

**BY ORDER OF THE COMMANDER
VANDENBERG AIR FORCE BASE**

**VANDENBERG AIR FORCE BASE
INSTRUCTION 48-148**



2 MARCH 2017

Aerospace Medicine

***RADIATION AND LASER
SAFETY PROGRAM***

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

ACCESSIBILITY: Publications and forms are available on the e-Publishing website at www.e-Publishing.af.mil for downloading or ordering

RELEASABILITY: There are no releasability restrictions on this publication

OPR: 30 MDOS/SGOJ

Certified by: 30 MDOS/CC
(Lt Col Maiya Anderson)

Supersedes: AFI40-201_30SWSUP,
23 October 2010

Pages: 29

This instruction implements AFI 48-148, *Ionizing Radiation Protection*. It also establishes guidance, procedures, precautionary measures, and responsibilities for the control of radioactive materials and radiation producing devices on Vandenberg Air Force Base (VAFB). It implements Air Force Instruction (AFI) 40-201, *Managing Radioactive Materials in the US Air Force*; AFI 48-148, *Ionizing Radiation Protection*; AFI 48-109, *Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program*; AFI 48-139, *Laser and Optical Radiation Protection Program*; Air Force Manual (AFMAN) 48-125, *Personnel Ionizing Radiation Dosimetry*; 10 Code of Federal Regulation (CFR), *Energy*; 21 CFR, *Food and Drug Administration*; 40 CFR, *Environment*; and 49 CFR, *Transportation*. It sets up approval and coordination procedures and gives direction for proper licensing of radioactive materials. It gives guidance for the transportation, handling, storage, possession, and disposal of radioactive materials on VAFB, including disaster control operations. This document applies to all assigned, attached, and tenant units as well as contractors who possess, use, handle, or store sources of ionizing and non-ionizing radiation within the confines of VAFB. This instruction describes the Radiation Safety and “As Low as Reasonably Achievable” (ALARA) Program on VAFB. It requires control of radioactive materials and machines or devices producing ionizing or non-ionizing radiation to safeguard the health of the military and civilian population, while permitting maximum benefits from their use. The effectiveness of the program depends on consistent and conscientious safety efforts practiced by individuals who use materials or machines producing radiation. Ensure that 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 (RDS) located at

<https://my.af.mil/afrims/afrims/afrims/rims.cfm>. 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*, through 30 MDG/CSS, 338 S. Dakota Ave., Vandenberg AFB, CA 93437.

1.	Responsibilities.....	3
2.	Non-ionizing Radiation.....	9
3.	Ionizing Radiation.....	11
4.	Approval of Radioactive Material and Radiation Producing Devices.....	14
5.	Radioactive Material Receipt or Shipment.....	15
6.	Radioactive Material Storage.....	15
7.	Radioactive Material Movement on VAFB.....	15
8.	Radioactive Material Disposition.....	16
9.	Depleted Uranium (DU) Munitions Operating and Emergency Procedures.....	16
	Attachment 1— GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION	18
	Attachment 2— LOCAL THRESHOLD LIMIT	23
	Attachment 3— USE OF RADIATION SOURCES APPLICATION REQUIREMENTS (SEE NOTE)	24
	Attachment 4— BASIC RADIOACTIVE MATERIAL SHIPPING PROCEDURES	29

1. Responsibilities.

1.1. The Commander, 30th Space Wing (30 SW/CC), or designated representative:

1.1.1. Has overall responsibility for the VAFB Radiation Safety Program.

1.1.2. Designates the installation BE, or other individual with equivalent radiation and laser safety experience, as the Installation Radiation Safety Officer (IRSO) and Installation Laser Safety Officer (ILSO) in accordance with (IAW) AFI 40-201 and AFI 48-139. The 30th Medical Group usually provides the IRSO and ILSO.

1.1.3. Delegates authority to the IRSO/ILSO to enforce provisions of the radiation and laser safety program.

1.1.4. Ensures that Unit, Detachment and Tenant Commanders with missions that may utilize or cause potential personnel exposure to sources of radiation will designate, in writing, a unit RSO and/or LSO to provide unit support to the IRSO/ILSO. Notify the IRSO/ILSO in writing when a unit/detachment RSO and/or LSO is appointed.

1.2. The Commander, 30th Medical Group (30 MDG/CC):

1.2.1. Provides the IRSO/ILSO, as well as the Space and Missile Medicine and Optometry Clinics, the resources necessary to carry out the provisions in this instruction.

1.2.2. Provides for occupational health exams as required for personnel working with radioactive material (RAM), lasers, x-ray producing sources, and electromagnetic frequency (EMF) sources through the Space and Missile Medicine Flight.

1.3. All Other Commanders/Program Directors with Ionizing or Non-Ionizing Radiation Sources:

1.3.1. Ensure unit personnel who receive, possess, distribute, use, transfer, or dispose of RAM, lasers, x-ray producing sources, or EMF sources observe the requirements of this instruction, United States Air Force (USAF) policies, and the applicable Codes of Federal Regulation.

1.3.2. Appoint the following:

1.3.2.1. Unit RSO (URSO), if necessary, under the provisions of AFI 40-201 and AFI 48-148. For units that have ionizing or non-ionizing radiation producing equipment, the URSO will act as the single focal point for the unit on radiation protection issues. It is the URSO's responsibility to inform the IRSO of any unit changes to radiation generating materials, equipment and/or radiation safety procedures (e.g., changes to source strength, power generation, safety controls, shop processes, etc.).

1.3.2.1.1. The URSO may also be appointed as the permit RSO (PRSO) if the unit possesses a Radioactive Material Permit. The PRSO must be a member of the using organization meeting education and experience as required by AFI 40-201. The using organization may appoint the IRSO as permit RSO with IRSO approval.

1.3.2.2. Unit Laser Safety Officer (ULSO) if the organization uses Class 3B or 4 Lasers IAW AFI 48-139, paragraph 3.1.4.

1.3.3. Ensure the unit RSO/LSO provides all information necessary to evaluate radiation hazards to the IRSO. Also, through the unit RSO/LSO, ensures that the IRSO is notified of any suspected overexposures to radiation.

1.4. The Bioenvironmental Engineering (BE) Flight (30 MDOS/SGOJ):

1.4.1. Serve as the IRSO/ILSO (unless the 30 SW/CC has designated another qualified individual in writing) and permit RSO when using organizations cannot provide someone with the required qualifications.

1.4.2. Initiate, supervise, and execute the VAFB Radiation and Laser Safety Program for ionizing and non-ionizing radiation operations, including the safe use of lasers.

1.4.3. Interpret instructions applicable to the use of radiation sources on VAFB. This is a coordinated effort between the Permit/Unit RSO and USAF Radioisotope Committee (RIC) (RIC Secretariat can be reached at DSN 761-6988).

1.4.4. Provide technical information and aid to 30 SW/PA, Public Affairs, on all incidents involving RAM or other radiation sources if requested.

1.4.5. Serve as sole source of technical assistance to assigned base and tenant units on the health risks associated with the use of RAM, radiation producing devices (including lasers and EMF), and radioactive wastes.

1.4.6. Advise users on the interpretation and enforcement of USAF policy, Nuclear Regulatory Commission (NRC) rules, and any Agreement State requirements.

1.4.7. Act as the central point of contact for all requests to use RAM or radiation producing devices on VAFB.

1.4.8. Provide the following in support of the VAFB Radiation Protection Program:

1.4.8.1. Radiation surveys upon request of radiation users or supervisors based on AFIs and technical order (T.O.) requirements.

