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Medical Command

**BASE IONIZING RADIATION PROTECTION
PROGRAM**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction establishes a Peterson Complex ionizing radiation safety program by delineating responsibilities and procedures on the handling, use, storage, control and disposal of radioactive materials and items producing ionizing radiation. It applies to all 21st and 50th SW activities, geographically separated units, Air Force Reserve and Air National Guard operations, to include all tenant organizations and contractor operations (with Statement of Work referencing this instruction) at these installations.

SUMMARY OF REVISIONS

This document is substantially revised and must be completely reviewed.

This instruction deletes the requirement for appointing a unit ionizing Radiation Safety Officer (RSO). It delineates responsibilities to Peterson Complex organizations to ensure a team effort in the recognition of potential radioactive materials introduced to USAF installations. This instruction also includes instructions on emergency response procedures in the event of a radioactive materials accident or incident.

1. Responsibilities:

1.1. Wing Commander (or equivalent):

1.1.1. Appoints a Base Radiation Safety Officer (RSO) in writing who meets the qualifications of AFI 40-201, *Managing Radioactive Materials in the US Air Force*.

1.1.2. Grants the Base RSO authority necessary and sufficient to implement radiation safety practices IAW Air Force policy for installation.

1.2. Director of Base Medical Services:

1.2.1. Recommends to Wing Commander removal of radiation workers from duties involving radiation exposure if NRC radiation exposure limits are exceeded.

1.2.2. Ensures all reported incidents of suspected or alleged radiation overexposure are reported to and investigated by the Base Radiation Safety Officer and the results of such investigations are properly documented by the Public Health Flight or qualified appointed representative.

1.2.3. Implement duties listed under Paragraph **1.3.** as applicable.

1.3. Unit Commanders:

1.3.1. Ensure compliance with Air Force policy governing radioactive materials and ionizing radiation safety in their units.

1.3.2. Ensure Base RSO (through Bioenvironmental Engineering Flight) is contacted when any government credit card, AF Form 9, **Request for Purchase**, or AF Form 616, **Fund Cite Authorization (FCA)**, action involves the purchase or use of radioactive materials or services.

1.3.3. Obtain USAF Radioactive Materials Permits for their units IAW AFI 40-201 and in consultation with the Base RSO.

1.3.4. Appoint and empower a qualified Permit Radiation Safety Officer when Radioactive Materials Permits are owned by their organization.

1.3.5. Ensure that all shipments of radioactive material to and from their organization are conducted in compliance with AFI 40-201. This includes notification of the Base Radiation Safety Officer within three (3) hours of receipt of a package marked with Department of Transportation (DOT) White or Yellow labels indicating radioactive materials in the shipment.

1.4. Base Radiation Safety Officer:

1.4.1. Establishes base ionizing radiation safety program. Serves as the focal point for radiation safety and radioactive material disposal issues as specified in Air Force Instructions and Technical Orders.

1.4.2. Maintain a master inventory of Air Force owned and operated radiation sources on base. Provide copies of inventory to the Fire Chief and Chief of Civil Engineering Readiness Flight whenever there is a significant change, or at least annually.

1.4.3. Identify radiation hazard areas, ensure they are properly posted, periodically survey these areas, and recommend procedures and policies to the commander and other responsible personnel.

1.4.4. Selects personnel to be monitored as part of the Air Force Thermoluminescent Dosimeter (TLD) program and manages program IAW AFI 48-125, *The US Air Force Personnel Dosimetry Program*. Document briefing of personnel on proper wear and storage of TLDs at time of issue.

1.4.5. Report and investigate each case of suspected or actual overexposure or abnormal radiation exposure to determine the cause and prevent recurrence, to include determining fetal doses for ionizing radiation and the extent of exposure to the affected individuals. Investigate (with workplace supervisor) TLD exposures exceeding established Action Levels of 50 mRem for a monthly TLD badge, 150 mRem for a quarterly TLD badge, and 10 mRem for a monthly pregnant worker TLD badge.

