition procedures from the Air Force radioactive waste manager.

9.2.1. The generator must provide national stock number; nomenclature; quantity; radionuclide; physical form; weight, activity per item and radiation measurements four inches from the open container.

9.3. The generator will retain custody of the unwanted radioactive material until authorization to ship the material is received.

9.4. The generator is responsible for obtaining proper shipping containers, and providing an appropriate accounting classification fund cite to cover the transportation expense.

9.5. Close coordination is required between the Base RSO, the generator and Packing and Crating to ensure all required monitoring, labeling and notification are accomplished prior to shipping or transferring the unwanted radioactive material to its destination.

9.6. Electron tubes and spark gaps containing radioactive materials must be disposed of as normal solid waste by using the activity in accordance with T.O. 00-110N-7. Unserviceable electron tubes and spark gaps must not be accumulated, but disposed of as they are removed from service.

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