1.4.8.2. Assistance with training on the ALARA concept to all military and civil service supervisors using radioactive materials or ionizing radiation producing devices. Conducting ALARA training is the unit and shop supervisor's responsibility. The IRSO will review and approve the plan.

1.4.8.3. Assistance with training in proper handling, use, and safety techniques for AF users of RAM or radiation producing devices.

1.4.8.4. Management of the Thermo Luminescent Dosimetry (TLD) program IAW AFMAN 48-125, *Personnel Ionizing Radiation Dosimetry*.

1.4.9. Investigate the loss, theft or spill of RAM, and all real or suspected overexposures to radiation.

1.4.9.1. In the event of contractor loss or release of RAM, the IRSO will report to the USAF RIC those portions of the incident that pertain to the AF involvement. The IRSO will not conduct investigations for contractors.

- 1.4.9.2. The IRSO may recommend procedures to the contractor through the installation contracting officer in regards to RAM handling and accountability to help ensure AF compliance.
- 1.4.10. Provide Wing Safety, the Fire Department, and Emergency Management the locations where RAM is stored and used on base.
- 1.4.11. Work with the Civil Engineering Squadron to ensure the adequate design of facilities that will contain radiation sources and operations involving ionizing and non-ionizing radiation, including lasers.
- 1.4.12. Oversee routine radiological decontamination and site remediation activities.
- 1.4.13. Be the authority for contacting Headquarters Space Command/Bioenvironmental Engineering (HQ AFSPC/SGPB, DSN 692-5800), USAF/RIC or NRC regarding reportable events.
- 1.4.14. Advises VAFB and tenant unit commanders on radiation and laser health and safety practices.
- 1.5. The Optometry Flight (30 MDOS/SGOO):
 - 1.5.1. Conduct baseline and termination eye examinations for personnel working with American National Standards Institute (ANSI) class 3b and 4 lasers. For compliance with this instruction, termination means prior to permanent change of station/permanent change of assignment (PCS/PCA) to duty that does not require the use of lasers and prior to retirement or separation.
 - 1.5.1.1. Provide pre-employment laser eye exams, at the discretion of the Space and Missile Medicine Flight, as part of the medical in-processing of applicable members.
 - 1.5.2. Conduct additional examinations as required to evaluate effects of suspected or alleged laser or ultraviolet radiation overexposures.
 - 1.5.3. Document all examinations in individual medical records.
- 1.6. The Space and Missile Medicine Flight (30 MDOS/SGOQ):
 - 1.6.1. Conduct pre-employment and termination medical examinations of civil service employees and Air Force personnel routinely exposed to ionizing radiation.
 - 1.6.2. Conduct examinations as required to evaluate health effects of suspected or alleged radiation overexposures.
 - 1.6.3. Document findings in individual medical records.
- 1.7. Supervisors of Personnel Working with Radiation Sources:
 - 1.7.1. Protect the health of personnel by ensuring all operations involving radiation adhere to all radiation safety instructions, TOs, and workplace OIs.
 - 1.7.1.1. Coordinate changes to operating procedures or source type or strength through the permit RSO if applicable, and the IRSO.
 - 1.7.1.2. Coordinate all new and revised OIs with permit RSO if applicable, and the IRSO prior to publishing.

1.7.2. Provide all necessary personal protection and safety equipment.

1.7.2.1. Ensure personnel wear TLD badges during all operations involving ionizing radiation, if required by the IRSO and enrolled in the TLD program.

1.7.3. Inform the IRSO and Unit/Permit RSO of new radiation sources or changes to existing sources.

1.7.4. Provide all personnel working with radiation sources periodic radiation safety training as directed by the IRSO. Document training on the individual's AF Form 55 or equivalent electronic records.

1.7.5. Refer all pregnant active duty, active duty reservists and civilians who work with ionizing radiation sources/equipment to 30 MDOS/SGOL, Public Health (PH) Flight, as soon as clinical confirmation of pregnancy.

1.7.6. Report any suspected or alleged overexposures immediately to the IRSO.

1.7.7. Conduct the following for workplaces monitored on the TLD program:

1.7.7.1. Review and maintain the Acceptable Level (AL) Listing 1499, *Report of Occupational Exposure to Ionizing Radiation*. Ensure personnel review their personal exposure data.

1.7.7.2. Report any errors in these forms to the IRSO.

1.7.7.3. Identify exposures that are above average and modify work practices to reduce exposures.

1.7.8. Protect the public from non-occupational radiation exposures resulting from VAFB activities through engineering and administrative controls (e.g., shielding, radiation signs, warning lights, etc.).

1.7.9. Notify the Unit RSO and IRSO of unsafe work practices or hazardous conditions involving radioactive materials or radiation producing devices.

1.7.10. Immediately report any accident, fire, theft, or loss involving radioactive material to the Unit RSO and IRSO.

1.7.11. Coordinate any acquisition of Laser systems through the ILSO for recommendations of approval/disapproval IAW AFI 48-139, paragraph 4.1.2.3. All acquisitions of laser systems must be IAW AFI 48-139, paragraph 4.1.2.

1.8. Personnel Working with Radiation Sources:

1.8.1. Minimize personal exposure to radiation in accordance with the ALARA principle. Follow all safety precautions to maintain radiation exposures below applicable limits.

1.8.2. Ensure required warning signs and safety devices are in place and operational prior to beginning work.

1.8.2.1. Properly wear TLD badges during all operations involving ionizing radiation if required by the IRSO and enrolled in the TLD program.

1.8.3. Report incidents of suspected overexposure to supervisor immediately.

1.8.4. Notify the IRSO of any non-AF radiation work (i.e., moonlighting), and provide monitoring results for inclusion in the Master Radiation Exposure Registry.

1.8.5. Notify the IRSO if on the TLD program and will be undergoing a procedure involving radioactive material medical diagnosis (e.g., cardiac stress test or other similar imaging test) or treatment (e.g., thyroid iodine ablation or other similar treatment).

1.8.6. Report to supervisor after clinical confirmation of pregnancy is determined in order to be evaluated by PH for a potential work duty limiting profile.

1.9. The Fire Protection Flight (30 CES/CEF):

1.9.1. Notify the IRSO and the source custodian (of the owning agency) of fires in facilities that contain RAM.

1.10. The CE Emergency Management Flight (30 CES/CEX):

1.10.1. Work with the IRSO to mitigate and remediate radiological hazards resulting from major accidents/incidents and terrorist use of weapons of mass destruction involving nuclear or radiological materials. The members of the CBRNE response team (BE and EM) will work in conjunction with one another in conducting radiation surveys to evaluate or confirm the extent and nature of the radiological hazards during emergency response operations.

1.10.2. Use attachments 4 and 7 in AFI 48-148 as guides in management of operations involving radiological contamination.

1.11. The CE Programs Flight (30 CES/CEN):

1.11.1. Coordinate designs for construction of new facilities and renovation of existing facilities that house radiation sources with the IRSO.

1.11.2. Ensure no contractor or other non-Air Force organizations are using a radiation source (i.e., radioactive material, ionizing and non-ionizing radiation sources, etc.) on VAFB without the approval of the IRSO (see attachment 3 for required procedures).

1.12. The 30th Contracting Squadron (30 CONS):

1.12.1. Ensure the IRSO has reviewed the functional activities requirements package when the delivery or use of radioactive material is involved in contract performance.

1.12.2. Inform the IRSO of preconstruction meetings when attending contractors plan to use radioactive materials or other forms of radiation during contract execution. Ensure contractor compliance with radioactive material requirements of the contract.

