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19TH AIRLIFT WING

LITTLE ROCK AIR FORCE BASE
INSTRUCTION 48-148

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Aerospace Medicine

RADIATION SAFETY PROGRAM

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This instruction provides guidance, procedures, precautionary measures, and responsibilities for the control of radioactive materials (RAM) and radiation-producing devices and acts as a written installation radiation safety program policy. This instruction incorporates AFMAN 48-148 *Ionizing Radiation Protection*, AFMAN 40-201 *Radioactive Materials (RAM) Management*, AFMAN 48-125 *Personnel Ionizing Radiation Dosimetry*, AFI 84-103 *United States Air Force Heritage Program*, and AFI 48-139, *Laser and Optical Radiation Protection Program*. It applies to all activities on Little Rock Air Force Base (LRAFB), Arkansas, to include tenant units, as well as, contractors who possess, use, handle, store, or bring radiation sources onto the installation. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route the AF Form 847 from the field through the appropriate functional chain of command. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) AFMAN 33-322, *Management of Records* and disposed of IAW the Air Force Records Information Management System Records Disposition Schedule. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force (AF).

Radiation has many beneficial uses in the Air Force. However, it is important to recognize that radiation can be detrimental to personal health. Thus, it is the policy of the Installation Commander that RAM and radiation producing devices are used safely and that exposures are kept as low as reasonably achievable (ALARA).

APPLICABILITY: Installation radiation safety program requirements apply to both RAM and radiation producing devices. As of July 2020, LRAFB does not have any RAM requiring a permit. Tenant organizations with radiation producing sources and RAM and those brought onto the installation by contractors are also subject to this instruction.

SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Major changes include responsibilities for specific units and the inclusion of a laser radiation safety program supplement.

1. RESPONSIBILITIES:

1.1. **19 AW/CC.**

1.1.1. Designates, in writing, a qualified Installation Radiation Safety Officer (IRSO), generally from the Bioenvironmental Engineering Flight. See AFMAN 48-148, paragraph 3.2 for qualifications.

1.1.2. Delegate authority in writing to the IRSO to suspend installation operations involving RAM that pose a significant health risk to personnel or the general public, present a clear violation of regulations or requirements, or present a high risk of negative impact to United States Air Force (USAF) operations, materiel, or real estate IAW AFMAN 40-201, paragraph 2.9.2.

1.1.3. Establish specific written policies, through the IRSO, for the execution of all applicable AF Instructions, Manuals, and federal regulations concerning the management and utilization of RAM on the installation.

1.2. **19 MDG/CC.**

1.2.1. The Medical Treatment Facility (MTF) shall maintain a radiation safety program and implement appropriate quality control programs for the various diagnostic imaging modalities offered at the MTF.

1.2.2. New diagnostic imaging and/or radiation therapy systems shall not be used clinically until acceptance testing has been performed by a qualified medical physicist.

1.2.3. It is the responsibility of the equipment gaining MTF to fund consulting medical physics services, to include acceptance testing and associated annual surveys. Request support from their regional medical physics office at least 90 days in advance of a requirement. Note: MTFs receive baseline funding for one routine medical physics visit per year.

1.2.4. Ensure dosimetry records are entered into an individual's medical record.

1.2.5. Ensure medical follow-up of personnel receiving significant exposures (e.g. the collection of bioassay, laboratory specimens) as necessary to assess internal exposures from ingested or inhaled RAM or contaminated wounds. Samples shall be sent to the USAF School of Aerospace Medicine (USAFSAM) for analysis and interpretation.

1.3. **Unit Commander.**

1.3.1. Designates, in writing, a Unit Radiation Safety Officer (URSO) when in possession of RAM (including check sources) or radiation producing devices. See AFMAN 48-148, paragraph 3.3 for qualifications.

1.3.2. Implements safety and training policies and procedures and provides resources for a radiation protection program.

1.3.2.1. These procedures and instructions should describe the actions or steps necessary to safely conduct a particular task involving a radiation source and document performance of the task. Radiation safety procedures and instructions shall be clearly written, readily available to all users of radiation producing devices, and annually reviewed and updated, as necessary. They shall describe the safety controls and procedural safeguards necessary to limit exposure and actions to be followed in the event of a mishap or emergency.

1.3.3. Notifies the IRSO before making changes regarding RAM or radiation producing devices (i.e., the amount or types of RAM, new or altered radiation sources, modification/construction of new facilities, special operations, etc.).

1.4. **19 OMRS/SGXB - Bioenvironmental Engineering - Installation Radiation Safety Officer (IRSO).**

1.4.1. The IRSO can be found in the Bioenvironmental Engineering Flight, which is located in Building 1090 (Medical Clinic) and can be reached at 501-987-7398.

1.4.2. Serves as technical subject matter expert and establishes and manages the overall installation radiation safety program, to include the dosimetry program, to keep occupational and public exposures ALARA.

1.4.2.1. Perform and document annual reviews of procedures and practices, facility design and classification, training, exposure control, monitoring, surveillance activities and RAM audits for the overall installation program and unit programs (possessing RAM or radiation producing devices).

1.4.2.2. Annually brief the Environmental, Safety, and Occupational Health Council on:

Table 1. Annually brief the Environmental, Safety, and Occupational Health Council on:

Annually	Semi-Annually
Review any necessary changes to RAM policies on the installation	Generally Licensed Device (GLD) inventories
Incidents/Accident investigations involving RAM	Utilization of RAM on the installation by non-USAF organizations and contractors
Status or outcome of any new facility designs and work orders	Status of corrective actions associated with deficiencies identified during external RAM inspections or the annual IRSO permit audits
Current and new restricted areas	
Radiation training status	
Exposure control (including dosimetry trends and results)	
Monitoring/surveillance (e.g. compliance and shipping surveys) activities	

1.4.2.3. Assist units on the utilization and disposal of RAM and written approval (or denial) of the permanent or temporary possession (e.g., purchase, loan, transfer, shipment, contracting) of RAM or radiation producing devices on the installation.

