BY ORDER OF THE COMMANDER
71ST FLYRING TRAINING WING

VANCE AIR FORCE BASE
INSTRUCTION 48-104

8 JULY 2016

Aerospace Medicine

OCCUPATIONAL SAFETY AND HEALTH RADIATION PROTECTION PROGRAM

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RELEASABILITY: There are no releasability restrictions on this publication.

OPR: 71 MDOS/SGOQB

Certified by: 71 MDG/CC
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Supersedes: Vance AFBI 48-148 2 Dec 2011

Pages: 11

This instruction provides guidance for all commanders, unit radiation safety officers (RSO), and all personnel whose duties may involve exposure to radiation. This instruction is divided into two distinct parts: paragraph 1 covers the radiofrequency (RF) radiation (non-ionizing) protection program and paragraphs 2 – 15 govern the ionizing (example: x-ray) radiation protection program and applies to all units assigned or attached to Vance AFB. 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 are disposed of in accordance with the Air Force Records Information Management System (AFRIMS) Air Force Records Disposition Schedule (RDS). Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, Recommendation for Change of Publication; route AF Form 847 from the field through the VAFB Publications and Forms Manager. AF Form 847 is prescribed in AFI 11-215, USAF Flight Manuals Program [FMP]. Refer to that publication for guidance on filling out the form.

SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed.

1. Non Ionizing Radiation Overview: Radiofrequency radiation is electromagnetic energy. This regulation concerns radiation emitted at frequencies from 3 kilohertz (kHz) to 300 gigahertz

(GHz). Air Force Instruction 48-109, Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program, is the Air Force Standard that governs the RF program. This section of this regulation provides guidance to implement the Vance AFB RF protection program.

1.1. Responsibilities:

1.1.1. The 71st Medical Group Commander's responsibilities are carried out through the appropriate agency as detailed in AFI 48-109, Chap 20.

1.1.2. Unit commanders will comply with the responsibilities as detailed in AFI 48-109, Chap 2.

1.1.3. Supervisors will comply with the responsibilities as detailed in AFI 48-109, Chap 2.

1.1.4. Individuals who work with or near RF radiation will comply with the responsibilities as detailed in AFI 48-109, Chap 2.

1.2. Base Program Requirements:

1.2.1. These requirements are outlined in AFI 48-109, Chap 2, augmented by this instruction, and will be followed by all Vance AFB personnel.

2. Ionizing Radiation Overview: There are two sources of ionizing radiation which personnel can be exposed occupationally: devices that generate radiation and radioactive materials.

2.1. Devices that generate x-ray radiation: Medical x-ray Bldg 810, Dental x-ray Bldg 810, and Nondestructive Inspection (NDI) Bldg 130.

2.2. Radioactive Material (RAM): Many organizations on base have some items that contain RAM. The majority of materials (such as historical Radium dials) do not require a permit. The Bioenvironmental Engineering Element (BEE) should be contacted if there are any questions concerning permitting. RAM that does not require a permit still must be controlled. Use, storage, and disposition requirements apply.

2.3. All exposures to ionizing radiation shall be As Low As Reasonably Achievable (ALARA) consistent with existing technology, cost, and operational requirements.

3. Responsibilities: Responsibilities concerning RAM are outlined in AFI 40-201 and specific guidance/policy in protecting AF personnel/general public are outlined in AFI 48-148. This instruction lists additional responsibilities specific to Vance AFB.

3.1. The Wing Commander will appoint in writing a radiation safety officer (RSO) for the installation and give the installation RSO the authority to suspend all operations involving RAM believed to be unsafe (reference AFI 40-201, para 2.15. and AFI 48-148, para 2.15.1.). The radiation safety officer is normally the senior ranking person in the BEE.

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 BEE 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 which requires a permit.

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 radiation safety officer (RSO) and authorized users for each permit issued by the USAF RIC and provide a copy of the appointment letter to the base RSO (71 MDOS/SGOQB).

