BY ORDER OF THE COMMANDER
82D TRAINING WING (AETC)

SHEPPARD AIR FORCE BASE
INSTRUCTION 48-106

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Aerospace Medicine

INSTALLATION RADIATION PROTECTION PROGRAM

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(Col D. S. Guermonprez)
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This publication satisfies AFI 48-148, Ionizing Radiation Protection, paragraph 2.19.3 to establish an installation radiation safety program. It implements applicable elements of DODI 6055.8, Occupational Radiation Protection Program, and AFPD 48-1, Aerospace Medicine Enterprise, AFI 40-201, Managing Radioactive Materials in the US Air Force and AFMAN 48-125, Personnel Ionizing Radiation Dosimetry, AFI 48-139, Laser and Optical Radiation Protection Program and AFOSHSTD 48-9, Electro-Magnetic Frequency (EMF)Radiation Occupational Health Program to provide guidance necessary to protect against ionizing and non-ionizing radiation. Specific technical orders or instructions should be referred to for additional detailed information on radiation protection for specific practices (e.g. T.O. 00-110N-2, Radioactive Waste Disposal or T.O. 33B-1-1, Non-destructive Inspection, T.O. 00-110N-3, Requisition, Handling, Storage, and Identification of Radioactive Material). This instruction applies to AF active duty military and civilian personnel, Air National Guard (ANG) Air Force Reserve, contractors, and tenant organizations on or in operating locations controlled by Sheppard AFB (SAFB). In this publication the term "radiation sources" may refer to radioactive material (RAM) or equipment that produces laser, EMF or ionizing 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://www.my.af.mil/afirms/afirms/rims.cfm**. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF IMT 847, Recommendation for Change of Publication; route AF IMT 847s from the field through the appropriate functional chain of command.

Chapter 1

RESPONSIBILITIES.

1.1. Wing Commander (82 TRW/CC).

1.1.1. Appoints the Installation Radiation Safety Officer (IRSO) and the Installation Laser Safety Officer (ILSO).

1.2. Medical Group Commander (82 MDG/CC).

1.2.1. Nominates the IRSO and ILSO to the 82 TRW/CC.

1.2.2. Implements the SAFB Radiation Safety Program.

1.2.3. Implements a medical program designed to evaluate personnel EMF radiation hazards.

1.3. IRSO.

1.3.1. Acts as focal point to permit holders, radioactive material users, and commanders on the rules and regulations stated on all current permits.

1.3.2. Exercises authority to terminate operations when imminent danger exists.

1.3.3. Documents education and training to minimize ionizing radiation exposure, IAW As Low As Reasonably Achievable (ALARA) standards and AFI 48-145, *Occupational Health Program*.

1.3.4. Provides the Fire Chief with a list of facilities containing radioactive commodities that are deemed potential hazards during fire fighting.

1.3.5. Develops procedures to assess permit compliance. NOTE: If organizations are in non-compliance, the IRSO has the responsibility to advise 82 TRW/CC, AETC Bioenvironmental Engineer (HQ AETC/SGPB), HQ Air Force Medical Operations Agency Air Force Radioisotope Committee (HQ AFMOA/SGOR), and user senior management as appropriate. HQ AFMOA/SGOR or Nuclear Regulatory Commission (NRC) has the authority to revoke the permit.

1.3.6. Monitors the installation radiation dosimetry program. TLDs are issued to personnel with the potential to receive an external dose exceeding 100 mrem. Females on the TLD programs are instructed to notify their supervisor immediately if they become pregnant.

1.3.7. Surveys radiation storage or use areas for designation as “Radiation Area” as defined in AFI 48-148 Attachment 1.

1.3.8. Provides technical advice on emergency procedures involving radioactive materials (intentional or accidental events such as spills, explosions, or fire).

1.3.9. Reports to Aerospace Medicine Council (AMC) annually all radiation permits on base.

1.3.10. Reviews all plans that include construction for proposed radiation usage.

1.3.11. Performs radiation protection surveys.

1.3.12. Recommends instrumentation related to radiation detection.

1.3.13. Provides technical advice on the receipt, shipment, transfer, and disposal of radioactive materials.

1.3.14. Monitors waste disposal control measures.

1.3.15. Maintains an inventory of all installation activities using, storing, or handling radioactive material, x-ray emitters, and lasers. Maintaining an inventory of all EMF emitters is also recommended.