1.4.2.3.1. Consult with the IRSO and provide requiring activities with information necessary to develop a Performance Work Statement/Statement of Work for compliance with all applicable statutes, regulations and instructions for managing RAM in the USAF and provide contracting officers information necessary to ensure appropriate award selection criteria are included in the solicitation IAW guidance and information from the Nuclear Regulatory Commission and Sealed Source and Device Registry.

1.4.2.4. Provide, or train URSOs to provide, initial and annual radiation safety training (also known as "ALARA Training") to all personnel (military, civilians and in-house contractors) in units who possess RAM or operate radiation producing devices.

1.4.2.5. Perform radiation surveys (e.g. scatter surveys, radiation shipments, radon, contamination, heritage) to assess health risk.

1.4.2.6. Inventory all base RAM, radiation producing surveys, and restricted radiation areas.

1.4.2.7. Perform investigations for radiation overexposures, administrative doses, and improper use/storage/shipment of RAM and furnish reports to relevant agencies (i.e., AMC/SG3PB, USAFSAM, RadioIsotope Committee Secretariat, Air Force Medical Readiness Agency, etc.).

1.4.2.8. Conduct investigations IAW AFMAN 48-125, paragraph 9.2.

1.4.2.9. Execute the installation's dosimetry program IAW AFMAN 40-125.

1.4.2.9.1. Appoint a Dosimetry Program Monitor for administrative tasks and requirements in Radiation Dosimetry Web.

1.4.2.9.2. Determine the type of external monitoring required (e.g., body, head, extremity, beta, gamma, neutron), the length of the monitoring period, and the type and scope of any bioassay procedures (e.g., urine sampling, fecal sampling). Prioritize pregnant workers for dosimetry.

1.4.2.9.3. Upon referral from Public Health for declared-pregnant individuals, conduct workplace evaluation and exposure assessment, notify Public Health of the scope of the radiation hazard and any recommended duty restrictions, enroll declared-pregnant individuals into the dosimetry program, and place them on a monthly monitoring schedule.

1.4.2.9.4. Brief personnel enrolling in dosimetry program on the following (IAW USAFSAM guidance):

1.4.2.9.4.1. Proper wear and storage of dosimeters. Dosimeter storage locations are approved in writing by the IRSO.

1.4.2.9.4.2. Hazards associated with ionizing radiation and methods to keep their exposure ALARA.

1.4.2.9.4.3. Additional briefing requirements for female radiation workers:

1.4.2.9.4.3.1. Hazards associated with exposure to ionizing radiation during pregnancy.

1.4.2.9.4.3.2. Their responsibility to report to Public Health as soon as possible following confirmation of pregnancy.

1.4.2.9.5. Ensure personnel are informed of the requirement to provide IRSO copies of results of any monitoring (e.g., dosimeter or bioassay) performed by organizations other than USAFSAM, such as after-duty civilian employment. Refer to AFMAN 48-125, paragraph 4.3 for more details.

1.4.2.9.6. The IRSO reviews the USAFSAM RDL Listing 1499 and distributes a copy to the supervisor of the monitored individuals.

1.4.2.9.7. Provide and review a copy of USAFSAM Form 1527-1, Annual Report of Individual Exposure to Ionizing Radiation, to each person upon demand and as otherwise required by DODI 6055.08. Ensure all other monitored personnel also receive a copy of their USAFSAM Form 1527-1. The IRSO provides these forms to each individual in the dosimetry program upon demand or as otherwise required by 10 CFR 19 within 30 days of receipt. The IRSO ensures all other monitored personnel also receive this form within 30 days of receipt.

1.4.2.9.8. The IRSO makes reasonable (i.e., at least two) attempts to provide a copy of the USAFSAM Form 1527-1 to each monitored individual and establishes a system (e.g., logbook, annotation on retained copy) to document each individual's receipt of the form. As a minimum, documentation should include the date provided, individual's name and signature verifying receipt, and initials or signature of the IRSO or designee providing the form. The IRSO shall retain the USAFSAM Form 1527-1 for a period of five (5) years. For individuals who have moved from the installation (e.g., permanent change of station, retirement, separation), one attempt will be made to send their USAFSAM Form 1527-1 to their last known forwarding address. If the IRSO can confirm that the individual completed a permanent change of station and was monitored by the dosimetry program for the remainder of the year covered by the USAFSAM Form 1527-1 at the gaining installation, then an attempt to provide a copy is not required. The monitored individual will receive the information on the USAFSAM Form 1527-1 that will be provided by the gaining IRSO. The IRSO signs the 1527-1.

1.4.2.9.9. Electronic Personal Dosimeters (EPD).

1.4.2.9.9.1. The IRSO shall serve as the Office of Primary Responsibility (OPR) for all contingency EPDs on the installation and collect and ensure that all contingency EPDs are submitted to USAFSAM for annual performance verification.

1.4.2.9.9.2. The IRSO or designee must complete and sign the Electronic Personal Dosimeter Dose Processing Worksheet (EPDDPW) and submit it to the AF Personnel Ionizing Radiation Dosimetry Program. Note: This form is not meant to replace the procedure established for administrative doses. If an IRSO wishes to assign a dose to monitored personnel utilizing dose information from an EPD those may still be submitted through the radiation dosimetry web application.