1.12.3. Ensure no contractors are using a radiation source (i.e., radioactive material, ionizing and non-ionizing radiation sources, etc.) on VAFB without the approval of the IRSO (see attachment 3 for required procedures).

1.13. The 30th Logistics Readiness Squadron (30 LRS):

1.13.1. Ship, receive, store, pack, crate or otherwise manage radioactive materials in accordance with 10 CFR, 49 CFR, Air Force Manual (AFMAN) 24-204, *Preparing Hazardous Materials for Military Air Shipments*, and other applicable commercial and military directives. Damaged shipments or shipments received with broken container seals will be handled IAW Department of Defense (DoD) 4500.9-R, *Defense Transportation Regulation*. Sections 6 and 7 briefly discuss these procedures and attachment 4 provides a thorough summary.

1.13.2. Train all personnel handling or storing RAM on proper safety and storage procedures after coordination with the IRSO.

1.14. The Public Health Flight (30 MDOS/SGOL):

1.14.1. Ensure that the appropriate occupational physical examination requirements are met and reported to the Occupational Health Working Group.

1.14.2. Refer pregnant workers with the potential for radiation exposures to the BE personnel to be enrolled in the monthly TLD monitoring program.

1.15. Unit Radiation Safety Officers (URSO) and Laser Safety Officers (ULSO):

1.15.1. The Unit RSO must ensure personnel are briefed on radiation overexposure notification procedures, the importance of coordinating changes in radiation generating devices, equipment and radiation safety procedures, and assist in investigations of suspected or actual overexposures.

1.15.2. Perform an inventory every six months of all ionizing and non-ionizing producing equipment operated by the unit and provide a copy to the IRSO.

1.15.3. Ensure all ionizing radiation operators are trained and certified by the section supervisor. Maintain a current listing of all certified operators for the unit. Document training on AF Form 55, *Employee Safety and Health Record*, or equivalent electronic records. A training program specific to ionizing radiation operation is required IAW AFI 40-201, attachment 5.

1.15.4. In the absence of an equipment specific Air Force Technical Order, ensure an operating instruction (OI) is written for each piece of equipment that has the potential to expose personnel to hazardous radiation when operated in a manner consistent with manufacturer's recommendations. The OI should include standard safety procedures and must be reviewed annually.

1.15.5. Coordinate radiation survey or hazard evaluations with the IRSO.

1.15.6. Ensure corrective actions are initiated within the unit on all Radiation Protection Program deficiencies identified by the IRSO.

1.15.7. Ensure workplaces using generally licensed materials adhere to the provisions of 10 CFR 31.5.

1.15.8. ULSOs must be trained IAW AFI 48-139, paragraph 3.2 and training will be provided by BE.

1.15.9. ULSOs must adhere to the duties outlined in AFI 48-139, paragraph 2.23. and those specified in [chapter 3](#) of AFI 48-139.

1.16. 30th Space Wing Safety Office (30 SW/SE):

1.16.1. Ensure 30th Space Wing Safety Assessment (30 SW/SEA) section is aware of all launch-related RAM sources and EMFR emitters and procedures at VAFB. Ensure 30 SW/SEA is involved in the process of reviewing supporting analyses to ensure design and operation meet System Safety requirements in accordance with Air Force Space Manual (AFSPCMAN) 91-710, Volumes 3, 5, and 6. If necessary, launch-related RAM users must provide additional information and obtain concurrence for use of RAM by the Radiation Safety Committee (RADSAFCOM) and in accordance with Air Force Instruction 91-110.

1.16.2. Ensure 30th Space Wing Launch Safety (30 SW/SEL) section is aware of all Laser systems at VAFB that could affect launch operations. Ensure 30 SW/SEL is involved in the process of reviewing supporting analysis and operational procedures to ensure design and operation meet Launch Safety requirements in accordance with AFSPCMAN 91-710 Volume 2, Directed Energy Plan requirements.

2. Non-ionizing Radiation.

2.1. Electromagnetic Field (EMF) Radiation:

2.1.1. Exposure Limits: No personnel will be exposed to an EMF level in excess of the Maximum Permissible Exposure (MPE) limits established by AFI 48-109, *Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program*.

2.1.2. Monitoring: BE is responsible, with assistance from shop supervisors and personnel, for identifying areas and conducting surveys where EMF levels in excess of the appropriate MPE may exist. BE will conduct evaluations IAW AFI 48-109. Shop supervisors will call the BE (606-7811) to schedule an EMF evaluation if they receive new equipment or make any changes to existing operating parameters (e.g., power levels, changes in azimuth that might place a beam at an angle that could lead to an exposure, etc.).

2.1.3. Reporting:

2.1.3.1. Immediately report any incident in which personnel are potentially exposed to EMF levels in excess of the MPE to the IRSO (BE) at 606-7811. Report exposure incidents that happen outside normal duty hours to the base Command Post at 606-9961. The Command Post will notify the IRSO or the on-call BE representative.

2.1.3.2. Follow any applicable unit safety incident reporting procedures.

2.1.3.3. Individuals suspected of overexposure will report to Space and Missile Medicine Clinic, 30 MDOS/SGOQ, building 13850, with IRSO coordination.

2.1.4. Facilities: Coordinate modification and construction plans for facilities intended for EMF operations with the IRSO.

2.1.5. Equipment: Shop supervisors and personnel are responsible, with assistance from BE, for changes to any EMF system that would increase the power density or field generated by the system and for new EMF systems in the shop for evaluation IAW AFI 48-109.

2.2. Laser Radiation:

2.2.1. Exposure Limits: Do not expose personnel to laser radiation in excess of the MPE limits specified in the most current American National Standards Institute (ANSI) ZI36.1, *American National Standard for Safe Use of Lasers*.

2.2.2. Monitoring: BE is responsible, with assistance from shop supervisors and personnel, for identifying areas and conducting surveys where laser hazards exist. BE will conduct evaluations IAW AFI 48-139, *Laser and Optical Radiation Protection Program*.

2.2.3. Reporting:

2.2.3.1. Immediately, report incidents in which personnel suspect they have been exposed to laser radiation in excess of the MPE or complaints of persistent visual disturbances after working with lasers to the IRSO at 606-7811. Report exposure incidents that happen outside normal duty hours to the base Command Post at 606-9961. The Command Post will notify the IRSO or the on-call BE representative.

2.2.3.2. Follow any applicable unit safety incident reporting procedures.

2.2.3.3. Individuals with suspected eye overexposure will report to Optometry, 30 MDOS/SGOO, 1st floor in building 13850, for examination with IRSO coordination. Individuals with suspected skin overexposure report to Space and Missile Medicine Clinic, 30 MDOS/SGOQ, 3rd floor in building 13850, for examination with IRSO coordination.

2.2.4. Facilities: Coordinate modification and construction plans for facilities intended for laser operations with the IRSO.

2.2.5. Eye Examinations: Personnel working with ANSI class 3b and 4 lasers require pre-employment and termination eye examinations from the Optometry Clinic.

2.2.5.1. Provide termination eye exams prior to PCS/PCA to duty that does not require the use of lasers and prior to retirement or separation.

2.2.6. Equipment: Shop supervisors and personnel are responsible, with assistance from BE, for changes to any laser system that would increase the power and/or modify wavelengths of the system and for new laser systems in the shop for evaluation IAW AFI 48-139.

2.2.6.1. Acquisition of Laser systems shall be IAW AFI 48-139, paragraph 4.1.2, be FDA-compliant, and will be coordinated with the ILSO.