1.3.16. Conducts an annual briefing to the unit commander named on the permit.

1.3.16.1. Documents summary of the briefing with MFR indorsed by unit commander and file MFR in the unit permit binder.

1.3.16.2. Reports briefings in AMC as they occur.

1.3.17. Conducts initial and annual worker training on hazards associated with ionizing radiation and document training on sign-in sheet or other form.

1.4. Unit Supervisors.

1.4.1. Enforce the rules and regulations stated on all current permits for radioactive materials which list the permit and IRSOs.

1.4.2. Responsible for training/documenting and implementing the ALARA concept when dealing with ionizing and non-ionizing radiation.

1.4.3. Immediately notify the primary or alternate IRSO of any equipment, personnel, or procedural changes regarding ionizing or non-ionizing radiation.

1.4.4. Enforce all health and safety publications relative to the safe handling of all radioactive materials and machines producing ionizing and non-ionizing radiation.

1.4.5. Ensure all necessary safety equipment (such as shields, hoods or protective clothing) is available and used by personnel with an occupational exposure to radiation sources.

1.4.6. Conduct inspections necessary to ensure that all safety equipment is operative and in a good state of repair.

1.4.7. Train new employees in the principles of radiation safety prior to assignment to such duties, to include wear of protective equipment and dosimeters. Immediately notify Public Health (82 AMDS/SGPM) and Bioenvironmental Engineering (BE) (82 AMDS/SGPB) when personnel are assigned to shops with radiation exposure risk.

1.4.8. Ensure all possible overexposures are reported to the IRSO.

1.4.9. Responsible for the safety of workers in any radiation environment, including pre-operative checks of safety equipment; for example, monitoring instruments, hood flow, eye shields, and interlocks.

1.4.10. Prepare a shop-specific written Radiological Health and Safety OI approved by the IRSO. Provide copies to Ground Safety (82 TRW/SEG) and BE. Shop instructions will specify initial and recurring training, engineering and storage area controls, and emergency procedures.

1.4.11. Alert for equipment failure or malfunction or improper safety procedures by personnel, which may result in excessive radiation exposure of personnel.

1.4.12. When applicable, maintain and comply with the Radioactive Material Permit issued by the AF Radioisotope Committee. Permit conditions, including semiannual inventory, leak testing and physical security requirements, must be strictly enforced and cannot be waived. RAM within the supervisor span of control must be visually inspected and inventoried every 6 months; send documentation to BE for review and signature. Permit conditions are not satisfied unless the IRSO has signed the inventory.

1.4.13. Ensure personnel who routinely work with class 3B and class 4 lasers are given pre-employment physicals prior to assignment to duties involving laser radiation and request termination physicals when personnel no longer have occupational exposure to radiation.

1.4.14. If applicable, ensure radiation-measuring equipment is properly stored, maintained and calibrated. Devices must only be operated by fully trained personnel.

1.4.15. Document initial and annual worker training on hazards associated with ionizing radiation on AF Form 55, Employee Safety and Health Record.

1.5. Individuals.

1.5.1. Responsible for proper storage and wearing of protective equipment and personnel monitoring devices required by the IRSO.

1.5.2. Ensure ALARA concept is used while exposed to radiation sources.

1.6. Base Occupational Medicine Consultant.

1.6.1. Designate staff/providers to accomplish described tasks.

1.6.2. Give pre-employment and termination physical examinations to all persons who routinely work with class 3B and class 4 lasers, as required by AFI 48-139.

1.6.3. Conduct special examinations and clinical tests as required.

1.7. Public Health.

1.7.1. Facilitates necessary education of personnel occupationally exposed to radiation.

1.8. Civilian Personnel Office and Military Personnel Flight.

1.8.1. Temporarily reassigns civilian and military pregnant females occupationally exposed to ionizing radiation when reassignment is recommended by medical personnel.