1.4.2.9.10. Investigate exposures if dosimeters exceed the following levels and submit written reports IAW AFMAN 48-125, paragraph 8.7.

Table 2. Investigation Action Level.

Dosimeter Type	Investigation Action Level			
	Pregnancy Monthly Monitoring Period	Quarterly Monitoring Period	Annual Monitoring Period	Duration of Pregnancy
Whole Body	25 mrem[a] (0.025 rem)	125 mrem (0.125 rem)	500 mrem (0.5 rem)	50 mrem (0.050 rem)
Lens of Eye	125 mrem[b] (0.125 rem)	375 mrem (0.375 rem)	1500 mrem (1.5 rem)	N/A
Extremity	416 mrem[c] (0.416 rem)	1250 mrem (1.25 rem)	5000 mrem (5.0 rem)	N/A

a. AFMAN 48-125, page 41
b. using 1/12th of annual action level
c. using 1/12th of annual action level

1.4.2.9.11. Assign administrative dose changes for lost or damaged dosimeters IAW AFMAN 48-125, paragraph 5.2.

1.4.2.9.12. The IRSO shall review all visitor dosimeter logs quarterly and ensure USAFSAM is provided a copy of all positive or greater than zero log readings for entry into the Master Radiation Exposure Registry (MRER) within 10 calendar days of the end of the quarterly monitoring period.

1.4.2.10. Scatter Survey results shall include: a description or drawing of each measurement location; measured dose or contamination levels at each location; the type, model number, serial number, and calibration date of the instrument; name of individual performing the survey; date and time of the survey; and applicable comments.

1.5. **UNIT RADIATION SAFETY OFFICER (URSO), WORKPLACE SUPERVISOR, WORKER.**

1.5.1. Refer to Attachments **2-9** for sample unit program documents.

1.5.2. Establish and manage the unit radiation safety program to keep exposures ALARA. The written program must include procedures and practices, facility design review and classification, training, exposure control activities, and routine monitoring and surveillance activities. These procedures and instructions should describe the actions or steps necessary to safely conduct a particular task involving a radiation source and document performance of the task. Radiation safety procedures and instructions shall be clearly written, readily available to all users of radiation producing devices, and annually reviewed and updated, as necessary. They shall describe the safety controls and procedural safeguards necessary to limit exposure and actions to be followed in the event of a mishap or emergency.

1.5.2.1. The training program shall include topics such as the risks of radiation, methods to minimize exposure, and the ALARA principle and be reviewed and revised as necessary to reflect changes in practices in the workplace.

1.5.2.2. Training programs presented, course curricula, and attendance shall be maintained for a period of three (3) years unless otherwise specified. Training shall be documented on personnel's AF Form 55 or equivalent.

1.5.2.3. URSOs are authorized to provide the annual Radiation Safety Training (i.e., ALARA Training) to its radiation workers IAW AFMAN 48-148, paragraph 3.5. The URSO may develop his own training provided it meets the requirements in AFMAN 48-148, Table 3.1.

1.5.3. In conjunction with Bioenvironmental Engineering and/or the IRSO, perform an annual review of the unit level program areas identified in **paragraph 1.5.2**.

1.5.4. Provide an updated inventory of RAM and/or radiation producing devices to the IRSO when there are changes.

1.5.5. Execute dosimetry program requirements. Personnel on the dosimetry program will wear their dosimeter while performing their duties, not bring it home, store it in an IRSO approved location, and be made available for exchange at the prescribed frequency (monthly for pregnant workers, quarterly for everyone else).

1.5.6. An active duty pregnant female shall, on becoming aware of pregnancy, notify her Commander, workplace supervisor, and the Public Health office. A non-military or civilian member is encouraged to notify her Commander, workplace supervisor, and Public Health office of her pregnancy but it is ultimately up to the civilian woman to decide whether or not she declares her pregnancy.

1.5.7. Perform all duties in a way that keeps radiation exposures ALARA. Workers shall use the following techniques under the judgment to ensure occupational dose limits are not exceeded and exposures are ALARA:

1.5.7.1. Time, Distance, and Shielding: As appropriate, minimize the time around sources of external radiation, maximize the distance to radiation sources, and utilize radiation shielding between radiation sources and potential exposed personnel to control external radiation doses.

1.5.7.2. Wear personal protective clothing, including lead aprons and thyroid shields to protect against x-rays, plastic face shields and glasses to protect from beta particles, and clothing and gloves to prevent contamination shall be used to the greatest extent possible.

1.5.8. Control of Visitors.

1.5.8.1. Visitors to any restricted area must be accompanied by persons knowledgeable about the protection and safety measures in the area.

1.5.8.2. Visitors must be provided adequate information and instruction before they enter a restricted area to ensure appropriate protection of the visitors and other personnel in the area.

1.5.8.3. Visitors entering a location defined as "Radiation Area" or "High Radiation Area" or that could incur a deep dose equivalent in excess of 0.10 mSv (10 mrem) shall be provided personal monitoring devices (i.e., a dosimeter or EPD). A log of all such monitored individuals shall be maintained and the results communicated to the individual and the IRSO quarterly (if there are visitors).

1.5.9. Cooperate with Bioenvironmental Engineering and the IRSO to complete investigations and paperwork to account for abnormal absorbed doses and/or lost dosimeters to assign an administrative dose.

1.5.10. Secure all radioactive material (to include check sources) from unauthorized removal or access. Examples include storing the RAM in a locked room, locked cabinet, safe, etc. RAM that is used in unrestricted areas must be under the constant surveillance.