2.3. Ultraviolet (UV) Radiation:

2.3.1. Exposures: Do not expose personnel to occupationally produced UV radiation (e.g., welding arcs, damaged metal halide lamps, Non-Destructive Inspection (NDI) lamps) in excess of the Threshold Limit Value (TLV) specified in the most current American Conference of Governmental Industrial Hygienists (ACGIH) TLVs and Biological Exposure Indices. BE is responsible, with assistance from shop supervisors and personnel, for identifying areas and conducting surveys where hazards may exist.

2.3.1.1. Workers performing duties outdoors in the sun should use sun block on exposed skin.

2.3.2. Reporting:

2.3.2.1. Report suspected UV radiation overexposures or complaints of persistent visual disturbances after working with UV to the IRSO, 606-7811. Report exposure incidents that happen outside normal duty hours to the base Command Post, ext 606-9961. The Command Post will notify the IRSO. **Exception: Do not report occupationally related sunburns to the IRSO.**

2.3.2.2. Follow any applicable unit safety incident reporting procedures.

2.3.2.3. Individuals with suspected eye overexposure will report to Optometry, 30 MDOS/SGOO, building 13850, for examination with IRSO coordination. Individuals with suspected skin overexposure report to Space and Missile Medicine Clinic, 30 MDOS/SGOQ, building 13850, for examination with IRSO coordination.

2.3.3. Facilities: Coordinate modification and construction plans for facilities intended for UV radiation operations with the IRSO.

2.3.4. Equipment: Shop supervisors and personnel are responsible, with assistance from BE, for changes to any UV system that would increase the power and for new UV systems in the shop for evaluation IAW AFI 48-139.

3. Ionizing Radiation.

3.1. Exposure Limits: Maintain ionizing radiation exposures ALARA and below limits established by Title 10 CFR 20, AFMAN 48-125, and AFI 48-148. BE is responsible, with assistance from shop supervisors and personnel, for identifying areas and conducting surveys where ionizing radiation hazards may exist.

3.2. Monitoring:

3.2.1. Each person involved in radiological operations on VAFB will use all reasonable means available (i.e., time, distance, and shielding) to minimize personnel radiation exposure from all ionizing radiation sources. Monitor AF military and civilian personnel who have the potential to exceed 10% of the dose limits by placing them on the TLD Program.

3.2.1.1. BE manages the TLD program for civil service and Air Force personnel at VAFB IAW AFMAN 48-125. Personnel enrolled in the TLD program will receive TLD training from BE prior to performing radiation duties.

3.2.1.2. All personnel assigned to shops monitored by BE through the Personnel Dosimetry Program must report to the BE for enrollment in the program and issue of a TLD prior to beginning duties with potential radiation exposures. **NOTE:** Contractors are responsible for their own monitoring program. Air Force personnel are not authorized to wear contractor's monitoring devices unless a suitable Air Force monitoring device accompanies the devices.

3.2.1.3. Personnel will wear and store their TLD IAW guidelines provided by BE and AFMAN 48-125. BE will investigate misuse or mishandling of TLDs (legal medical documentation), intentional or otherwise.

3.2.2. Each supervisor is responsible for additional monitoring such as pocket dosimeters when they are required by an AFI or a T.O. BE personnel conducting surveys are not required to use a TLD or electronic personal dosimeter (EPD).

3.2.3. Local threshold limit: VAFB's Investigation Action Level (IAL) is established at 0.125 rem per quarter (0.5 rem annually). For pregnant workers, local threshold limit is established at 0.041 REM per month (0.5 rem total per duration of pregnancy). Personnel should not receive a dose in excess of 0.125 rem quarterly. When exposure to personnel is above the local threshold limit, investigation of the exposure will be conducted to determine the causative factors and identify corrective measures.

3.3. Personnel Contamination Control: All personnel working with RAM (both permitted and exempt) must adhere to safe and healthful work practices whenever handling radioactive materials. Obtain additional guidance on safe practices and contamination control from the IRSO.

3.4. Reporting:

3.4.1. Immediately report any unplanned or abnormal exposure incident to the IRSO at 606-7811. Report exposure incidents that happen outside normal duty hours to the base Command Post at 606-9961. The Command Post will notify the IRSO or the on-call BE representative.

3.4.1.1. Supervisors must account for all personnel evacuated from the emergency area. Assemble evacuated personnel in an area away from the hazard area. Do not allow personnel to leave the evacuation staging area without approval of the IRSO or designated representative. **NOTE:** Give full details, including circumstances, amount and type of isotopes, names of personnel exposed, where the incident occurred, and an estimate of the extent of contamination (if RAM is dispersed).

3.4.1.2. Users provide a complete written report to the IRSO within five working days from the date of the incident. Include a detailed, chronological description of the incident and preventive measures taken to prevent reoccurrence AFI 40-201 and AFI 48-148 detail other reporting instructions. The IRSO will communicate with HQ AFSPC/SGPB, the USAF RIC, and the NRC.

3.4.2. Follow any applicable unit safety incident reporting procedures.

3.4.3. Individuals suspected of overexposure report to Space and Missile Medicine Clinic, 30 MDOS/SOQ, Building 13850, for examination with IRSO coordination.

3.5. Report new or modified uses of radioactive materials to the IRSO for approval.

3.6. Facilities: Coordinate modifications and construction plans for facilities intended for ionizing radiation operations or radioactive material storage with the IRSO.

3.7. Radioactive Material (RAM):

3.7.1. Handle RAM in accordance with AFI 40-201.

3.7.2. The Unit/Permit RSO will ensure all generally licensed devices are leak tested and inventoried every six (6) months.

3.7.3. The Unit/Permit RSO will ensure all permitted RAM is leak tested and inventoried IAW the permit conditions.

3.7.4. The Permittee will retain custody and control of receipt, storage, and issue of NRC licensed radioactive material covered by an AF-held license.

3.8. Industrial Radiography:

3.8.1. General: Follow these procedures when working with industrial radiography in fixed and temporary radiographic installation sites during day and night operations. Non-destructive inspection (NDI) personnel will also comply with T.O. 33B-1-1, *Non-Destructive Inspection Methods*.

3.8.1.1. Have at least two individuals present during radiographic operations.

3.8.1.2. Have all personnel who perform radiological operations wear TLDs unless told otherwise by the IRSO. Personnel may wear pocket dosimeters in conjunction with the TLD during radiological operations. **DO NOT wear pocket dosimeters in place of TLDs. NOTE:** BE personnel performing routine surveys are not required to wear TLDs due to limited exposure time, but should wear an EPD with an appropriate alarm level set.

3.8.1.3. Use a minimum of two radiation survey meters during all radiographic operations. Calibrate these meters annually.

3.8.1.4. Establish a radiation controlled area at a cordon that limits exposure to 2.0 mREM/hr or less. This area also needs to limit general public exposures to less than 100 mREM per year. Post hazard warning signs and beacons to alert personnel approaching the area during radiographic operations.

3.8.1.5. Ensure there are enough personnel to monitor the controlled area to prevent intrusion of unauthorized personnel.

3.8.1.6. Have the IRSO approve all radiographic operation locations.

3.8.1.6.1. The IRSO will coordinate with Wing Safety and the Fire Department to approve all unshielded radiographic operations on the flight line.

3.8.2. In the event of an unauthorized entry into a controlled area during a radiographic operation:

3.8.2.1. Immediately, discontinue the operation.

3.8.2.2. Escort unauthorized individual(s) out of the area.

3.8.2.3. Obtain the name, organization, and supervisor's telephone number of each individual.

3.8.2.4. Report the incident immediately to the Unit RSO and IRSO.

3.8.2.5. Record all pertinent information with assistance from the IRSO (i.e., time, date, length of potential exposure, approximate exposure level individual was subject to, etc.).