1.9. Contracting Squadron.

1.9.1. Will ensure that all statements of work are routed through Bioenvironmental Engineering (82 AMDS/SGPB) for review by the Contracting Officer's Representative (COR) at the functional organization requiring the service.

1.9.2. When deemed necessary by Bioenvironmental Engineering, the COR from the cognizant functional area will include all applicable statements listed below in the statements of work (SOW):

1.9.2.1. Radioactive materials (Permitted and Generally Licensed Devices) and/or ionizing radiation producing devices must be identified to the Installation Radiation Safety Officer (IRSO) in **writing** 30 days prior to entry onto Sheppard Air Force Base. Requests to deviate from the 30 day requirement will be submitted along with justification to the IRSO for review/approval.

1.9.2.2. Hazardous lasers/laser systems (class 3B or 4) must be identified to the Installation Laser Safety Officer (ILSO) in **writing** 30 days prior to entry onto Sheppard Air Force Base. Requests to deviate from the 30 day requirement will be submitted along with justification to the ILSO for review/approval.

1.9.2.3. The contractor will provide the IRSO and/or ILSO the following information:

1.9.2.3.1. Name, local address, and telephone number for the responsible local representative.

1.9.2.3.2. Name, address, and telephone number of the contractor's Radiation Safety Officer, Laser Safety Officer, or responsible person.

1.9.2.3.3. Brief description of the proposed activities.

1.9.2.3.4. Copy of a current Nuclear Regulatory Commission (NRC) or equivalent license specifying specific use locations (license must specifically list the installation or grant approval for work at temporary sites) (Permitted materials only).

1.9.2.3.5. Copy of the last 4 leak test results (Radioactive materials only)

1.9.2.3.6. Copy of user's equipment qualifications or training certificates

1.9.2.3.7. Copy of the contract section containing description of work to be done at Sheppard Air Force Base and the inclusive dates of the work.

1.9.2.4. The Installation Radiation Safety Officer (IRSO) is authorized by AFI 40-201 to conduct no-notice inspections to ensure radiation safety practices prevent exposures to Air Force personnel and avoid contamination of government property.

1.9.2.5. The Installation Radiation Safety Officer (IRSO)/Installation Laser Safety Officer (ILSO) has authority to suspend contractor operations believed to be unsafe. This action will be coordinated with the base contracting officer or designated representative.

1.9.3. Unlicensed radioactive material will not be allowed entry to SAFB for any reason. Any questions on a contractor's responsibility regarding this issue should be directed to the IRSO prior to the contractor starting any work.

Chapter 2

PERSONNEL DOSIMETRY PROGRAM

2.1. Thermoluminescent Dosimeters (TLDs).

2.1.1. TLDs are issued by BE before personnel are authorized to perform duties with ionizing radiation risk.

2.1.2. The supervisor must submit a written notice to BE when personnel enter or leave shops on the radiation dosimetry program.

2.2. Dosimeter Requirements.

2.2.1. TLDs will be worn by all workers performing duties with the potential to exceed 100 mrem or as designated by the IRSO.

2.2.2. TLDs will be worn on the part of the body most likely to receive the greatest exposure to radiation.

2.2.3. The badge must be clipped to the collar of the outer garment unless specifically instructed otherwise by the IRSO. They must not be placed inside the front or back pocket, behind cloth, cigarettes, coins, or any obstruction whatsoever.

2.2.4. Supervisors must train personnel not to tamper with TLDs. If a device is accidentally damaged or exposed, the wearer must immediately return it to BE and exchange it for a new one. The wearer will explain the nature of the accident to aid in documentation.

2.2.5. Except to perform immediate lifesaving actions, personnel responding to emergencies will not enter a known or suspected radiation field without a TLD and electronic pocket dosimeter (EPD) programmed for specific individuals and alarm settings. This will permit the user to frequently monitor exposure during hazardous procedures. Never place dosimeters behind dense material such as coins or other metallic objects in the pocket.

2.2.6. The IRSO has designated these areas to be on the TLD program as per Table 2.1.

Table 2.1. Designated TLD Areas.