1.5.11. If in possession of a GLD and if required by the Sealed Source and Device Registry, the device shall be tested for leakage, and proper operation of any on-off mechanism or indicator, if any, tested at no longer than six month intervals, or as specified by 10 CFR Part 31. All leak tests will be coordinated with the IRSO so that appropriate protocols and materials are used.

1.5.12. Dosimetry Program.

1.5.12.1. Ensure dosimeters are properly worn, handled, and secured when not in use. This includes utilization of the control board, whose location is approved in writing by the IRSO.

1.5.12.2. Cooperate with Bioenvironmental Engineering for the efficient exchange of dosimeters. Note: pregnant worker dosimeters are exchanged monthly while all other dosimeters are exchanged quarterly.

1.5.12.3. Refer newly assigned personnel who will require a dosimeter to the IRSO for entry into the dosimetry program prior to starting work involving occupational exposure to ionizing radiation.

1.5.12.4. As notified, refer pregnant military personnel and declared-pregnant civilian personnel to Public Health for establishment of a pregnancy profile, which includes any work restrictions, and to the IRSO for placement into the monthly monitoring program.

1.5.12.5. Distribute the USAFSAM Form 1527-1 to individuals covering the same monitoring period.

1.5.12.6. The monitored individual will be provided with a copy of the signed USAFSAM Form 1527-1. A member signed copy will be placed in the individual's health record (if available) and a member signed copy retained in the files of the IRSO.

1.5.12.6.1. Provide the IRSO with all relevant personal dosimetry information such as, but not limited to, listing current or prior history of occupational radiation exposure.

1.5.12.6.2. AF personnel may not wear their AF-issued dosimeter while performing non-AF duties.

1.5.12.7. Consult with the IRSO if personnel with dosimeters are deploying or on temporary duty.

1.5.12.8. If afforded two dosimeters, the whole body badge is worn on the front of the body, below the neck and above the waist and underneath the lead apron. The collar badge is worn on the front of the body, at collar or neck level and outside the lead

apron. Placement of the two badges is not interchanged during the monitoring period. The dosimeters will be appropriately labeled to avoid confusion.

1.5.12.9. If EPDs are issued, the dosimeters must have been performance verified within the last year. In addition, a log of all direct reading dosimeter readings must be maintained by the workplace supervisor. This log must include the following:

1.5.12.9.1. The date, time, and purpose of the visit.

1.5.12.9.2. The visitor's name, social security number, business address, sex, and phone number.

1.5.12.9.3. The dosimeter's serial number and calibration date.

1.5.12.9.4. The dosimeter reading before and after the visit.

1.5.12.9.5. The dosimeter's net exposure reading and net exposure time.

1.5.13. Provide the IRSO with the form found in **Attachment 6** when an off-base contractor desires to bring RAM onto the installation for work.

1.6. **19 CONS - BASE CONTRACTING.**

1.6.1. Monitor and review contracts on projects in which contractor(s) requires the use of devices that contain RAM (e.g., soil density gauges, radiography cameras) or use of radiation producing devices (e.g., portable x-ray machines). Coordinate with the IRSO to ensure all solicitations for goods or services that may require the use of RAM contain appropriate award selection criteria.

1.6.2. Ensures the IRSO reviews the scope of work to assess radiation protection requirements prior to contractor(s) bringing RAM containing devices or radiation producing devices onto the installation.

1.6.3. When involved with contracts where off-base entities desire to bring RAM onto the installation for work, inform the unit receiving the services to coordinate with the IRSO so that the form in **Attachment 6** is completed prior to project commencement.

1.6.4. Ensure that all contracts involving RAM contain required contract clauses. When appropriate, ensure the Performance Work Statement/Statement of Work satisfies AFMAN 40-201, paragraph 2.19.2.

1.7. **19 LRS – Cargo Movement.**

1.7.1. Cargo Movement personnel will call Bioenvironmental Engineering at 987-7398 and schedule surveys involving the shipment of RAM.

1.7.2. Cargo Movement personnel will provide the name of the radionuclide, number of items, item nomenclature and National Stock Number, and total activity.

1.7.3. If the requested information is unavailable, provide the component make and model, Safety Data Sheet, and any other relevant information so the IRSO can perform research, which might delay the shipment. Note: shipments listing the incorrect RAM and markings/labels could be dangerous for emergency responders and incur fines from the Department of Transportation and Nuclear Regulatory Commission.

1.7.4. Do not seal the package prior to Bioenvironmental Engineering's survey. When the survey and paperwork have been completed, Bioenvironmental Engineering will provide two copies to Cargo Movement personnel – one for their record and one that goes in the box.

2. REQUIREMENTS IN THE CLINICAL USE OF X-RAY.

2.1. As a general principle, the dose to the patient shall be kept to a minimum and consistent with clinical objectives. Each MTF shall have and implement written operating and safety procedures. These procedures, including any restrictions of the operating technique required for the safe operation of the particular system, shall be made available to each individual operating a radiation producing machine. These procedures shall be reviewed annually and approved by the appropriate clinic chief, MTF radiation safety office, or regional consulting medical physics office.

2.1.1. The following general imaging principles should be followed to the greatest extent possible consistent with clinical objectives.

2.1.1.1. Minimize patient radiation dose.

2.1.1.2. The minimum necessary anatomy should be exposed.

2.1.1.3. Unnecessary repeat studies should be avoided.

2.1.1.4. Imaging parameters (e.g., kilovoltage peak, milliampere-seconds) should be optimized for the patient's age and habitus.