3.9. Medical/Dental Radiography:

3.9.1. General: Only authorized personnel who are properly trained and knowledgeable about radiation protection, safe operating requirements of the equipment, potential effects from ionizing radiation, and exposure limiting techniques, will operate medical and dental X-ray units.

3.9.2. All personnel involved in the use of medical or dental X-ray units follow these general operating procedures:

3.9.2.1. Medical X-ray unit operators wear TLDs during radiographic operations (personnel performing dental X-rays are not required to wear TLDs). All TLDs must be stored in a low radiation area with the area control badge when not in use. **NOTE:** BE personnel performing surveys are not required to wear TLDs due to limited exposure time.

3.9.2.2. Radiographic unit operators and other occupationally exposed personnel will not hold patients during exposures. If patient assistance is needed, a non-occupationally exposed person (i.e., family member) may help, provided they are fully protected (i.e., lead apron, lead gloves, etc.) and are not in direct field of the X-ray beam.

3.9.3. Allow only personnel required for radiographic operations in the radiographic room during exposures.

3.9.4. Radiographic unit operators stand behind the protective barrier during exposures.

3.9.5. Do not expose personnel solely for the purpose of training or demonstrating equipment.

3.9.6. Establish a quality control program to reduce exposures through optimized techniques, film and screen combinations, preventative maintenance, film development, and calibration.

4. Approval of Radioactive Material and Radiation Producing Devices.

4.1. Requirements for non-Vandenberg AFB organization use of Radioactive Material and Radiation Producing Devices:

4.1.1. The IRSO must approve the use of radioactive material and radiation producing devices on base by all organizations not associated with Vandenberg AFB. This includes contract companies and units from other installations that would be TDY to VAFB. This is for accountability and tracking purposes.

4.1.2. Non-Air Force organizations (contractors) will request approval from the IRSO at least 30 calendar days prior to use. Include the information listed in attachment 3.

4.1.2.1. Include these requirements in the statement of work for contractors.

4.1.2.2. Contractors will not bring radioactive material onto VAFB without the written consent of the IRSO. Contractors are required to submit a radiation safety plan to the IRSO for review prior to approval for use on the installation.

4.2. USAF Radioactive Material (RAM) Permits:

4.2.1. All VAFB organizations must have a USAF Radioactive Material Permit, or a license issued by the NRC, in order to possess and use RAM on VAFB (this requirement for a USAF RAM permit does not apply to contract operators who temporarily bring RAM onto the installation for an operation and will have their own NRC permit or Agreement State license).

4.2.2. Application: The requestor will submit applications for permits through the IRSO. The requestor will prepare the application in accordance with AFI 40-201, paragraph 3.4.2.

4.2.3. Renewal: Organizations desiring to renew an expiring RAM Permit will contact the IRSO at least 60 days prior to the permit expiration date. Renewal will consist of preparation and submission of a complete, stand-alone application to the USAF RIC.

4.2.4. Termination: Personnel no longer requiring the use of permitted RAM will transfer or dispose of the permitted material and initiate the termination of their existing permit. AFI 40-201, paragraph 3.11, outlines termination or transfer guidelines. Contact the Unit/Directorate RSO or IRSO for assistance with disposal and termination.

5. Radioactive Material Receipt or Shipment.

5.1. Ship and receive RAM in accordance with attachment 4.

5.2. The IRSO will provide instructions and assistance as needed.

5.3. The 30th Logistics Readiness Squadron, Deployment and Distribution Flight (30 LRS/LGRD), will receive, pack, crate and ship radioactive materials IAW 49 CFR, *Transportation*, AFMAN 24-204, *Preparing Hazardous Materials for Military Air Shipments*, and other applicable commercial and military directives. Damaged shipments or shipments received with broken container seals will be handled IAW DoD 4500.9-R, *Defense Transportation Regulation*. Notify IRSO regarding radioactive materials shipment. Cargo Movements personnel will request BE personnel conduct a surface scan of radioactive material shipments to facilitate certification of RAM prior to shipment.

6. Radioactive Material Storage.

6.1. Keep all RAM in a radioactive material storage area or a locked enclosure separate from other items to prevent accidental exposure. AFI 40-201 and 10 CFR Part 20 outline proper storage techniques and labeling requirements.

6.2. The IRSO or other qualified individuals will survey former RAM storage areas. Obtain written clearance from the IRSO before using this area for other purposes.

7. Radioactive Material Movement on VAFB .

7.1. Control on-base movement of RAM to account for the location of this material and to prevent the movement of RAM to unauthorized persons or locations without adequate handling or storage facilities.

7.2. Move RAM only in adequately shielded and authorized containers per Department of Transportation (DOT) regulations (49 CFR).

7.3. Containers in transit will meet all DOT marking and shipping requirements.

7.4. Vehicles will use the appropriate DOT placards.

7.5. All users will have proper survey instruments or assistance from BE when moving RAM on base.

7.6. Schedule on-base movement of RAM with 2nd Range Operations Squadron Scheduling Office (2ROPS/DOS).

8. Radioactive Material Disposition.

8.1. Transfer RAM only to another licensed agency or to a licensed disposal contractor.

8.2. Transfer: Users of RAM must give written notification to the IRSO of the final disposition of RAM transferred to another license. Final disposition of RAM transferred to another license includes but is not limited to, notification that the material departed from VAFB (and the transferee received it) or the material was disposed of.

8.3. Disposal: In general, radioactive wastes include radioactive materials or items, and substances contaminated with radioisotopes. Disposal of RAM is the responsibility of the using organization. AFI 40-201 specifies specific disposal procedures for Air Force owned radioactive materials.

9. Depleted Uranium (DU) Munitions Operating and Emergency Procedures.

9.1. General Operating Procedures:

9.1.1. Manage munitions in accordance with AFI 21-201, *Management and maintenance of Non-Nuclear Munitions*, and T.O. 11A13-14-7, *Specialized Storage and Maintenance Procedures for 30 Millimeter Ammunition*.

9.1.2. Track munitions through the Combat Ammunition System (CAS) database.

9.1.3. Document annual training for all munitions handlers whose responsibilities involve handling DU on the AF Form 55.

9.1.4. Transport munitions in accordance with 49 CFR 106, 107, and 171 – 180, and DoD Directive 4500.9, *Transportation and Traffic Management*.

9.1.4.1. The DOT has issued an exemption to the DoD, DOT-E 9649, dated 19 October 2000, allowing DU munitions to be shipped according to their explosive content and exempting them from the requirements of 49 CFR 173.421 (a)(2) and (4) and 173.422 (a)(3), and 173.426(c) and (d).

9.1.4.2. Maintain a copy of the exemption at the authorized storage site.

9.1.4.3. 576 FLTS/Munitions Flight will contact the IRSO to survey any shipment departing from or arriving at VAFB in order to comply with the specified transportation exemption limits.

9.2. General Emergency Response Procedures:

9.2.1. The individual identifying the DU-related incident will immediately notify the Fire Department.

9.2.2. The Fire Department will notify the IRSO/BE (606-7811). The Fire Department will initiate their recall list and activate the Emergency Operations Center (EOC), if appropriate.

9.2.3. The Fire Department will respond in accordance with established procedures and establish an initial cordon of at least 1200 feet.

9.2.4. BE will respond with appropriate personal protective equipment and radiological survey devices based on the nature of the incident.