Sheppard AFB TLD Areas
1. 82 MDSS/SGSS Radiology (Permanent Party)
2. Phase II Radiology Students (Bldg 1200)
3. Phase II Radiology Students (United Regional Medical Center)

2.2.7. The IRSO will designate which area and/or personnel need to use TLDs during emergency response operations.

Chapter 3

IONIZING RADIATION

3.1. Procurement Procedures.

3.1.1. All requests for radioactive material or radiation-producing devices must be reviewed and approved by the IRSO.

3.1.1.1. The user will prepare a letter of justification and supporting documentation indicating the materials or equipment desired.

3.1.1.2. Requests will include, as a minimum, the following information:

3.1.1.2.1. Name, title, organization, and telephone number of user.

3.1.1.2.2. Names, titles, and organizations of all personnel who will regularly use the material or equipment.

3.1.1.2.3. Exact locations where the material or equipment will be kept.

3.1.1.2.4. Brief outline or procedure to be followed and any other special requirements.

3.1.2. The application will not be approved if:

3.1.2.1. It is determined that the applicant is not equipped to meet health and safety standards established by the NRC, HQ AFMOA/SGOR, 82 MDG/CC, or the criteria established within the NRC licenses applicable to the material or equipment involved.

3.1.2.2. It is determined that the applicant is not qualified to use radioisotopes or the equipment for the purpose requested.

3.1.2.3. Past records indicate that the applicant has neglected to observe necessary health and safety standards resulting in over exposure or injury.

3.1.3. Following IRSO approval, BE will submit permit modification requests to HQ AFMOA/SGOR. Radioisotopes may not be procured until the applicant has received written approval from the IRSO.

3.1.4. The IRSO will forward to United States Air Force School of Aerospace Medicine (USAFSAM) those applications that are complex, controversial in nature or cannot be resolved at installation level. The AF Radioisotope Committee is the final authority for any issues involving radioactive material.

3.2. Receipt of Radioactive Materials.

3.2.1. When any radioactive commodities are received, the receiving agency will contact BE and/or IRSO within 72 hours. Limit handling of the package and avoid opening if possible.

3.2.2. BE will survey the package at the receiving agency and verify radiation levels at surface and one meter from container do not exceed levels in 49 CFR 173.422. If discrepancies are found, the IRSO will have the shipment placed at the radioactive storage area and will notify the sender. The IRSO will contact the health physicist consultant at USAFSAM to determine proper follow-up action.

3.2.3. The receiving agency and BE will log all radioactive material arriving on SAFB.

3.2.4. If the material is a permitted sealed source, the BE will perform a leak test (swipe sample).

3.3. Storage of Radioactive Materials.

3.3.1. Store all radioactive materials in safe and secure locations to prevent removal by unauthorized personnel. All machines producing ionizing radiation may be stored in convenient locations provided they are in a configuration to preclude inadvertent operation.

3.3.1.1. Shielding should be such that the exposure rate on the outside of the areas does not exceed 2mR/hr. The BE must survey the area at least annually.

3.3.1.2. Post appropriate standard radiation-warning signs.

3.3.1.3. Make sure the area is uncluttered and in an orderly arrangement.

3.3.1.4. Post the names and telephone numbers of responsible individuals in a conspicuous location.

3.3.1.5. Maintain an inventory log of all radioactive commodities stored in the facility.

3.3.2. Radioactive material or items will be stored in accordance with T.O. 00-110N-3, *Requisition, Handling, Storage, and Identification of Radioactive Material*.

3.3.3. Authorized shipping containers for radioactive material may be used for storage provided the shielding is adequate (reference T.O. 00-110N-3).

3.3.4. Confine shipping and storage containers to the designated storage area, even when empty. The presence of contamination in amounts greater than the allowable limits (T.O. 00-110N-2, *Radioactive Waste Disposal*) must be reported to the IRSO immediately.

3.4. Shipment of Radioactive Materials.

3.4.1. Users of licensed/permitted RAM must coordinate with the primary or alternate IRSO before shipping from SAFB. Persons responsible for permitted RAM may not transfer such material to another person or organization except as provided in the applicable portions of the permit and IAW AFI 40-201. Contact the IRSO for coordination and assistance.