1.4.6. Establishes ionizing radiation safety training program for base radiation workers. Performs or monitors radiation safety training in base workplaces.

- 1.4.7. Briefs the Wing Safety Council at least annually on the status of the radiation safety program on Peterson Complex.
- 1.4.8. Review and coordinate on all unit and work area instructions covering radiation protection.
- 1.4.9. Review and forward to HQ AFSPC/SGPB all radioactive material permit applications, renewals, or requests for amendment.
- 1.4.10. Review, approve and monitor contractor use of radioactive materials on Peterson Complex.
- 1.4.11. Obtains disposal and recycling instructions for low level radioactive waste as specified in Air Force Technical Orders. Assists equipment custodians and unit personnel with implementing disposition instructions and complying with all applicable regulations.
- 1.4.12. Monitors the receipt, transfer and shipment of radioactive materials to and from Peterson Complex.
- 1.4.13. Responds to incidents or accidents involving radioactive materials. Assists on-scene commander with controlling hazards of incident or accident. Reports incident or accident to HQ AFMOA/SGOR IAW AFI 40-201.

1.5. Permit Radiation Safety Officer:

- 1.5.1. Complies with all requirements in AFI 40-201, paragraph 1.22.
- 1.5.2. Ensures the NRC Form 3 (if required) is posted and contains the supplemental notice in AFI 40-201, paragraph 3.5.3.
- 1.5.3. Ensures permitted radioactive materials are secured from unauthorized removal or access at all times or are under constant surveillance of an authorized individual.
- 1.5.4. Responsible for implementation of actions consistent with Air Force Radioactive Materials permit. Conducts swipe sampling/leak testing and radioactive materials inventory IAW permit, AFI 40-201, and applicable Technical Order directives. Forwards copy of leak test results and inventory to Base RSO for review. Requests support from Base RSO for annual area surveillance and annual ALARA training. Maintains all permit documentation for a minimum of three (3) years and inventories a minimum of five (5) years. Inventories shall include: date of inventory, model number and serial number of each source as applicable, identity and quantity of radionuclide, location of each source and the signature of the PRSO.
- 1.5.5. Point of contact for all Air Force Inspection Agency (AFIA) and Nuclear Regulatory Commission (NRC) inspections for respective permit.
- 1.5.6. Reports any incidents or accidents involving permitted materials to the BRSO within one (1) hour of discovery. Further notifications will be conducted IAW AFI 40-201, paragraph 3.11.

1.6. Work Area Supervisors of Radiation Areas:

- 1.6.1. Ensure all personnel who work with radiation emitters are properly trained on the potential hazards and that training is documented on the individual's AF Form 55, **Employee Safety and Health Record**, or equivalent.

- 1.6.2. Establish a work area operating instruction for the work area radiation protection program completely covers work area requirements. Coordinate work area instructions pertaining to radiation protection with the BRSO before printing.
- 1.6.3. Ensure the names and telephone numbers of the BRSO, and emergency notification procedures in the event of an accident, are posted in the work area.
- 1.6.4. Ensure all ionizing radiation workers receive annual ALARA training. Train on specific operating procedures in the work area to keep exposures ALARA.
- 1.6.5. Immediately notify the PRSO and BRSO following a radiation accident/incident. Do not change the set-up of anything involved. Collect all pertinent information concerning the accident/incident and draft a detailed sketch of what happened. Take photos, if possible. Assist BRSO in conducting investigation and implement recommendations BRSO presents to prevent future incidents/accidents.
- 1.6.6. Ensure a copy of this regulation is maintained in each work area where radioactive materials or x-ray producing equipment are maintained, stored or used.
- 1.6.7. Review AF Form 1499, report errors to the BRSO, and maintain in the work area until replaced by AF Form 1527. Ensure a copy of each AF Form 1527 is returned to the BRSO with certification that it was received by the employee. Ensure all monitored personnel review these reports.
- 1.6.8. Ensure TLDs are available for exchange at the end of each monitoring period.
- 1.6.9. Immediately refer pregnant workers to the Public Health Flight, 10 AMDS/SGPM (556-1225).