9.2.5. Clearly mark contaminated areas and record levels of contamination on a grid map. **Consider areas with radiation levels exceeding three times background contaminated.**

9.2.6. The IRSO will coordinate with HQ AFSPC/SGPB, HQ AFMOA/SG3PR, and AFMSA/SG3PB (RIC) regarding removal of contamination, remediation, and release for unrestricted use.

J. CHRISTOPHER MOSS, Colonel, USAF
Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

- AFPD 40-2**, *Radioactive Materials (Non-Nuclear Weapons)*, 15 March 2007
- AFJMAN 24-204**, *Hazardous Materials for Military Air Shipments*
- AFMAN 33-363**, *Management of Records*, 1 March 08
- AFI 40-201**, *Managing Radioactive Materials in the USAF*, 13 April 2007
- AFMAN 48-125**, *Personnel Ionizing Radiation Dosimetry*, 7 August 2006
- AFI 48-148**, *Ionizing Radiation Protection*, 12 October 2001
- AFI 21-201**, *Conventional Munitions Maintenance Management*, 23 November 2007
- AFI 48-109**, *Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program*
- AFI 48-139**, *Laser and Optical Radiation Protection Program*
- 10 CFR Part 20**, *Standards for Protection Against Radiation*
- 10 CFR Part 30**, *Rules of General Applicability to Domestic Licensing of Byproduct Material*
- 10 CFR Part 40**, *Domestic Licensing of Source Material*
- 49 CFR Part 173**, *Shippers General Requirements for Shipments and Packaging*
- DoD 4 500.9-R**, *Defense Transportation Regulation*
- DOT-E 9649**, *DoD Exemption to Shipment of Munitions Containing Depleted Uranium*
- T.O. 11A13-14-7**, *Specialized Storage and Maintenance Procedures for 30 Millimeter Ammunition*
- T.O. 31Z-10-4**, *Electromagnetic Radiation Hazards*
- T.O. 33B-1-1**, *Non-Destructive Inspection Method.*
- T.O. 00-110N-2**, *Radioactive Waste Disposal*
- ANSI Z 136.1**, *American National Standard for Safe Use of Lasers*
- AMARG OI 40-201**, *Radiation Safety Program*
- IOH-SD-BR-SR-2005-004**, *Bioenvironmental Engineer's Guide to Ionizing Radiation*

Abbreviations and Acronyms

- 30 MDOS/SGOJ**—30th Medical Operations Squadron, Bioenvironmental Engineering Flight
- 30 MDOS/SGOO**—30th Medical Operations Squadron, Optometry Flight
- 30 MDOS/SGOQ**—30th Medical Operations Squadron, Space Missile Medicine Clinic
- 30 MDOS/SGOL**—30th Medical Operations Squadron, Public Health Flight

30 CES/CEF—30th Civil Engineer Squadron, Fire Protection Flight
30 CES/CEP—30th Civil Engineer Squadron, Programs Flight
30 CES/CEX—30th Civil Engineer Squadron, Readiness Flight
30 CONS—30th Contracting Squadron
30 SW/CC—30th Space Wing Commander
30 LRS/LGRD—30th Logistics Readiness Squadron, Distribution Flight
30 LRS/LGRT—30th Logistics Readiness Squadron, Traffic Management Flight
30 MDG/CC—30th Medical Group Commander
576 FLTS/Munitions Flight—30 Flight Test Squadron, Munitions Flight
88 ABW/EM—88th Air Base Wing/Environmental Management
AFSPC/SGPB—Space Command Bioenvironmental Engineering
ACGIH—American Conference of Governmental Industrial Hygienists
AF—Air Force
AFI—Air Force Instruction
AFIOH—Air Force Institute for Operational Health
AFJMAN—Air Force Joint Manual
AFMAN—Air Force Manual
AFMOA—Air Force Medical Operations Agency
AFOSH—Air Force Occupational, Safety and Health
ALARA—As low as Reasonably Achievable
AL—Acceptable Level
ALI—Annual Limit on Intake
AMARG—Aerospace Maintenance and Regeneration Group
ANSI—American National Standards Institute
BE—Bioenvironmental Engineering
BEF—Bioenvironmental Engineering Flight
CAS—Combat Ammunition System
CC—Commander
CEF—Fire Protection Flight
CFR—Code of Federal Regulations
DAD—Digital Alarming Dosimeter
dB—Decibels

VAFB—Vandenberg Air Force Base
DoD—Department of Defense
DOE—Department of Energy
DOT—Department of Transportation
DU—Depleted Uranium
EMF—Electromagnetic Field
EOC—Emergency Operations Center
FTU—Flight Training Unit
KvP—Peak Kilovoltage
GHz—Gigahertz
HQ—Headquarters
IAL—Investigation Action Level
IAW—In accordance with
KW—Kilowatts
LASER—Light Amplification by Stimulated Emission of Radiation
LSO—Laser Safety Officer (Installation; Unit)
mA—Milliamperes
MHz—Megahertz
MOU—Memorandum of Understanding
MPE—Maximum Permissible Exposure
NDI – Non—Destructive Inspection
NRC—Nuclear Regulatory Commission
OI—Operating instruction
OPR—Office of Primary Responsibility
PCA—Permanent Change of Assignment
PCS—Permanent Change of Station
MPE—Permissible Exposure Levels
PH—Public Health
PPS—Pulses Per Second
Rad or RAD—Radiation Absorbed Dose
RAM—Radioactive Material
RCRA—Resource Conservation and Recovery Act

RDS—Records Disposition Schedule
REM—Roentgen Equivalent Man (a unit of radiation dose)
RF—Radio Frequency
RIC—Radioisotope Committee
RSO—Radiation Safety Officer (Installation; Unit; Permit)
RPM—Rotations Per Minutes
RSO—Radiation Safety Officer
SAR—Specific Absorption Rate
SDR—Air Force Research Lab Environmental Analysis Division
SDRH—Air Force Research Lab Radioanalytical Department
SG3PR—Air Force Medical Operations Agency Health Physics Section
TLD—Thermoluminescent Dosimeter
TLV—Threshold Limit Value
TO—Technical Order
USAF—United States Air Force
UV—Ultraviolet
W/kg—Watts per Kilogram

Terms

Abnormal Exposure Level—An exposure that, if continued at the same rate, would exceed the limits specified in 10 CFR Part 20 and AFMAN 48-125.

ALARA—As Low As Reasonably Achievable. A concept devised for management and administrative actions taken to maintain exposures to radiation “as low as is reasonably achievable” consistent with existing technology, costs, and operational requirements. Scientific evidence suggesting no level of radiation exposure is totally risk-free led to the development of the ALARA concept.

ALI (Annual Limit on Intake)—The derived limit for radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI values differ on the type of radionuclide in question.

Investigation Action Level (IAL)—A dosimetry result that requires an investigation to determine the reason for the exposure. Local threshold limit at DM AFB is established at 0.125 rem per quarter (0.5 rem annually). For pregnant workers, local threshold limit is established at 0.005 rem per month (0.05 rem per duration of pregnancy). Personnel should not receive a dose in excess of 0.125 mrem quarterly. When exposure to personnel is above the local threshold limit, investigation on the exposure will be conducted to determine the causative factors and identify corrective measures.

Ionizing Radiation—Any electromagnetic or particulate radiation capable of producing ions (free electrons or other charged subatomic particles) directly or indirectly in its passage through matter. Ionizing radiation includes X-rays, gamma rays, alpha particles, beta particles, neutrons, and protons.

Maximum Permissible Exposure (MPE) for Lasers—The maximum level of laser radiation (radiant exposure or integrated radiance) that does not cause adverse effects.

