BY ORDER OF THE
COMMANDER, 436TH AIRLIFT WING

DOVER AIR FORCE BASE
INSTRUCTION 48-107

13 JULY 2001

Aerospace Medicine

IONIZING RADIATION PROTECTION PROGRAM

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements Air Force Policy Directive 48-1, *Aerospace Medicine Program* and AFI 40-201, *Managing Radioactive Materials in the USAF*. It establishes the procedures and assigns responsibilities for implementing the radiation protection program at Dover AFB. It applies to all base and tenant units. This instruction applies to all organizations which use radioactive materials or devices which generate radiation. It applies only to ionizing radiation; it does not apply to nonionizing radiation such as lasers or radar. It does not apply to radioactive materials transferred from the Department of Energy to the Department of Defense as parts of nuclear weapon systems, nuclear reactor parts, fuel controlled under Section 91b of the Atomic Energy Act, and Department of Energy activities related to SAFE HAVEN requirements.

SUMMARY OF REVISIONS

This document is substantially revised and must be completely reviewed.

Squadron designation “436 AMDS” was changed to “436 ADOS”, the SGPB office symbol was changed to SGGB, the office building number 439 was changed to 260 and Security Police Squadron was changed to Security Forces Squadron. Also changed were 436th Dental Squadron and 436th Aerospace Medicine Squadron to 436th Aeromedical Dental Squadron. 436th Component Repair Squadron, TMDE Flight and 436th Component Repair Squadron, Avionics Flight were deleted due to their RAM permits being terminated. Added 436th Aerial Port Squadron, Passenger Terminal (Ionscan) which received a RAM permit for the ionscan. Deleted para 3.12., there are no longer radioluminescent exit signs in buildings 201,204, and 500. Deleted all of section “14. Radioluminescent Exit Signs” due to no longer having that type of exit sign on base.

1. General Information:

1.1. There are two sources of ionizing radiation to which personnel can be exposed occupationally: devices which generate radiation and radioactive materials.

1.1.1. Devices which generate x-ray radiation. The 436th Equipment Maintenance Squadron Nondestructive Inspection Element, 436th Medical Support Squadron Radiology section, 436th Aeromedical Dental Squadron, 436th Services Squadron Mortuary Affairs Flight, 436th Civil Engineering Squadron Explosive Ordinance Disposal Flight, and 436th Aerial Port Squadron Passenger Service Terminal operate x-ray machines. The 512th reserve units associated with these areas also use the equipment.

1.1.2. Radioactive material (RAM). Most organizations on base have some items which contain RAM. The majority of materials (such as lensatic compasses and electron tubes) do not require a permit, but some materials do. The Bioenvironmental Engineering Flight should be contacted if there are any questions concerning permitting.

1.1.2.1. RAM permits. Organizations which currently have RAM permits issued by the USAF Radioisotope Committee (RIC) are listed below, along with the permitted material.

1.1.2.1.1. 436th Aeromedical Dental Squadron, Bioenvironmental Engineering Flight (lead meter & improved CAM).

1.1.2.1.2. 436th Civil Engineer Squadron, Readiness Flight (chemical agent detectors).

1.1.2.1.3. 436th Aerial Port Squadron, Passenger Terminal (Ionscan).

1.1.2.1.4. 512th Civil Engineer Squadron, Readiness Flight (chemical agent detectors).

1.1.2.2. RAM which does not require a permit still must be controlled in some manner. Use, storage, and disposal requirements apply.

1.2. Radiation safety officer (RSO). There are two types of radiation safety officers, the base RSO and the permit RSO.

1.2.1. Base RSO. The base RSO is normally the senior ranking person in the 436 ADOS Bioenvironmental Engineering Flight. This person runs the base's radiation safety program. The base RSO can be contacted at extension 2595.

1.2.2. Permit RSO. A permit RSO is required for each RAM permit issued by the USAF Radioisotope Committee (RIC). The RSO is usually the person in the using organization who has control over the RAM. The USAF RIC establishes qualifications for permit RSOs. If no one within the using organization meets the qualifications, a qualified person from the Bioenvironmental Engineering Flight will be appointed as the RSO.

1.3. All exposures to ionizing radiation shall be as low as reasonably achievable (ALARA) consistent with existing technology, cost, and operational requirements.

2. Definitions: See AFI 40-201, for definitions.

3. Responsibilities: Responsibilities concerning RAM are outlined in AFI 40-201. This base instruction lists additional responsibilities specific to Dover AFB.

3.1. The 436th Airlift Wing Commander will appoint in writing a radiation safety officer for the base. The radiation safety officer is normally the senior ranking person in the Bioenvironmental Engineering Flight.