3.3. The Civil Engineer Service Provider will:

3.3.1. Ensure contractors using RAM have received approval from the base RSO before the materials are brought/used on base.

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

3.4. The Traffic Management Officer (TMO) and the Supply, Transportation and Procurement Department Superintendent of Materiel Management will:

3.4.1. Ensure RAM is shipped according to US Department of Transportation (DOT) regulations.

3.4.2. Ensure the BEE is notified of all RAM shipments originating from Vance AFB prior to shipping.

3.4.3. Contact the BEE whenever RAM arrive at or is trans-shipped through Vance AFB.

3.5. The Superintendent of Materiel Management will ensure the base RSO is notified immediately of all radioactive shipments that arrive at Vance AFB.

3.6. The installation RSO will:

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

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

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

3.6.4. Act as the approval authority for the use of RAM by non-Air Force organizations at Vance AFB.

3.6.5. Have the authority to suspend operations that may be unsafe from a radiation safety standpoint.

3.7. Permit RSOs will:

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

3.7.2. Contact the installation RSO if any questions or problems arise concerning the permitted radioactive material.

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

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

3.7.5. Brief the squadron commander annually on the permit safety program and any problem areas.

3.7.6. Provide the installation RSO with a copy of all shipping and transfer paperwork.

3.8. Supervisors will:

3.8.1. Establish and enforce radiation safety procedures.

3.8.2. Ensure radiation safety training is conducted.

3.8.3. Notify the installation RSO and the squadron commander of any radiation safety problems.

3.9. All personnel using RAM or devices that generate x-ray will:

3.9.1. Follow established radiation safety procedures.

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

3.9.3. Notify the BEE of any off-duty employment which may involve exposure to radiation.

3.9.4. **(Military only)** If pregnant, notify the Public Health Element and supervisor as soon as possible after notification of 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.

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. The binder shall contain as a minimum, all the mandatory requirements of AFI 40-201, para 2.28.10 Reference AFI 40-201, para. 3.15., for record retention requirements.

4.6. A Nuclear Regulatory Commission (NRC) Form 3 and a supplemental notice regarding the availability of the permit shall be posted in the area where the permit RAM is stored or used. The supplemental notice shall contain the information in AFI 40-201, para 3.5. The permit RSO is responsible for ensuring this is posted.

4.7. Storage, disposal, and transfer of RAM shall be accomplished according to the permit.

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. All locally developed operating procedures shall be approved by the installation RSO before implementation. Deviation from these procedures could result in exposures to radiation that is not ALARA.

5.1. Exposure to ionizing radiation shall be minimized to an ALARA level when using RAM or devices that 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 Vance AFB shall be approved by the installation RSO. Non-Air Force organizations, including contractors, who plan on using RAM or devices which produce x-ray radiation on base shall notify the installation RSO in writing. Notification for RAM use by contractors shall be IAW AFI 40-201, para 3.4.5, at least 30 calendar days before bringing the materials on base. Attachment 2 is an information sheet that is to be given to contractors to assist in this notification.

7. Storing RAM:

7.1. Radiation storage areas are classified as restricted or unrestricted. The classification is dependent on the radiation exposure levels measured in the storage area. The installation RSO determines the storage area classification. If RAM is stored in an unrestricted area, provisions shall be established to prevent unauthorized removal of RAM.

7.2. All commodities that 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 shipping the RAM shall contact BEE for packaging, labeling, and other shipping requirements.

8.3. The TMO will notify the BEE of all RAM shipments originating from Vance AFB. It is the TMO personnel's responsibility to ensure RAM is shipped according to DOT regulations. As a check, TMO personnel contact the BEE prior to shipment to do a quality control check

of the shipment. Normally, no specific actions need to be taken when RAM is trans-shipped through Vance AFB. However, the BEE shall be contacted whenever RAM that 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. When this occurs, the DOT requirements (including labeling) apply. Organizations that may transport radioactive materials on public roads must contact the BEE for additional information on labeling and transportation requirements. Organizations shall obtain approval from the BEE before transporting RAM off base.