2.2. Before any medical procedure involving radiation is performed, the patient shall be asked if she is pregnant. If the patient is pregnant or there is a possibility that she could be pregnant, the attending physician shall be immediately informed. Before any therapeutic procedure, a pregnancy test shall be given to all fertile women no sooner than 48 hours preceding the treatment. Any inconclusive pregnancy test or statement made by the patient as to the potential of being pregnant should delay treatment until a conclusive negative pregnancy test can be obtained. Note: A pregnancy test cannot detect the presence of an embryo until several days post implantation.

2.3. MTFs shall report any total effective dose equivalent to a conceptus (i.e., embryo or fetus) or nursing child that is greater than 50 mSv (5 rem) that is a result of the administration of machine produced radiation to a pregnant individual or nursing mother from studies or treatments where the resultant dose was not specifically approved, in advance, by the requesting physician. See AFMAN 48-148, paragraph 8.8.3 for reporting requirements.

2.4. A medical event is defined as an adverse event which places the patient at risk of injury, except for an event that results from patient intervention, in which the use of radiation was for medical applications. The clinic shall notify the responsible MTF's Chief of Medical Staff, or their designee, no later than the next calendar day after discovery of the medical event. The Chief of Medical Staff will then determine, based upon consultation with the responsible physician utilizing radiation for medical purposes, qualified medical physicist, and referring physician or clinic, whether or not the event involves risk of permanent injury to the patient or subject. If such risk is determined to be present, the event becomes a reportable medical event. The clinic will then telephonically report the medical event to the AF Medical Readiness

Agency (Radiation Programs) within seven (7) calendar days. See AFMAN 48-148, paragraph 8.8.3 for reporting requirements.

2.5. Diagnostic radiology and dental technician trainees may operate ionizing radiation equipment in their specialty while under the direct supervision of a fully qualified radiologic technologist or dental technician. The Chief of Medical Staff, in consultation with the lead radiologist and URSO, may approve other individuals to operate ionizing radiation equipment for specialty medical and dental applications. These operations must be conducted under the supervision of a radiological medical/dental practitioner.

2.6. All clinics shall implement a quality control program for each diagnostic imaging modality present. These programs are aimed at ensuring staff and public safety while optimizing clinical efficacy and patient radiation dose.

2.7. Equipment Performance Evaluations.

2.7.1. Initial equipment performance evaluations (i.e., acceptance testing) on diagnostic systems can be used in conjunction with vendor overseen applications setup or training after consultation with medical physicist. An initial equipment performance evaluation must be conducted prior to all other uses of these systems on a human.

2.7.2. Sustainment equipment performance evaluations shall be performed annually (+/- 2 months).

2.7.3. Post-modification equipment performance evaluations shall be performed following repair, upgrade, modification, or relocation in a manner that may significantly affect the equipment's performance relative to a demonstrable standard.

2.8. Facility Requirements.

2.8.1. Facilities shall maintain records of installed radiation shielding until the shielding is removed.

2.8.2. Facilities shall post signs consistent with the following:

2.8.2.1. Signs advising patients to inform staff of potential pregnancies shall be clearly posted in departments where unsealed RAM is medically administered or ionizing radiation may be directly applied to the abdomen or pelvis.

2.8.2.2. Doors and walls that contain lead, or other intentional radiation shielding material, shall be posted and include thickness information. This requirement can be consolidated into a single placard for each effected room.

3. RADIATION DOSIMETRY.

3.1. The IRSO shall determine which work centers require radiation dosimetry.

3.2. Individuals who are occupationally exposed to ionizing radiation as part of their duties must be provided dosimetry and bioassays as described in AFMAN 48-125 when any of the following apply:

3.2.1. Exposures are measured or calculated to exceed 1 mSv (100 mrem) Total Effective Dose Equivalent in a year, 2% of a Committed Effective Dose Equivalent based Annual Limit of Intake, or 2% of the occupational limits listed in AFMAN 48-148, Table A4.1.

3.3. Dosimetry services may be provided to individuals not meeting the above criteria. If the type of radiation to which the individual could be exposed is detectable by the AF personnel monitoring program, at the discretion of the IRSO, dosimetry services may be provided in the following cases:

3.3.1. Monitoring would be helpful in demonstrating compliance with ALARA;

3.3.2. Monitoring is desirable to evaluate potential exposure conditions to relieve worker concern;

3.3.3. Requested by the individual.

3.4. Pregnant occupational radiation workers must be monitored throughout their gestational period. Note: Contractors will only be provided dosimetry when specified in the contract. Otherwise, the contract, IAW 29 CFR 1910.1096, should state the contractor's employer (not the USAF) will provide dosimetry.

3.5. Contractors will not be included in USAF dosimetry program unless stated so in their contract.

3.6. Personnel on the dosimetry program will wear their dosimeter while performing their duties, not bring it home, store it in an IRSO approved location, and be made available for exchange at the prescribed frequency (monthly for pregnant workers, quarterly for everyone else).

3.7. The IRSO and worker shall work together to complete investigations and paperwork to account for abnormal absorbed doses and/or lost dosimeters to assign an administrative dose for the member's MRER.

4. HERITAGE PROGRAM RADIATION SURVEYS.

4.1. Prior to a new item being added to the inventory, Bioenvironmental Engineering will survey the internal and external components for the presence of radiation.

4.1.1. The survey includes ambient radiation measurements of all accessible aerospace vehicles and any historical property containing RAM to ensure personnel dose limits are not exceeded. Non-accessible aerospace vehicles include, but are not limited to, those suspended or mounted on pedestals currently in the historical collection. If non-accessible aerospace vehicles are relocated or entered for maintenance, an initial survey is conducted if not already on file.