3.2. Squadron commanders will:

3.2.1. Ensure radiation safety procedures are followed within their squadron.

3.2.2. Ensure all RAM permit requirements are followed.

3.2.3. Ensure the Bioenvironmental Engineering Flight is notified of all new RAM or x-ray producing devices used within the squadron.

3.2.4. Apply for RAM permits prior to procurement, storage, or use of the RAM.

3.2.5. Ensure RAM permit renewal applications are made at least 90 days prior to the expiration of the existing permit.

3.2.6. Appoint in writing a permit RSO and authorized users for each permit issued by the USAF RIC and provide a copy of the appointment letter to the base RSO (436 ADOS/SGGB).

3.3. The Commander, 436th Contracting Squadron will:

3.3.1. Ensure contractors using RAM have received approval from the base RSO to use the material on base.

3.3.2. Give the base RSO the authority to conduct periodic checks of contractors using RAM on base.

3.3.3. Give the base RSO the authority to suspend contractor operations involving RAM believed to be unsafe (reference AFI 40-201, para 3.4.18.2.).

3.4. The 436th Civil Engineer Squadron Engineering Flight Chief, along with the contracting squadron, will ensure that the base RSO has approved the use of RAM on base by contractors.

3.5. The Commander, 436th Aerial Port Squadron will:

3.5.1. Ensure RAM is shipped according to US Department of Transportation regulations.

3.5.2. Ensure the Bioenvironmental Engineering Flight is notified of all RAM shipments originating from Dover AFB prior to shipping.

3.5.3. Contact the Bioenvironmental Engineering Flight whenever RAM which arrives at or is trans-shipped through Dover AFB is damaged, is suspected of having surface contamination, or is not labeled correctly.

3.6. The Commander, 436th Supply Squadron will:

3.6.1. Ensure the base RSO is notified immediately of any radioactive shipments which arrive damaged or require swipe testing.

3.6.2. Comply with the requisition, receiving, and storage requirements for radioactive materials established by T.O. 00-110N-3.

3.7. The 436 ADOS Bioenvironmental Engineering Flight, through the base RSO, will:

3.7.1. Act as the main point of contact for radiation protection matters.

3.7.2. Perform announced and unannounced radiation protection surveys and other monitoring as required to ensure radioactive sources and materials are being stored and used safely.

3.7.3. Be the main point of contact with the USAF RIC for all radiation protection matters.

3.7.4. Act as the approval authority for the use of RAM by non-Air Force organizations on Dover AFB.

3.7.5. Have the authority to suspend operations which may be unsafe from a radiation safety standpoint.

3.8. The 436th Airlift Wing Public Affairs Officer will notify the State of Delaware Office of Radiation Control of RAM incidents and accidents as described in paragraph **13.3.** of this instruction.

3.9. Permit RSOs will:

3.9.1. Ensure all permit requirements are followed at all times.

3.9.2. Contact the base RSO if any questions or problems arise concerning the permitted radioactive material.

3.9.3. Maintain a binder concerning the radioactive material permit as described in this instruction.

3.9.4. Be familiar with the requirements of AFI 40-201, especially the permit RSO responsibilities and incident reporting procedures.

3.9.5. Brief the squadron commander annually on the radiation safety program and any problem areas.

3.9.6. Provide the base RSO with a copy of all shipping and transfer paperwork.

3.10. Supervisors will:

3.10.1. Establish and enforce radiation safety procedures.

3.10.2. Ensure radiation safety training is conducted.

3.10.3. Notify the base RSO and the squadron commander of any radiation safety problems.

3.11. All personnel using RAM or devices, which generate x-rays, will:

3.11.1. Follow established radiation safety procedures.

3.11.2. Notify their supervisor of potential or existing radiation safety hazards.

3.11.3. Notify the Bioenvironmental Engineering Flight of any off-duty employment which may involve exposure to radiation.

3.11.4. If pregnant, notify the Public Health Flight and supervisor as soon as possible after finding out about the pregnancy.

4. RAM Permit Requirements: The requirements in this section apply only to organizations which have or are applying for a RAM permit from the USAF RIC.

4.1. RAM permits are issued through the USAF RIC. All permit applications shall be submitted to the USAF RIC through the base RSO.

4.2. All questions concerning the RAM permit shall be directed to the base RSO.

4.3. Communication with the USAF RIC. All communication with the USAF RIC shall be coordinated with the base RSO. The only exception is emergency reporting done according to Chapter 3 of AFI 40-201.

4.4. The permit RSO shall be appointed by the squadron commander who meets the requirements specified in the permit. Authorized users shall be identified as specified in the permit. The squadron commander shall ensure that the permit RSO and users meet the permit requirements.