10. Receiving RAM: All RAM shipped with a DOT radioactive symbol (white I, yellow II, or yellow III) shall be checked for contamination with a survey meter as soon as possible after it is received. Contact the BEE if the organization does not have the capability to do this monitoring. Monitoring shall be documented. The documentation shall include the instrument used, calibration date, date and time monitored, and person performing the monitoring.

11. RAM Disposition:

11.1. All disposition of excess RAM shall be coordinated with the installation RSO. Specific disposition procedures depend on the isotope, activity, and physical state of the RAM.

11.2. All disposal of RAM shall be coordinated by the Installation RSO through the Air Force Radiation Recycling and Disposal Agency.

12. Monitoring: Radiation monitoring will be conducted by the BEE on affected military and DOD civilians as determined by BEE. In some workplaces (such as NDI), 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.

12.1. TLDs: The BEE identifies Military and DOD civilians who must wear TLDs.

Table 1.1. The investigation action levels based on ALARA and BEE Guide to Ionizing Radiation.

Exposure Limit Category	Dosimetry Period (rem)		
	Annual	Quarterly	Monthly
Total Effective Dose Equivalent	0.5	0.13	0.042
Lens of Eye	1.5	0.37	0.13
Extremity, Shallow, Deep Dose, Committed Equivalent, and Head Dose Equivalent	5	1.3	0.42

12.1.1. The supervisor is responsible for identifying to the BEE all personnel who are required to wear a TLD. Before issuing a TLD, the BEE must enroll the individual in the program and conduct training. This process takes about 20 minutes, and is by appointment only. An appointment may be scheduled by calling 213-7241.

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

12.1.3. Pregnancy: If an active duty woman who handles RAM or operates X-ray devices becomes pregnant, she shall notify the Public Health Element, Ext 5079, and her supervisor of the pregnancy. As part of the pregnancy profile, BEE will assess her radiation exposure risks and if required, she will be enrolled in the monthly TLD monitoring program. The same process shall be followed for a civilian worker who declares pregnancy, however a civilian worker may choose not to declare pregnancy.

12.1.4. Off-duty employment: The BEE must be notified of any off-duty employment involving RAM.

12.2. Results of monitoring, including Dosimetry and survey results, are available for review in the BEE office in Bldg 810.

13. 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. The BEE or shop supervisor will provide annual training.

13.1. The supervisor is responsible for ensuring training is conducted. The supervisor shall maintain training documentation.

13.2. The supervisor shall schedule all personnel for training and ensure they attend.

13.3. The supervisor conducting the annual training must meet all of the conditions below:

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

13.3.2. A detailed lesson plan is developed for the training. The installation RSO can assist in the development of this lesson plan.

13.3.3. The lesson plan is approved by the installation RSO.

13.3.4. If a RAM permit exists for the workplace, the lesson plan must cover the permit requirements and the location and content of the permit RSO's binder required by para 5.5 of this instruction.

13.3.5. A list of personnel trained is forwarded to BEE (71 MDOS/SGOQB) upon completion of training. The list shall include the name of the individuals who performed the training.

14. RAM Incidents and Accidents:

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

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

14.3. Some situations may require State of Oklahoma notification according to AFI 40-201, para 3.12. If this notification is required, the Wing Public Affairs Officer shall issue a statement to the Oklahoma Office of Radiation Control. 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.

15. Contractor Operations (Reference Attachment 2):

15.1. Ensure no civilian contractors, Department of Defense (DoD), Department of Energy (DoE) or Defense Logistics Agency (DLA) are using radioactive material on VAFB without the approval or knowledge of 71 MDOS/SGOQB. Non-Air Force users of radioactive materials on VAFB must be a VAFB Radioactive Material Permittee and inspected by the VAFB RSO, contract monitor, Air Force inspectors, or Nuclear Regulatory Commission inspectors.