4.1.2. If no radiation is found, document on AF Form 3583 or 3580 and write an accompanying memo documenting the negative finding. Periodic surveys are no longer required (AFI 84-103, paragraph 9.5.4).

4.2. If radiation is found:

4.2.1. Write a memo with a description/drawing/picture showing each measurement location; measured dose or contamination levels at each location; the type, model number, serial number, and calibration date of the survey instrument; name of individual performing the survey, date and time of the survey and applicable comments.

4.2.2. Identify items as having radioactive material in one of the following manners:

4.2.2.1. An inconspicuous mark on the front face of the item, such as an approximately 1/4-inch red dot, containing a number corresponding to the item number on the survey record.

4.2.2.2. A drawing or photograph identifying the component and location with corresponding number to the survey record.

4.2.3. At each point of entry to any aerospace vehicle which contains RAM, place a conspicuous sign stating, "Contact Installation Radiation Safety Officer Before Entering" or similar.

4.2.4. Artifacts containing RAM and not installed in aerospace vehicles are:

4.2.4.1. Segregated from non-radioactive artifacts during storage.

4.2.4.2. Secured to prevent unauthorized removal or entry.

4.2.4.3. Area marked as containing RAM.

4.2.4.4. Stored in a manner such that public dose limits are not exceeded.

4.2.4.5. Follow up survey for units containing RAM is required every five (5) years.

4.2.5. Radium (i.e., Radium-226).

4.2.5.1. Each item containing radium-226 is swipe sampled, including the surrounding area, to determine the extent of any removable contamination. Note: Do not take swipe samples from items containing unprotected radium paint.

4.2.5.2. Removable radium-226 contamination cannot exceed 20 disintegrations per minute (dpm)/100 cm^2 or, if less than 100 cm^2, the entire surface should be swiped.

4.2.5.3. A general license is issued by 10 CFR 31.12 for self-luminous products containing radium-226 for:

4.2.5.3.1. Luminous items installed in operational air, marine, or land vehicles.

4.2.5.3.2. All other luminous products provided that no more than 100 items are used or stored at the same installation at any one time.

4.2.6. Every five (5) years, Bioenvironmental Engineering shall scan the exterior of the item and swipe of the lowest overhanging part of the vehicle is accomplished to ensure there is no internal leakage to ensure the dose to the public is less than 100 mrem per year and 2 mrem per hour.

4.2.6.1. A routine survey of the internal compartments of an aerospace vehicle is not required if access to the aerospace vehicle's internal compartments is secured from unauthorized entry (i.e., a positive method is in place to prevent entry) or access points are marked indicating entry is not allowed without an authorized escort.

5. RADON.

5.1. Little Rock AFB has been determined by USAFSAM to be **low-risk** IAW the Bioenvironmental Engineer's Guidebook for Radon Management.

5.2. Exposure to radon will be assessed by radon progeny exposure in the units of Working Level Months in a year (WLM/yr). Refer to AFMAN 48-148, paragraph 7.1.1 for calculations.

5.3. The annual limit is 4 WLM/yr. The AF goal is the annual average concentration of radon gas in occupied buildings (i.e., homes, schools, child development centers, work centers, and office buildings) be at or below concentrations where exposure from radon progeny does not exceed 0.8 WLM/yr. Mitigation begins at exposures above 0.8 WLM/yr. Refer to AFMAN 48-148, Table 7.1 for mitigation timelines.

5.4. All installations must have radon assessments for structures supporting housing, child development centers, and Department of Defense Education Activity schools. Results of testing will be made available to occupants.

5.4.1. Radon testing and mitigation in current privatized housing will be accomplished by the project owner as specified in the applicable project documents.

5.4.2. Facilities that may pose a risk to high radon exposure (e.g. subterranean buildings, facilities with inadequate ventilation) should only be sampled after consultation with the IRSO and/or USAFSAM.

5.5. Bioenvironmental Engineering shall document radon measurement results in the Defense Occupational and Environmental Health Readiness System.

6. RAM AND RADIATION PRODUCING DEVICE INVENTORY.

6.1. The IRSO will maintain a list of restricted areas, to include: the classification of the area, the location, and the owning organization.

6.2. Ensure all Nuclear Regulatory Commission licensed RAM, GLDs, permitted RAM, and any other type of RAM utilized by Department of Defense activities and organizations or in facilities for which the installation commander is responsible is accurately inventoried in the RAM Management Information System (RAMMIS), unless otherwise stated in AFMAN 40-201.

6.2.1. RAMMIS is not required to be used to inventory targeting pods; however, the IRSO will obtain a copy of the Reliability, Availability, Maintainability Logistics Support System for Pods (commonly referred to as “RAMPOD”) inventory at an interval not to exceed six (6) months.

6.2.2. Weapon systems containing strategic special nuclear material or tritium, and the associated waste streams, regulated by 42 U.S. Code 2121, Air Force Policy Directive 91-1, AFI 91-101, Air Force Nuclear Weapons Surety Program, and AFI 91-108 are exempt from the RAMMIS inventory requirement.

6.2.3. Exempt consumer product uses of nuclear materials, certain unimportant quantities of source materials, and certain Department of Energy activities are exempt from the RAMMIS inventory requirement.

6.2.4. RAM integral to in-service aerospace vehicles or weapons system (e.g., magnesium thorium, optics and electronics) is exempt from inventory until such time it is removed for disposal by the Aerospace Maintenance and Regeneration Center or Air Force Radioactive Recycling and Disposal.