4.5. The permit RSO is responsible for maintaining a binder with permit information. All documentation shall be maintained in the binder for a period of at least three years. The binder shall be organized as follows:

4.5.1. Tab A Notes concerning permit (including documentation of commander's briefing)

4.5.2. Tab B Permit

4.5.3. Tab C Swipe sampling results

4.5.4. Tab D Training plan and documentation

4.5.5. Tab E Correspondence

4.5.6. Tab F Procedures for authorizing purchase of the permitted material

4.5.7. Tab G Receiving, opening and shipping packages of radioactive materials

4.5.8. Tab H Storing radioactive materials

4.5.9. Tab I Inventory of radioactive materials

4.5.10. Tab J Emergency response to loss of control of radioactive material

4.5.11. Tab K Using radioactive materials safely

4.5.12. Tab L Periodic radiation surveys

4.5.13. Tab M Calibrations and checks of survey instruments and other safety equipment

4.5.14. Tab N Disposing of radioactive materials

4.5.15. Tab O AFI 40-201

4.5.16. Tab P DAFBI 48-107

4.6. An NRC Form 3 and a supplemental notice regarding the availability of the permit shall be posted in the area where the RAM is stored or used. The supplemental notice shall contain the information in AFI 40-201, para 3.5.3. The permit RSO is responsible for ensuring this is done.

4.7. Storage, disposal, and transfer of RAM shall be accomplished according to the permit. Additional information is provided in this instruction, and questions should be referred to the Bioenvironmental Engineering Flight.

5. Use of RAM and Devices Which Produce Radiation: RAM and devices which produce ionizing radiation shall be used according to established operating procedures and technical orders. Supervisors shall establish operating procedures if they do not exist already. All locally developed operating procedures shall be approved by the base RSO before implementation. Deviation from these procedures could result in exposures to radiation which are not ALARA.

5.1. Exposure to ionizing radiation shall be minimized to an ALARA level when using RAM or devices which produce ionizing radiation. There are three ways to reduce radiation exposure: time, distance, and shielding.

5.1.1. Time. The amount of time to which personnel are exposed to ionizing radiation should be minimized whenever possible. This will minimize the person's cumulative exposure,

5.1.2. Distance. Radiation levels decrease with distance. The farther the person is from the source, the smaller the radiation exposure.

5.1.3. Shielding. Shielding is used to reduce the amount of ionizing radiation. It is effective for x-ray and gamma radiation sources. When shielding is present to minimize exposure, it shall be used.

5.2. Radioactive materials shall not be applied to people or clothing except as part of a diagnostic process.

6. USE of RAM or Devices Which Produce Radiation by Non-Air Force Organizations: Any use of RAM or devices which produce x-ray radiation by non-Air Force organizations on Dover AFB shall be approved by the base RSO.

6.1. Non-Air Force organizations, including contractors, who plan on using RAM or devices which produce x-ray radiation on base shall notify the base RSO in writing. Notification for RAM use by contractors shall be done in accordance with AFI 40-201, para 3.4.18.2., at least 30 calendar days before bringing the materials on base.

6.2. The 436th Support Group commander and 436th Civil Engineer Squadron Fire Protection and Readiness Flight chiefs will be informed by the base RSO when non-Air Force organizations are approved to use RAM on base.

7. RAM Storage:

7.1. Radiation storage areas are classified as "restricted" or "unrestricted" according to T.O. 00-110N-3. The classification is dependent on the radiation exposure levels measured in the storage area. The base RSO determines the storage area classification. Even if RAM is stored in an "unrestricted" area, provisions shall be established to prevent unauthorized removal of RAM.

7.2. All commodities, which contain RAM, shall be labeled unless excepted by technical order or regulation.

8. Shipping RAM:

8.1. Instructions for shipment of a particular RAM may be specified in a technical order or other directive. If this is the case, those instructions shall be followed in addition to the requirements in this instruction.

8.2. Before shipping RAM, the organization which will be shipping the RAM shall contact the Bioenvironmental Engineering Flight for packaging, labeling, and other shipping requirements.

8.3. The Aerial Port Squadron will notify the Bioenvironmental Engineering Flight of all RAM shipments originating from Dover AFB. Aerial Port personnel will ensure the package is checked by the Bioenvironmental Engineering Flight prior to shipment. Normally, no specific actions need to be

taken when RAM is trans-shipped through Dover AFB. However, the Bioenvironmental Engineering Flight shall be contacted whenever RAM which is trans-shipped is damaged, is suspected of having surface contamination, or is not labeled correctly.

9. Transporting RAM on Public Roads: In some situations, it may be necessary for base personnel to transport RAM on public roads off base in government or privately owned vehicles. Whenever this occurs, the Department of Transportation requirements (including labeling) apply. Organizations which may transport radioactive materials on public roads must contact the Bioenvironmental Engineering Flight for additional information on labeling and transportation requirements. Organizations shall obtain approval from the Bioenvironmental Engineering Flight before transporting RAM off base.