15.2. Ensure civilian contractors observe the following provisions:

15.2.1. The contractor must notify the installation RSO before bringing the radioactive material onto the installation and must notify them when radioactive material is removed. The contractor must ensure that the RSO, installation fire department, and safety office know the locations where the material will be used and stored when not in use.

15.2.2. The contractor must comply with the requirements of their NRC or Agreement State License and the VAFB Radioactive Material Permit.

15.2.3. 71 MDOS/SGOQB may randomly check the use of the radioactive material to ensure proper radiological health precautions are being followed. If they discover improper radiological procedures, SGOQB will immediately notify the contractor monitor to initiate corrective actions.

15.2.4. Non-Air Force organizations must formally apply for either a renewal or termination of their VAFB permit upon its expiration.

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Commander, 71st Flying Training Wing

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 48-109, *Radio-Frequency Radiation (RFR) Safety Program*

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

AFI 48-148, Ionizing Radiation Protection

AFMAN 48-125, *Personnel Ionizing Radiation Dosimetry 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. 33Bl-l, Nondestructive Inspection Methods*

Prescribed Forms

None

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

71 MDG—71st Medical Group

AAF—Auxiliary Air Field

AFB—Air Force Base

AFMAN—Air Force Manual

AFRIMS—Air Force Records Information Management System

ALARA—As Low As Reasonably Achievable

BEE—Bioenvironmental Engineering Element

DoD—Department of Defense

DOT—Department of Transportation

FMP—Flight Manuals Program

IAW—In Accordance With

MDOS—Medical Operation Squadron

NDI—Nondestructive Inspection

NRC—Nuclear Regulatory Commission

RAM—Radioactive Material

RDS—Records Disposition Schedule

RF—Radio Frequency

RIC—Radioisotope Committee

RSO—Radiation Safety Officer

TLD—Thermoluminescent Dosimeters

TMO—Traffic Management Officer

T.O—Technical Order

VAFBI—Vance Air Force Base Instruction

TermsSee AFI 40—201, for additional terms

Installation RSO———-The installation RSO is normally the senior ranking person in the 71 MDOS Bioenvironmental Engineering Element. This person runs the installation's radiation safety program. The installation RSO can be contacted at Ext 7241.

Permit RSO———-A permit RSO is required for each RAM permit issued by the USAF RIC. The RSO is usually the person in the using organization that has control over the RAM. Verify that the individual selected for this responsibility meets the requirements of AFI 10-201 para 2.25.1.

Radiation Safety Officer—There are two types of radiation safety officers, the installation RSO and the permit RSO.

Attachment 2

REQUIREMENTS FOR CONTRACTORS WHO BRING RADIOACTIVE MATERIALS ON BASE

A2.1. The following information must be provided to 71 MDOS/SGOQB for approval (Phone: 213-7241) 30 days prior to a contractor bringing radioactive material onto Vance AFB and Kegelman AAF. This is an Air Force requirement established by Air Force Instruction 40-201, Managing Radioactive Materials in the USAF. NOTE: This is required, regardless of whether or not the NRC or State requires a license.

A2.2. A brief description of the proposed activities

A2.3. The dates the radioactive material will be used on base

A2.4. The name of the contractor and contracted project under which the work is being done

A2.5. A copy of the NRC or Agreement State license authorizing the use of the radioactive materials (if one is required).

A2.6. A copy of the local representative's current radiation safety training certificate

A2.7. Copies of the most recent leak-tests if applicable. The device will be denied if these test are out of date

A2.8. The name, local address, and telephone number of the responsible local representative and the name, address, and telephone number of the radiation safety officer (if there is an NRC license, this must be the person specified on the license)

A2.9. An acknowledgement the base radiation safety officer can make periodic checks to ensure contractor personnel follow radiation safety practices to prevent exposure to Air Force personnel and avoid contamination of government property.