3.4.2. Other transfers. An individual or organization should notify the IRSO before transferring radioactive materials or machines producing ionizing radiation that are not subject to federal or AF regulation.

3.5. Disposal/Recycle of Radioactive Materials.

3.5.1. No RAM or radioactive waste will be disposed of on SAFB property. The supervisor will report lost or misplaced RAM immediately to BE. Under no circumstances will an organization knowingly ship radioactive waste without specific, written approval from the IRSO.

3.5.1.1. Using organizations will:

3.5.1.1.1. Dispose of radioactive waste in strict accordance with T.O. 00-110N-2.

3.5.1.1.2. Attach radiation warning labels bearing the radiation symbol and the words, “RADIOACTIVE MATERIAL,” to any container thought to hold or be

contaminated with RAM. The labels will be affixed so that at least one is visible from any direction of approach.

3.5.1.1.3. Be responsible for monitoring the containers for radiation intensity build up and taking swipe samples to determine if there is any removable contamination.

3.5.1.1.4. Forward waste information as listed in T.O. 00-110N-2 to the IRSO.

3.5.2. Excess Permitted/Licensed RAM. Excess RAM that is permitted or licensed will not be shipped for disposal or recycle unless approved by the IRSO. On-base owners and users of permitted RAM will contact the IRSO for approval to dispose or recycle their sources. Permitted or licensed RAM received from off-base sources will not be disposed or recycled unless approved by the IRSO.

3.5.3. The IRSO will arrange for disposal of RAM with the Radiation Surveillance Division, Health Physics Branch, Air Force Radioactive and Mixed Waste Office or USAFSAM/OEHHL at 365 Third Street, Building 674C, Wright-Patterson AFB OH 45433. The USAFSAM/OEHHL office will provide disposal instructions. Disposal will be arranged as needed.

3.5.4. RAM determined to be recyclable, the IRSO will arrange with the Wright-Patterson AFB Radioactive Material Recycling Facility, 88 ABW/EMB, 1450 Littrell Road, Wright-Patterson AFB, OH 45433. Recycling RAM will be arranged as needed.

3.6. Surveys.

3.6.1. BE will conduct routine or special surveys and schedule shielding surveys. The IRSO or delegate will conduct other surveys at the request of using organizations.

3.6.2. Surveys will be reported through the OEHWG.

3.6.3. Types of surveys are:

3.6.3.1. Probe surveys using portable survey meters to detect alpha, beta, gamma, neutrons, or x-ray radiation.

3.6.3.2. Swipe sample surveys which use filter paper to smear suspected outer contaminated areas.

3.6.3.3. Evaluation of procedures, materials, and documentation.

3.7. Leak Testing Sealed Sources.

3.7.1. Each sealed source acquired from another person or organization, (containing by-product material or any other radioactive material with a half-life greater than 30 days and in any form other than gas) will be tested for contamination and leakage before use.

3.7.2. In the absence of a certificate from a transfer indicating that a test had been made within six months prior to the transfer, the sealed source will not be put in use until tested.

3.7.3. The test will be capable of detecting the presence of 0.005 microcuries or more of radioactive material on the test sample.

3.7.4. Permitted sources will be tested IAW permit requirements. Generally Licensed Devices (GLDs) will be tested every six months. The permittee or responsible individual is responsible for contacting BE to perform testing. Tests will be sent to USAF Radiation

Dosimetry Laboratory, 2510 Fifth Street, Area B, Building 0840, Room W 239, Wright-Patterson AFB OH 45433-7913 for analysis.

3.7.5. If the above tests reveal the presence of 0.005 microcuries or more of removable contamination, the permittee will immediately notify IRSO and withdraw the sealed source from use and arrange for it to be decontaminated and repaired or disposed of in accordance with the waste disposal procedures.

3.8. Emergency Procedures.

3.8.1. Emergencies include any unusual occurrences that result in contamination of facilities or environment, or that may result in the exposure of personnel to hazardous levels of ionizing or non-ionizing radiation. BE must be notified immediately of all these emergencies.