1.7. Workers Assigned to Radiation Areas:

- 1.7.1. Comply with work area instructions and permit conditions.
- 1.7.2. Wear TLDs with name side away from the body at all times in radiation areas. Report missing or damaged TLDs immediately. Store TLD with control badge when not worn.
- 1.7.3. Report suspected overexposures immediately to the work area supervisor.
- 1.7.4. Report ionizing radiation exposures from outside employment and provide dosimetry results to the BRSO.
- 1.7.5. Keep ionizing radiation exposures to self and others ALARA.
- 1.7.6. Review AF Form 1499 and AF Form 1527 as provided, and notify the work area supervisor of any errors noted. Certify that you received AF Form 1527 on one copy of the form, and return this certification copy to the work area supervisor.
- 1.7.7. Report intentional abuse of the dosimetry program.
- 1.7.8. Immediately report suspected pregnancy to supervisor.

1.8. Organizations Acquiring the Use or Purchase of Radioactive Materials on Peterson Complex through Any Contracting Mechanism (Corp of Engineers, Saber, Ft. Carson, etc.):

- 1.8.1. Agency will contact the BRSO prior to developing the requirements document. The BRSO will assist the using activity, as necessary, in obtaining an accurate commercial description of the

requirements for use of radioactive materials required under contract. All requirement documents containing radioactive materials requirements must be approved by the BRSO prior to forwarding the purchase request package to contracting for purchasing action. Ensure that all contracts requiring the use of radioactive materials on Peterson Complex include a requirement for the BRSO's approval prior to bringing the material on installation. As a minimum the requirements document should contain the following:

1.8.2. Non-Air Force Organizations that bring radioactive materials on Peterson Complex or conduct operations using radioactive materials on Peterson Complex must get approval from the Base Radiation Safety Officer (BRSO). To get this approval, the requesting organization must send a request in writing to the BRSO, 10 AMDS/SGPB, 625 W. Ent Ave., Peterson AFB, CO 80914-2840. The BRSO must be notified at least 30 days in advance of the date any contractor or outside agency plans to bring radioactive material onto the base.

1.8.3. To obtain an approval, all contractors must make available for review the following information:

1.8.3.1. A brief description of the proposed activities.

1.8.3.2. A copy of a valid NRC Radioactive Material License or Agreement State Radioactive Materials License (which must be current). All amendments must be included.

1.8.3.2.1. Non-Air Force organizations that don't have an NRC permit and who are not DoE or DoE prime contractors exempted from licensing must contact (through BRSO) AFMOA/SGPR for guidance and approval to use radioactive materials on an Air Force installation.

1.8.3.3. The name, local address, and phone number of the RSO named on their license.

1.8.3.4. A copy of the portion of the Air Force contract describing the work to be done and inclusive date.

1.8.3.5. Copies of training certificates for authorized users.

1.8.3.6. A copy of most recent leak test results (not over 180 days old).

1.8.3.7. An acknowledgment that the BRSO has authority to suspend contractor operations believed to be unsafe and the right to make periodic checks.

1.8.4. Contractors will not bring radioactive materials onto Peterson Complex without written consent of the BRSO. Permission, if granted, will be only for the activities and isotopes specified in the documents submitted.

1.8.5. Use of radioactive material will be minimized consistent with Air Force requirements.

1.8.6. Every accident or incident involving licensed radioactive material will be reported to the BRSO immediately.

1.8.7. The BRSO may terminate permission to use radioactive materials on Peterson Complex at any time for violation or noncompliance with NRC, US Air Force, State, or other regulatory requirements.

1.8.8. Transportation and Control of Radioactive Materials while on Peterson Complex will be in accordance with 49 CFR 172.500 through 49 CFR 172.556.

1.8.9. Vehicles transporting radioactive material on Peterson Complex will be marked with the appropriate radioactive material warning placards affixed to a conspicuous place on each side of the transport vehicle.

1.8.10. The source will be transported in the original manufacturer's shipping container or equivalent type "A" shipping container.