6.3. Inventory documentation must include the following:

6.3.1. Date of the inventory;

6.3.2. Model number and serial number of each source, if assigned;

6.3.3. The identity of the radionuclide, manufacturer date, and source activity;

6.3.4. The location of each source;

6.3.5. The name of the individual conducting inventory;

6.3.6. The signature of the Permit RSO endorsing the inventory and;

6.3.7. National Stockpile Number, if applicable.

6.4. Exempt Quantity Item Disposal. Electron tubes and spark gaps containing RAM can be disposed of as normal trash providing the following conditions are satisfied:

6.4.1. Store electron tubes or spark gaps in a way that will prevent breakage. Each tube or spark gap must contain less than the quantities listed in 10 CFR 30.15 (do not accumulate exempt quantities) or does not contain more than the exempt quantity of naturally occurring and accelerator produced materials specified in **paragraph 3.10** and;

6.4.2. The levels of radiation from each electron tube or spark gap does not exceed one (1) milliRoentgen per hour on contact when measured with a proper radiation detection instrument.

7. RADIATION PROTECTION DURING CONTINGENCIES.

7.1. These environments may include deployed locations where known or suspected nuclear or radiological hazards exist and radiological environments created by hostile action or industrial, medical, nuclear incident or accident. Interventions are specific actions performed in these environments to mitigate the source(s) of exposure, to save life or limb, protect high value assets, or achieve higher objectives that may merit personnel incur risks greater than those permitted for practices. For specific guidance refer to Joint Publication 3-11 Operations in Chemical, Biological, Radiological, and Nuclear Environments (Oct 2013); Medical Management of Radiological Casualties, 4th Edition (Jul 2013); and/or Bioenvironmental Engineering Field Manual (Aug 2012).

7.2. Applying radiation protection principles should not introduce a higher level or more severe risk to the unit or mission. Complete risk management requires:

7.2.1. Limitation. The dose to an individual conducting operations shall be monitored and limited in accordance with the commander's operational exposure guidance.

7.2.2. Justification. Unnecessary risks to health should not be accepted.

7.2.3. Optimization. To minimize the potential effects of exposure, intervention planning should reduce the time in a radiation area, maintaining the maximum distance possible from radiation sources, and using shields between exposed personnel and radiation sources to keep radiation exposures ALARA.

7.2.4. Information. Personnel must assess risk using an all hazards approach using all available information such as measurements, visual observations, and modeling.

7.3. The commander will establish the operational dose guidance with input from the 19 MDG and Bioenvironmental Engineering. This dose will account for internal (inhaled and ingested)

and external (exposure) radiation. Occupational dose limits do not apply in contingency environments.

7.4. Personnel entering contaminated environments should be afforded in-vitro or in-vivo bioassays to determine the extent of internal exposures if internal contamination is suspected.

7.5. Bioenvironmental Engineering will provide health risk assessments for contingencies to include:

7.5.1. Recommendations for personal protective equipment for various populations (i.e., aircrew, maintenance, medical, etc.).

7.5.2. Aircraft and material decontamination levels. Note: adequate background measurements are necessary to identify the presence of abnormal radiation.

7.5.3. Coordination with Aircrew Flight Equipment and Civil Engineering Emergency Management for operational support.

7.5.4. Issue dosimeters.

7.5.4.1. Personnel deployed in known or potential radiation environments shall be provided individual dosimeters if the potential to exceed 1 mSv (100 mrem) exists.

7.5.4.2. If individual dosimetry or prompt bioassay measurements are not available, efforts will be made to estimate individual doses through group dosimetry, radiation survey, environmental monitoring data, modeling, dose reconstructions, or other scientifically accepted methods.

7.5.5. Radiation monitoring, such as air sampling and surface swipes. Note: adequate background measurements are necessary to identify the presence of abnormal radiation.

7.5.6. Coordination with medical staff for prophylaxis and bioassay recommendations.

7.6. Recommended contamination levels for clothing, skin, and equipment shall be managed to levels that are ALARA consistent with Department of Defense Manual (DoDM) 3145.03, Department of Defense Chemical, Biological, and Radiological Clearance Guidance for Platforms and Materiel or guidance provided by the assigned radiation protection personnel.

7.7. Medical Surveillance.

7.7.1. On completion of military operations involving radiation exposure, long term, periodic health monitoring is required for individuals receiving cumulative effective doses in excess of 50 mSv (5 rem).

7.7.1.1. Creation of a registry for the impacted population;

7.7.1.2. Submission of biological or bioassay samples to determine absorbed dose and residual burdens of RAM, respectively; and/or

7.7.1.3. Annual or biannual medical examination through the local Base Operational Medicine Clinic, particularly following the latent periods of known radiogenic cancers.

JOHN M. SCHUTTE. Colonel, USAF
Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFMAN 40-201, *Radioactive Materials (RAM) Management*, 29 March 2019

AFMAN 48-125, *Personnel Ionizing Radiation Dosimetry*, 9 January 2019

AFMAN 48-148, *Ionizing Radiation Protection*, 27 October 2020

AFI 48-139, *Laser and Optical Radiation Protection Program*, 22 April 2020

AFI 84-103, *United States Air Force Heritage Program*, 21 May 2015

ANSI Z136.1, *Safe Use Of Lasers*, 2014

DoD 6055.05-M, *Occupational Medical Examinations and Surveillance Manual*, 2 May 2017

DoDI 6055.08, *Occupational Ionizing Radiation Protection Program*, 15 December 2009

DoDM 3145.03, *DoD Chemical, Biological, and Radiological (CBR) Clearance Guidance for Platforms and Materiel*, 8 May 2019

Joint Publication 3-11, *Operations in Chemical, Biological, Radiological, and Nuclear Environments*, 29 October 2018

Prescribed Form.