3.8.2. IRSO, BE, or delegate will be directly involved with all investigations and reporting of accidents and incidents involving radioactive materials. The Occupational Medicine Consultant will be informed of all ongoing investigations. The IRSO will report the findings to the OEHWG. All reporting and investigations will be per the applicable sections of AFI 91-202, *The U.S. Mishap Prevention Program*; AFI 91-204, *Safety Investigations and Reports*; AFI 40-201; and TO 00-110N-3. Reporting under AFI 91-204 does not negate the reporting requirements of AFI 40-201 and the NRC.

3.8.3. Treat any RAM spill as a major spill until monitoring can be accomplished to determine the actual intensity of the radiation exposure.

3.8.4. Fire fighting procedures are as follows:

3.8.4.1. The fighting of fires, which may occur in buildings, must be accomplished in such a manner that exposure of personnel to radiation is held to a minimum and the spread of radioactive contamination is avoided.

3.8.4.2. As a general rule, when using fire hoses, water fog is preferable to solid stream application to avoid excessive runoff of water that may spread contamination.

3.8.4.3. If a fire breaks out, sound the evacuation alarm, call 911, and notify BE of its location. If no immediate radiation hazard exists and the potential for sustaining injuries is remote, combat the fire using the nearest fire extinguisher, sand, or water. If there is sufficient time, personnel who are using isotopes and are not in the fire area should quickly place their isotopes into storage containers, transport containers from the area, then close the windows and doors, and shut off the ventilation system before leaving the area.

3.8.4.4. Firefighters must wear protective clothing and respiratory equipment even though there is no evidence of immediate radiation danger. If possible, fire fighting should be conducted from the upwind side of the blaze. If time allows, firefighters will be issued TLDs and EPDs by BE personnel.

3.8.5. Accidental peacetime exposure to radioactive material (non-wartime or terrorist attack):

3.8.5.1. Remain calm. Accidental exposure to medically significant radiation is not possible with the items present on SAFB.

3.8.5.2. Notify BE as soon as possible by calling 676-3080 or BE on-call cell phone 940-882-5031.

3.8.5.3. A person known or suspected to have ingested or inhaled any quantity of radioactive material will be transported immediately for medical evaluation. The individual will not present a radiation hazard to emergency response personnel.

3.8.5.4. A person with radioactive particulate contamination on their clothing should slowly remove the affected garment (to limit producing airborne dust). Place the garment in any expedient container, preferably a plastic bag if available. If particulate contamination is suspected on bare skin, thoroughly rinse the area with water. Additional decontamination may be conducted by Fire Department.

Chapter 4

LASER SAFETY PROCEDURES

4.1. Laser Operations Approval Request.

4.1.1. Any new process involving lasers requires adequate safe operating procedures. BE will review the proposed process and inspect the operation area for hazards (such as reflecting surfaces) and required controls (such as laser safety goggles). All work with lasers will be done in strict accordance with AFI 48-139.

4.1.2. Using organizations will prepare a safety OI for the laser and forward it to BE no less than 30 days prior to start of operations. The OI will contain the following information, as a minimum:

4.1.2.1. Personal hazards including safe eye exposure distance.

4.1.2.2. Location (building, room number).

4.1.2.3. Sequence of operations.

4.1.2.4. Unit personnel assigned as laser safety officer(s).

4.1.3. Required technical specifications on the laser include:

4.1.3.1. Type of laser (gas, chemical, solid-state) and gain medium.

4.1.3.2. Wavelength(s) emanated.

4.1.3.3. Maximum output power in any mode.

4.1.3.4. Mode of operation (pulse or continuous).

4.1.3.5. Pulse duration (if applicable).

4.1.3.6. Beam diameter in millimeters or centimeters.

4.1.3.7. Beam divergence in radians.

4.1.3.8. Transverse electromagnetic modes (if applicable).

4.1.3.9. Pulse repetition rate.

4.1.3.10. List of personnel authorized to perform laser operations (last, first, and middle name, rank or civil service rating, and Last 4 (SSN).