Maximum Permissible Exposure (MPE) for Electromagnetic Frequency Radiation—The MPE is the maximum exposure level that will not cause damaging biological effects. The MPEs for EMF levels are based upon a whole-body specific absorption rate (SAR) expressed in watts per kilogram (W/kg). There are no special EMF exposure limits for pregnant females. Any EMF environment that is safe for the mother is also safe for the developing embryo or fetus.

Non—ionizing Radiation – Any electromagnetic radiation incapable of producing ions directly or indirectly. Microwave, Radio Frequency Radiation (RFR), infrared, ultraviolet, and laser (*light amplification by stimulated emission of radiation*) are forms of non-ionizing radiation.

Radioactive Material (RAM)—Materials whose nuclei, because of their unstable nature, decay by emission of ionizing radiation. The radiation emitted may be alpha or beta particles, gamma or X-rays, or neutrons. Also known as radioisotopes.

Thermo Luminescent Dosimeter (TLD)—A type of dosimeter that uses powdered or solid phosphor materials to record radiation exposures. When heated, the phosphor emits light proportional to the amount of radiation energy absorbed. This type of dosimeter consists of a card and a holder (badge).

USAF Radioactive Material Permit (RAM Permit)—A written authorization from the USAF Radioisotope Committee for USAF organizations to receive, possess, distribute, use, transfer, or dispose of radioactive materials.

USAF Radioisotope Committee—A committee established to coordinate the administrative and regulatory aspects of licensing, receiving, possessing, using, distributing, storing, transporting, transferring and disposing of all radioactive materials in the AF (except nuclear weapons and reactor systems).

Attachment 2

LOCAL THRESHOLD LIMIT

A2.1. In accordance with AFI 48-148 , *Ionizing Radiation Protection*, **Chapter 3**, paragraph 3.4.3, Installation RSOs shall establish local threshold levels for dose or radionuclide intake, above which an investigation is conducted to determine the causative factors and identify corrective measures. The local threshold limit for VAFB is established as 0.125 rem in one quarter (this is 2.5% of the annual allowable occupational limit of 5 rem, or 10% of a quarterly monitoring limit of 1.25 rem that is established in AFI 40-201, paragraph 3.5.2).

A2.2. Do not expose pregnant workers to levels of radiation that will result in a dose greater than 0.5 rem (500 mrem) throughout the full term of the pregnancy. The investigation action level (IAL) for pregnant workers is 0.041 rem (41 mREM)

A2.3. When exposure to personnel is above the local threshold limit , investigation on the exposure will be conducted to determine the causative factors and identify corrective measures. If there is a consistent trend for quarterly exposures that are slightly below the established threshold limit line, the IRSO should establish this as the new investigative action level in order to capture when potential process changes or control failures occur. (For example, if a shop that is enrolled in the TLD program consistently saw quarterly exposures of 100 mrem, this can become the new IAL – lowering it from the current 125 mrem limit.) Use professional judgment when adjusting the IAL.

A2.4. The IRSO investigates administrative doses when lost, damaged or not returned. Review historical doses by person and the highest dose received in the monitoring period by anyone in the shop to correct the dose.

Attachment 3

USE OF RADIATION SOURCES APPLICATION REQUIREMENTS (SEE NOTE)

A3.1. NOTE : Although there is a 30-day requirement for informing the IRSO of intended use of radiation sources (including lasers and EMF), emergencies or last minute mission requirements may drive a short notice request. Coordinate with the IRSO at 805-606-7811 and provide the details of the situation for approval inside this 30-day window. **Additionally, this requirement is for units/organizations that are not already established mission partners on Vandenberg AFB.**

A3.2. Use of Radioactive Materials (RAM):

A3.2.1. AFI 40-201, *Managing Radioactive Materials in the US Air Force*, sets Air Force policy for using radioactive material. It applies to all civilian, contractors, Department of Defense, Department of Energy (DOE), and DOE prime contractor personnel bringing radioactive materials onto Air Force installations.

A3.2.2. Organizations that bring radioactive materials onto Air Force installations, or conduct operations involving radioactive material on Air Force installations, obtain the approval in writing of the Installation Commander or his designee. To obtain this approval, the contractor must forward an application to the IRSO (805-606-7811) with a courtesy copy to the designated contracting officer at least 30 days before the planned date for commencement of activities on the installation. Non-Air Force organizations possessing Agreement State Licenses must also submit an NRC Form 241, *Report of Proposed Activities in Non-Agreement States*, to the Nuclear Regulatory Commission (NRC) in compliance with 10 CFR 150.20. Organizations requiring more than 180 days of operation per calendar year on the installation must possess an NRC license. Requests must include:

A3.2.2.1. A description of the proposed activities on NRC Form 241 (the 180-day limitation on the form does not apply to organizations holding an NRC license).

A3.2.2.2. The procedures established to ensure radiological health and safety of AF personnel and the public while on Air Force installations; the name, local address, and telephone number for the responsible local representative; and the name, address, and telephone number of the RSO named on their license.

A3.2.2.3. A current copy of the applicable NRC, or Agreement State License. Expired licenses are unacceptable. A valid license will either specifically state the installation by name or show state approval for work at temporary job sites anywhere in the United States where the NRC or Agreement State maintains jurisdiction. DOE or DOE prime contractors must provide, in lieu of a license, written certification of their exemption from NRC licensing requirements and cite the applicable exemption of 10 CFR.

A3.2.2.4. The part of the AF contract containing the work description with inclusive dates.

A3.2.2.5. An acknowledgement that the IRSO can make periodic checks to ensure the contractor is following applicable radiological health and safety practices that prevent unnecessary exposures to Air Force personnel and prevent potential contamination of government property. The IRSO must identify deficiencies to the contracting officer for

corrective actions. In addition, the IRSO has authority to suspend contractor operations believed to be unsafe.

A3.2.2.6. Copies of the most recent leak test results (not over 180 days old) for sealed sources.

A3.2.2.7. Copies of training certificates for authorized users.

A3.3. Contractors will adhere to 10 CFR and 49 CFR sections pertaining to transportation of radioactive material.

A3.4. Contractors must notify the IRSO when they bring RAM on to or remove it from the base.

A3.5. Use of Lasers:

A3.5.1. Organizations requiring the use of class 3b or 4 lasers on VAFB must submit a written request for approval at least 30 calendar days before commencement of these activities.

A3.5.2. Organizations must submit their request to the ILSO (805-606-7811) with a courtesy copy to the contracting officer and 2 ROPS/DOS (805-605-3318), and will include:

A3.5.2.1. Description/Characteristics:

A3.5.2.1.1. Manufacturer

A3.5.2.1.2. Model

A3.5.2.1.3. Number of same units.

A3.5.2.1.4. Serial numbers

A3.5.2.1.5. Laser medium

A3.5.2.1.6. Method of operation (i.e. continuous wave (CW), single pulse, multiple pulses)

A3.5.2.1.7. Maximum exposure time (train length)

A3.5.2.1.8. Time (sec) & wavelength

A3.5.2.1.9. Energy/pulse (J) or CW power (W)

A3.5.2.1.10. Pulse repetition frequency

A3.5.2.1.11. Pulse width

A3.5.2.1.12. Beam diameter (at 1/e point)

A3.5.2.1.13. Beam divergence (at 1/e point)

A3.5.2.2. The part of the Air Force contract (or organizational process description for DoD organizations) containing the work description with inclusive dates. Additional required information includes where the unit or contractor plans to use the laser (location, indoors, outdoors, enclosures, etc.), and the safety features of the device.