1.8.11. The isotope will be secured via lock and key when not in actual use.

1.8.12. Radioisotopes will not be kept on base overnight without specific permission from the BRSO.

1.9. Traffic Management Office, Cargo Movement Element:

1.9.1. Packages and ships all radioactive materials IAW Department of Transportation (DOT) requirements. Obtains technical guidance from Base RSO as needed to accomplish this task.

1.9.2. Maintains written procedures and log for processing and monitoring of inbound/ outbound radioactive shipments.

1.9.3. Notifies Base Radiation Safety Officer within three (3) hours of a package received with DOT White or Yellow Radioactive Materials labels. Places hold on package pickup until Base RSO or designated representative accomplishes safety survey. Assists Base RSO in performing the safety survey as necessary.

1.9.4. Notify the BRSO, **prior to shipment**, of any outgoing packages, which contain radioactive material. Provide the BRSO with: identity of shipper, appropriate point of contact, and telephone number. Radioactive material packages must not be shipped without BRSO approval.

1.10. Base Supply (or equivalent):

1.10.1. Maintain a radioactive material storage area for serviceable excess or unserviceable stock-listed commodities (containing radioactive materials) which have been turned in by using organizations for return to stock or for disposition decision. Notify the BRSO of the location of each radioactive material storage area and a point of contact for access to the area for surveys.

1.10.2. Post a completed AFTO Form 9C in the area.

1.10.3. Post a completed AFTO Form 9B in or on each bin containing a radioactive commodity.

1.10.4. The storage area will remain an unrestricted area as long as no more than 100 radioactive electron tubes/spark gaps are stored there and the radiation dose rate outside the bins remains below 2 mR/hr.

1.10.5. Ensure the BRSO surveys the storage area annually. Contact the BRSO if the number or type of items in storage change significantly.

1.10.6. Establish written procedures for handling radioactive items turned in by organizations or individuals. Procedures must specifically address radioactive items turned in to the Individual Equipment Issue Element and provide appropriate instructions for all personnel on handling, storage, requesting disposition instructions, and shipping of radioactive items. Written procedures will be reviewed annually by the BRSO concurrent with the radioactive material storage area survey.

1.11. Security Police:

1.11.1. Attempt to identify and stop all contractors or contractor vehicle operators from bringing radioactive materials onto installation without written authorization from the BRSO. Verification can be obtained by calling Bioenvironmental Engineering at 556-7721 or outside normal duty hours through the 21 SW Command Post.

2. Procedures:

2.1. Radioactive Material Disposal:

2.1.1. Excess serviceable or repairable items containing radioactive material must be reported to the appropriate Item Manager when they are no longer required locally.

2.1.2. Radioactive Electron Tubes and Spark Gaps will be disposed of in accordance with T.O. 00-110N-7S-2, Handling and Disposition of Radioactive Electron Tubes and Spark Gaps.

2.1.3. Generators of other radioactive materials requiring disposal shall submit to the BRSO a written request for disposal guidance. The request must contain as much of the following information as possible: name of item, quantity, radionuclide, physical form of the radionuclide (solid, liquid, gas), chemical form of the radionuclide, National Stock Number (NSN), activity of the item in millicuries, and the name and phone number of the point of contact.

2.1.4. The owner of the radioactive material is responsible for scheduling radioactive disposal/recycling shipment with the Traffic Management Office and the Base RSO, and implementing all disposal or recycling guidance obtained. The Traffic Management Office is responsible for shipping radioactive materials/items IAW U.S. Department of Transportation (DOT) and Armstrong Laboratory requirements.

2.2. Static Displays:

2.2.1. The Peterson Air and Space Museum shall establish a radiation safety record for each historical aerospace vehicle they manage in accordance with AFI 84-103, *Museum System*. These records will detail all radioactive commodities present in each vehicle as documented by initial and periodic radiation surveys.