4.1.3.11. The maximum number of personnel required to participate in the operation.

4.2. Laser Operations Inspections.

4.2.1. The initial inspections are normally conducted by BE in conjunction with the ILSO and 82 TRW/SEG representative.

4.2.1.1. The ILSO or designated alternate is the inspection leader and will ensure laser safety, as prescribed in American National Standards Institute (ANSI) Z136.1, *American National Standard for Safe Use of Lasers*, AFI 48-139, *Laser and Optical Radiation Protection Program*, and standards set by the Public Health Service, as required by Public Law 90-602, *Radiation Control for Health and Safety Act of 1968*.

4.2.1.2. 82 TRW/SEG or designated alternate will inspect for compliance with applicable provisions of AFI 91-203, *Air Force Consolidated Occupational Safety Instruction,* and other applicable safety regulations that apply.

4.2.1.3. The unit safety representative will accompany the inspectors and make notes as to the deficiencies found. This individual has the responsibility for ensuring compliance with safe operating procedures.

4.3. Procurement and Disposal.

4.3.1. MIL-STD-1425, *Military Lasers and Associated Support Equipment*, and the CFR Title 21, *Food and Drug Administration*, must be used in procuring nonexempt and exempt lasers respectively.

4.3.2. Exempt lasers must be disposed of in accordance with MIL-STD-1425.

4.4. Training.

4.4.1. Supervisors shall conduct initial and annual worker training on hazards associated with laser radiation and document training on AF Form 55, *Employee Safety and Health Record*.

Chapter 5

ELECTRO-MAGNETIC FREQUENCY (EMF) SAFETY PROCEDURES.

5.1. EMF Assessments.

5.1.1. BE will assess EMF emitters within work areas during the industrial hygiene surveys. Emitters will be assigned a risk assessment rating (low, medium, or high) based on its hazard potential as defined by AFOSHSTD 48-9, *Electro-Magnetic Frequency (EMF)Radiation Occupational Health Program*. The frequency of EMF emitter surveys outside occupied work areas will be based on the risk assessment rating and will be at the discretion of the installation BE.

5.1.2. Workplace supervisors will provide BE a current inventory of EMF emitters during periodic BE workplace assessments. Supervisors will contact BE to perform a hazard assessment at least 5 days prior to operation of new emitters.

5.1.3. EMF hazard assessments will be documented on AF Form 2759 with high risk systems being documented in the Defense Occupational and Environmental Health Readiness System (DOEHRS). Classified data will be provided to BE via SIPRNET and will not be documented in unclassified systems. All hazard assessments will be provided to 82 TRW/SEG for electro-explosives hazard evaluations.

5.1.4. Supervisors will provide the following to ensure accurate assessment:

5.1.4.1. Location and nomenclature.

5.1.4.2. Organization responsible for its use.

5.1.4.3. Function of the EMF emitter.

5.1.4.4. Operating frequency (or frequencies).

5.1.4.5. Antenna gain.

5.1.4.6. Output power (state if average or peak).

5.1.4.7. Operating mode (continuous wave or pulsed).

5.1.4.8. Pulse repetition frequency and pulse width.

5.1.4.9. Supervisors will coordinate all modifications and additions to EMF emitters with BE.

5.2. Training.

5.2.1. Supervisors are responsible for ensuring their workers are aware of and follow the safety procedures outlined in AFOSHSTD 48-9, equipment technical manuals, and unit safety awareness training. Supervisors will review and implement their responsibilities as explained in AFOSHSTD 48-9.

5.2.2. Supervisors shall conduct initial and annual worker training on hazards associated with radio frequency radiation and document training on AF Form 55, Employee Safety and Health Record.

Chapter 6

RECORDS

6.1. Radioactive Materials.

6.1.1. User and BE will maintain records on all unit permits and materials licenses, as required by CFR Title 10 and AFI 37-138, *Records Disposition Procedures and Responsibilities*.

6.1.2. Unit inventory records of RAM will list isotope, activity, item description, date of original activity, model number, serial number and storage location.

6.2. Surveys.

6.2.1. For machines producing ionizing radiation, the Unit RSO and BE will maintain equipment scatter survey records.

6.2.2. Unit RSO and BE will maintain survey records on all machines producing non-ionizing radiation that may be hazardous to personnel.