A3.5.2.3. An acknowledgement that the IRSO can make initial and periodic checks to ensure the unit or contractor is following applicable radiological health and safety practices that prevent unnecessary exposures to Air Force personnel.

A3.5.3. Acquisition of FDA-compliant lasers.

A3.5.3.1. The installation commander serves as the final approval authority – with support from the installation radiation/laser safety officer – for the acquisition of any class 1M, 2M, 3R, 3B, 4 laser or laser system which meets the description of an FDA-compliant laser. FDA lasers are fully compliant with Title 21, CFR, Parts 1010 and/or 1040 and do not fall under the category of military-specific. Typical FDA-compliant lasers are medical, industrial, laboratory, and communication lasers, and they will have FDA tracking numbers.

A3.5.3.2. Any VAFB unit that requires the acquisition of an FDA-compliant laser or laser system will coordinate with the installation RSO/LSO (805-606-7811) to ensure that safe operating procedures are in place and documented in a written training plan. The installation RSO/LSO will accomplish an assessment to ensure that the laser system and its intended use are safe for VAFB.

A3.5.3.3. Units acquiring new lasers or laser systems that have not previously used lasers in the execution of their mission will have an appropriate occupational health risk categorization assigned (or their current one will be updated, if necessary) by the installation Occupational and Environmental Health Working Group (OEHWG).

A3.5.3.3.1. The BE Flight will track all occupational and environmental health assessments for the lasers in the Defense Occupational and Environmental Health Readiness System (DOEHRS).

A3.5.3.3.2. Personnel working with or that may be potentially exposed to laser radiation in the workplace will be tracked by the 30th Medical Group and will receive annual occupational health exams as stated in paragraphs 1.5, 1.6, and 1.14.

A3.6. Use of Electromagnetic Frequency Radiation:

A3.6.1. Organizations requiring the use of equipment generating EMF levels in excess of 7 watts peak power and a frequency of 100 megahertz (MHz) or greater on VAFB must submit a written request for approval at least 30 calendar days before commencement of activities that require the use of the EMF generating device.

A3.6.2. Organizations must submit their request to the IRSO (805-606-7811) with a courtesy copy to the contracting officer; and will include:

A3.6.2.1. Description/Characteristics:

A3.6.2.1.1. Description

A3.6.2.1.2. Nomenclature

A3.6.2.1.3. Location of emitters

A3.6.2.1.4. Quantity

A3.6.2.1.5. Frequency (MHz)

A3.6.2.1.6. Pulse width (microsecond)

A3.6.2.1.7. Pulse repetition freq (pps)

A3.6.2.1.8. Peak power (KW)

A3.6.2.1.9. Antenna size (feet--horizontal/vertical)

A3.6.2.1.10. Antenna bandwidth (degrees--horizontal/vertical)

A3.6.2.1.11. Antenna gain (dB)

A3.6.2.1.12. Scan rate (rpm)

A3.6.2.2. The part of the Air Force contract (or organizational process description for DoD organizations) containing the work description with inclusive dates. Additional required information includes where the unit or contractor plans to use the EMF generating device (location, indoors, outdoors, enclosures, etc.), and the safety features of the device.

A3.6.2.3. An acknowledgement that the IRSO can make initial and periodic checks to ensure the unit or contractor is following applicable radiological health and safety practices that prevent unnecessary exposures to Air Force personnel.

A3.7. Use of Ionizing Radiation:

A3.7.1. Organizations that need to use ionizing radiation generating devices (for RAM, see section 1) on VAFB must submit a written request for approval at least 30 calendar days before commencement of these activities.

A3.7.2. Organizations must submit their request to the IRSO (805-606-7811) with a courtesy copy to the contracting officer; and will include:

A3.7.2.1. Description/Characteristics:

A3.7.2.1.1. X-ray unit manufacturer

A3.7.2.1.2. Model number

A3.7.2.1.3. Serial number

A3.7.2.1.4. Maximum kVp, mA, Sec

A3.7.2.1.5. Ionizing radiation source/emitter (electron tube)

A3.7.2.2. The part of the Air Force contract (or organizational process description for DoD organizations) containing the work description with inclusive dates. Additional required information includes where the unit or contractor plans to use the ionizing radiation producing device (location, indoors, outdoors, enclosures, etc.), and the safety features of the device.

A3.7.2.3. An acknowledgement that the IRSO can make initial and periodic checks to ensure the unit or contractor is following applicable radiological health and safety practices that prevent unnecessary exposures to AF personnel.

A3.8. Use of Ultraviolet (UV) Radiation:

A3.8.1. Organizations required to use UV generating devices on VAFB must submit a written request for approval at least 30 calendar days before commencement of these activities.

A3.8.2. Organizations must submit their request to the IRSO (805-606-7811) with a courtesy copy to the contracting officer; and will include:

A3.8.2.1. Description/Characteristics:

A3.8.2.1.1. Description

A3.8.2.1.2. Nomenclature

A3.8.2.1.3. Location of devices

A3.8.2.1.4. Quantity

A3.8.2.1.5. Wavelength

A3.8.2.1.6. Effective Irradiance

A3.8.2.2. The part of the Air Force contract (or organizational process description for DoD organizations) containing the work description with inclusive dates. Additional required information includes where the contractor plans to use the UV generating device (location, indoors, outdoors, enclosures, etc.), and the safety features of the device.

A3.8.2.3. An acknowledgement that the IRSO can make initial and periodic checks to ensure the unit or contractor is following applicable radiological health and safety practices that prevent unnecessary exposures to AF personnel.

Attachment 4

BASIC RADIOACTIVE MATERIAL SHIPPING PROCEDURES

A4.1. Each receiving or shipping agency must have a separate, marked, and locked enclosure for the receipt, handling, or shipment of radioactive packages. This separate area will prevent accidental exposure to ionizing radiation. This location must be coordinated with the IRSO.

A4.2. All radioactive materials covered by a license or permit must be accounted for by a radioactive material transfer receipt, which is separate from any contractual, security, or other receipt documents. **Contract shipping and receiving agencies should obtain transfer receipts when dispensing items to VAFB organizations.**

A4.3. Organizations planning to ship or receive RAM contact the IRSO or designated representative to monitor the container. **If the receiving or shipping agency is a contractor, the contractor is not required to notify the IRSO. The contractor must perform all labeling, packaging, and monitoring requirements outlined in 10 CFR and 49 CFR. NOTE:** In accordance with 10 CFR 20.1906, all packages labeled with a Radioactive White I, Yellow II, or Yellow III, as specified by DOT regulations (49 CFR 172.403 and 172.436-440), must be monitored as soon as possible but not later than three (3) hours after the package is received. Survey the package no later than three hours from the beginning of the next workday if received after normal duty hours.

A4.3.1. The most recent leak test results must accompany the package if the radioactive material is a sealed source. Send a copy of these results to the IRSO. If this test does not accompany the sealed source, an individual approved by the IRSO will perform a leak test before it is used. Current leak test results must accompany sealed sources shipped from VAFB.

A4.3.2. Contact the user or custodian and transport the material directly to the user or custodian after the RSO or approved individual monitors and clears the package. If the user or custodian cannot be located, store the radioactive material until the user or custodian accepts receipt. **NOTE:** Only authorized personnel will open or package containers of radioactive material or items.

A4.4. When transporting radioactive material from VAFB , prepare for shipment and packaging per applicable NRC and Department of Transportation regulations (Title 49 of the Code of Federal Regulations). Contact the IRSO (805-606-7811) for assistance and shipping surveys.