2.2.2. The BRSO shall conduct an initial radiation survey of each static display and document findings on AF Form 3583, **USAF Museum Aerospace Vehicle Static Display/Component Radiation Survey Log (LRA)**, and/or AF Form 3584, **USAF Museum Aerospace Vehicle Static Display/Component Radiation Swipe Log (LRA)**. If radioactive materials are determined to be present in a static display vehicle, the BRSO will ensure radiation exposures to AF personnel and the public are kept within acceptable limits. In addition, if radioactive material is present, the BRSO will perform periodic surveys of the display every three years.

2.2.3. If radioactive material is found to be present in a static display, all maintenance activity for the radioactive component(s) must be coordinated through the BRSO. Radioactive components must never be sanded, ground, machined, drilled, etched, or subjected to any process which produces respirable particles or changes the form of the component.

2.2.4. Report any damage to radioactive components of static displays to the BRSO immediately.

2.3. Emergencies Involving Radioactive Materials:

2.3.1. Any incident involving radioactive materials must be reported to 21 SW Command Post (ext. 6-4555). The Command Post will notify the Bioenvironmental Engineering Flight/Base RSO

through the Disaster Control Group pager or Bioenvironmental Engineering Technician on-call pager.

2.3.2. Emergencies involving radioactive materials will be reported to the USAF Radioisotope Committee as outlined in AFI 40-201. The Base RSO and Bioenvironmental Engineering personnel are authorized to conduct this reporting as specified in AFI 40-201.

JERRY M. DRENNAN, Brigadier General, USAF
Commander

ATTACHMENT 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

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

29 CFR 1910.1096, *Ionizing Radiation*

49 CFR Parts 171, 172, 173, 175, 177 and 178, *Transportation Requirements*

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

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

AFI 84-103, *Museum System*

AFI 91-204, *Safety Investigations and Reports*

AFM 32-4004, *Emergency Response Operations*

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

Technical Manual T.O. 00-11N-3, *Requisition, Handling, Storage, and Identification of Radioactive Material*

Technical Manual T.O. 00-110N-7S-2, *Handling and Disposition of Radioactive Electron Tubes and Spark Gaps*

Technical Manual T.O. 00-110N-10, *Requisitioning, Use, and Disposition of Lensatic Compass FSN 6605-079-0007YS*

Technical Manual T.O. 00-110N-12, *Requisitioning, Use, Storage, and Disposition of Submersible Wrist Compass NSN 6540-00-382-1000*

Technical Manual T.O. 00-110N-15, *Requisition, Use and Disposition of Lensatic Compass NSN 6605-00-151-5337YS*

Technical Manual T.O. 33B-1-1, *Non Destructive Inspection Methods*

AFOEHL Report 90-211RD00253MRF, *USAF Personnel Dosimetry Program Instruction Manual*

Terms

As Low As Reasonably Achievable (ALARA) Concept—Air Force philosophy for work with ionizing radiation and radioactive materials. Establishes set of management and administrative actions to ensure radiation doses are minimized to the greatest extent possible.

Base Radiation Safety Officer (BRSO)—. Focal point for radiation safety on installation and appointed in writing by the Wing Commander. Must meet requirements specified in AFI 40-201.

Ionizing Radiation—Particulates or electromagnetic energy produced from the decay of unstable elements, which may produce ions when interacting with matter. Ionizing radiation may also be produced in the form of x-rays. The different types of ionizing radiation include Alpha, Beta, Gamma, x-ray and most rarely, Neutron radiation.

Permit Radiation Safety Officer (PRSO)—Specified by the Radioactive Material Permit and assigned duties IAW AFI 40-201 for the specific permit. Appointed by commander of organization owning Radioactive Material Permit.

Radioactive Material Permit—A permit issued by the U.S. Air Force Radioisotope Committee (HQ AFMOA/SGOR, Bolling AFB, DC) IAW AFI 40-201 regulating the possession, use, maintenance and disposal of a non-exempted instrument or item containing radioactive material.

Thermoluminescent Dosimeter (TLD)—Badge issued by Bioenvironmental Engineering Flight (10 AMDS/SGPB) to monitor personal exposure to ionizing radiation in certain jobs identified as having an exposure risk by the Base Radiation Safety Officer.