6.3. TLD personnel exposure records.

6.3.1. Results will be kept quarterly on an **RDL Listing 1499-1**, *Current Occupational Radiation Exposure* and **RDL Listing 1499-2**, *Summary of Occupational Radiation Exposure* and annually on an AF Form 1527, *History of Occupational Exposure to Ionizing Radiation.*

6.3.2. The IRSO is responsible for establishing an investigation dose level for personnel TLD exposure records. Table 13.1 is a list of investigation action levels on SAFB. If any of these levels have been exceeded, an investigation will be conducted by the IRSO to determine causative factors, and identify corrective measures, as appropriate.

Table 6.1. List of Investigation Action Levels.

Shop Name	Current Action Level*	Summary Action Level**
Radiology (Permanent Party)	10 mrem	40 mrem
Radiology Students	10 mrem	40 mrem
*Reported on **RDL Listing 1499-1**, **Reported on **RDL Listing 1499-2**		

SCOTT A. KINDSVATER, Brigadier General, USAF
Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 33-332, *The Air Force Privacy and Civil Liberties Program*, 05 June 2013

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Title 49, Code of Federal Regulations (49 CFR), *Transportation*, Part 173-Shippers – *General Requirements for Shipments and Packaging*

TO 33B-1-1, *Nondestructive Inspection Methods, Basic Theory*, 1 January 2013

Adopted Forms

AF Form 847, Recommendation for Change of Publication

AF Form 55, Employee Safety and Health Record

AF Form 1527, History of Occupational Exposure to Ionizing Radiation

Attachment 2

TERMS

A2.1. ALARA – As Low As Reasonable Achievable concept. ALARA is defined as that set of management and administrative actions taken to reduce personnel ionizing radiation exposure to as low a level as possible consistent with existing technology, costs, and operational requirements.

A2.2. Controlled Area – An area outside of a restricted area but inside the site boundary, access to which can be limited by the licensee for any reason.

Controlled area – Any area where radioisotopes are used or stored and to which access is limited to reduce exposure of individuals to radiation. In the case of non-ionizing radiation, controlled areas are those that may be occupied by personnel who accept potential exposure as concomitant of employment or duties; by individuals who knowingly enter areas where levels above the permissible exposure limits (PEL), defined in AFOSHSTD 48-9, Radio Frequency Radiation (RFR) Safety Program, are to be expected; and by personnel passing through such areas.

A2.3. Electromagnetic radiation - A term used to mean non-ionizing radiation in the frequency range from about 10 kilohertz (kHz) to 300 gigahertz (GHz).

A2.4. Microcuries – One-millionth of a curie. A curie is a term designating a quantity of radioactive material present; 1 curie is the amount of radioactive material required to produce 37 billion disintegrations per second. Because radioisotopes decay at different rates, the amount of a specific radioactive element that represents a curie is different for each element.

A2.5. Millirem – One-thousandth of roentgen equivalent man (rem). A rem is a unit of absorbed radiation by human beings. Radiation standards are normally expressed in millirem (mrem) or rem per unit of time.

A2.6. Probe surveys – Measurements using portable survey meter to detect alpha, beta, gamma, neutrons, or x-ray radiation.

A2.7. Radiation dosimeter program. – A program described in AFI 48-125, *The US Air Force Personnel Dosimetry Program*, for routinely monitoring personnel who work with radiation producing devices and who may receive radiation doses in excess of 10% of the applicable radiation standard.

A2.8. RAM – Radioactive material.

A2.9. Restricted Area – An area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Thermoluminescent badges and self-reading pocket dosimeters will be worn in ionizing radiation areas.

A2.10. Self-reading Pocket Dosimeter – A radiation detection device normally worn by an individual and designed to detect and quantitatively measure x-ray and gamma radiation. These dosimeters are not as accurate as thermoluminescent dosimeters (TLD), but they can be read by the wearer and give a good indication of received radiation dose. If issued, they are to be worn concurrently with TLDs.

A2.11. Swipe samples – Samples using filter paper to detect removable radioactive material. Filter paper is smeared across suspected contaminated areas.

A2.12. TLD (Thermoluminescent Dosimeter) – A radiation detection device normally worn by an individual and designed to detect and quantitatively measure beta, gamma, x-ray, and, if required, neutron radiation.