10. RAM Disposal:

10.1. All RAM disposal shall be coordinated with the base RSO. Specific disposal procedures depend on the isotope and the activity of the RAM.

10.2. Some lensatic compasses and other RAM can be recycled through Wright-Patterson AFB. All recycling shall be coordinated with the base RSO.

11. Monitoring: Radiation monitoring will be conducted by the Bioenvironmental Engineering Flight. In some workplaces (such as nondestructive inspection), personnel may also conduct radiation monitoring whenever they use devices which produce x-ray radiation. Monitoring methods include the use of thermoluminescent dosimeters (TLDs), radiation survey meters, pocket dosimeters, and alarms.

11.1. TLDS. Personnel who must wear TLDs are identified by the Bioenvironmental Engineering Flight.

11.1.1. TLDs are worn by personnel who use RAM or devices which produce x-ray radiation in the following work areas (and their associated reserve unit):

11.1.1.1. 436th Equipment Maintenance Squadron Nondestructive Inspection Element.

11.1.1.2. 436th Medical Support Squadron Radiology section.

11.1.2. The supervisor is responsible for identifying to the Bioenvironmental Engineering Flight all personnel who are required to wear a TLD. Before issuing a TLD, the Bioenvironmental Engineering Flight must enroll the individual in the program and receive training. This process takes about 20 minutes, and is done by appointment only. An appointment may be scheduled by calling the Bioenvironmental Engineering Flight.

11.1.3. All personnel who wear TLDs shall do so according to instructions. TLDs shall be stored with the control badge when not in use.

11.1.4. Pregnancy. If a woman who is on the TLD program becomes pregnant, she shall notify the Public Health Flight (extension 2564) and her supervisor of the pregnancy.

11.1.5. Off-duty employment. The Bioenvironmental Engineering Flight must be notified of any off-duty employment involving RAM.

11.2. Results of monitoring, including dosimetry and survey results, are available for review in the Bioenvironmental Engineering Flight office in Bldg 260.

12. Training: Personnel who use permitted RAM or x-ray producing devices require initial and annual radiation safety training. Initial training on radiation safety is normally conducted as a part of a person's formal technical training, and will be supplemented as necessary by the person's initial workplace safety training provided by the supervisor. Annual training may be provided either by the shop supervisor or the base RSO.

12.1. The supervisor is responsible for ensuring training is conducted. Training documentation shall be maintained by the supervisor.

12.2. Annual training may be conducted by the base RSO or the supervisor. Both may participate in the training.

12.2.1. If the base RSO will perform the annual training, the supervisor shall notify the base RSO (extension 2595) of training requirements at least 3 weeks in advance of training. The supervisor shall schedule all personnel for training and ensure they attend.

12.2.2. The supervisor may conduct the annual training only if all of the conditions below are met:

12.2.2.1. The person conducting the training has the necessary experience and understanding of radiation safety principles to conduct the training. The base RSO shall determine if the person meets this requirement.

12.2.2.2. A detailed lesson plan is developed for the training. (The base RSO can assist in the development of this lesson plan).

12.2.2.3. The lesson plan is approved by the base RSO.

12.2.2.4. If a RAM permit exists for the workplace, the lesson plan covers the permit requirements and the location and content of the permit RSO's binder required by paragraph 5.4. of this instruction.

12.2.2.5. A list of personnel trained is forwarded to 436 ADOS/SGGB upon completion of training. The list shall include the name of the individuals trained, and the date training was conducted.

13. RAM Incidents and Accidents:

13.1. Any incidents or accidents shall be reported to the base RSO and supervisor immediately.

13.2. Loss or theft of RAM shall be reported to the base RSO, supervisor, and 436th Security Forces Squadron immediately.

13.3. Some situations may require State of Delaware notification according to AFI 40-201, paragraph 3.11. If this notification is required, the 436th Airlift Wing Public Affairs Officer shall issue a statement to the State of Delaware Office of Radiation Control, Department of Health and Social Services. The base RSO will notify the Public Affairs Office and prepare a statement. The statement should be issued jointly by the Public Affairs Officer and the base RSO.

S. TACO GILBERT III, Colonel, USAF
Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

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

AFI 48-125, *The US Air Force Personnel Dosimetry Program*.

Title 10, Part 19, Code of Federal Regulations, *"Notices, Instructions and Reports to Workers: Inspection and Investigation."*

Title 10, Part 20, Code of Federal Regulations, *"Standards for Protection Against Radiation."*

T.O. 00-110N-2, *Radioactive Waste Disposal*.

T.O. 00-110N-3, *Requisition, Handling, Storage, and Identification of Radioactive Material*.