USAFSAM Form 1527-1

USAFSAM RDL Listing 1499

Electronic Personal Dosimeter Dose Processing Worksheet (EPDDPW.

AF Form 3583

AF Form 3580

Abbreviations and Acronym.

ALARA—As Low As Reasonably Achievable

ANSI—American National Standard Institute

CFR—Code of Federal Regulation

EPD—Electronic Personal Dosimeter

GLD—Generally Licensed Device

IAW—In Accordance With

ILSO—Installation Laser Safety Officer

IRSO—Installation Radiation Safety Officer

LRAFB—Little Rock Air Force Base

LSO—Laser Safety Officer

MRER—Master Radiation Exposure Registry

MTF—Military Treatment Facility

NHZ—Nominal Hazard Zone

NOHD—Nominal Ocular Hazard Distance

OD—Optical Density

OPR—Office of Primary Responsibility

RAM—Radioactive Material

RAMMIS—Radioactive Material Management Information System

RSO—Radiation Safety Officer

SOP—Standard Operating Procedure

URSO—Unit Radiation Safety Officer

USAF—United States Air Force

USAFSAM—United States Air Force School of Aerospace Medicine

WLM—Working Level Month

Terms

Activity—The rate of disintegration (transformation) or decay of radioactive material. The units of activity are the Curie (Ci) and the Becquerel (Bq).

Administrative Dose—A value assigned in a dose report in cases where a dosimeter is not returned for processing at the end of the wear period, is damaged, or cannot be evaluated due to other factors.

ALARA—Acronym for "As Low As Reasonably Achievable" means making every reasonable effort to maintain exposures to radiation as far below applicable dose limits as is practical, consistent with the purpose for which the activity is undertaken, taking into account the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations and in relation to utilization of nuclear energy, RAM, and radiation in the public interest.

Bioassay—The determination of kinds, quantities or concentrations, and, in some cases, the locations of RAM in the human body, whether by direct measurement (in-vivo counting) or by analysis and evaluation of materials excreted or removed (in-vitro) from the human body.

Dose—The energy imparted by ionizing radiation per unit mass of irradiated material.

High Radiation Area—Any area with dose rates greater than 0.1 rem (1 mSv) in one hour, 30 centimeters from the source, or from any surface through which the ionizing radiation penetrates. Areas at licensee facilities must be posted as "high radiation areas" and access into these areas is maintained under strict control.

Ionizing Radiation—Any electromagnetic or particulate radiation capable of producing ions, directly or indirectly during its passage through matter. It includes gamma rays, x-rays, alpha

particles, beta particles, neutrons, protons and other particles and electromagnetic waves capable of producing ions.

Laser—An acronym for Light Amplification by Stimulated Emission of Radiation. Any device that can be made to produce or amplify electromagnetic radiation in the x-ray, UV, visible, and infrared or other portions of the spectrum by the process of controlled stimulated emission of photons.

Laser Safety Officer (LSO)—An individual designated in writing whom is responsible for implementing a laser safety program and enforcing control of laser hazards within their area of responsibility.

Maximum Permissible Exposure (MPE)—The level of laser radiation to which a person may be exposed without hazardous effect or adverse biological changes in the eye or skin.

Nominal Ocular Hazard Distance (NOHD)—The distance from the output aperture along beam propagation beyond which irradiance or radiant exposure is not expected to exceed the appropriate MPE for unobstructed viewing by the human eye. The NOHD may increase with the use of aided viewing.

Occupational Dose—The dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation or to RAM from regulated and unregulated sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include dose received from background radiation; from any medical administration the individual has received; from exposure to patients administered RAM and are properly released/discharged; from voluntary participation in medical research programs; or as a member of the public.

Radiation—For the purposes of this regulation, unless otherwise specified, ionizing radiation and specific, medical uses of non-ionizing radiation, such as radio- or microwaves, or visible, infrared, or ultraviolet light.

Radiation Safety Officer (RSO)—The person that the commander designates, in writing, as the person responsible for the installation, organization or unit radiation safety program. The term "Radiation Safety Officer" is a functional title and does not denote a commissioned status or specialty code. The RSO must have the education, training, and professional experience needed for the job.

Rem—The conventional unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by a radiation quality factor, Q (1 rem = 0.01 Sv = 1 cSv).

Working Level Months—Exposure to radon and its progeny are generally indicated by the working-level. One working level is defined as that concentration of radon daughters in air that has a potential alpha energy release of 1.3E5 mega-electron volt in a liter of air, equivalent to 2E-5 Joule per cubic meter of air (J/m^3). One working level month (WLM, or 3.5E-3 Jh/m^3) would be the exposure received by being present in that concentration for one working month, equivalent to 170 hours. Exposure to one WLM results in an estimated absorbed dose to the lung of 4 to 13 mGy (0.4 to 1.3 rad). One WLM is approximately equal to an annual exposure of 4 pCi per liter of radon, if the radon decay products are in 50% equilibrium with the radon.

Attachment 2

UNIT RADIATION SAFETY PROGRAM REQUIREMENTS

Table A2.1. Unit Radiation Safety Program Requirements.

Shop		Required Program Elements			
	Unit RSO	Dosimetry Program	Unit Radiation Safety Program	Annual Radiation Safety Training	Annual Program Inventory & Audit
19 MDSS Radiology	X	X[1]	X	X	X
19 MXS NDI	X	X	X	X	X
Vet Clinic	X	X[2]	X	X	X
19 OMRS Dental Clinic	X	X[3]	X	X	X
189 MDG Dental Clinic	X		X	X	X
19 CES EOD	X		X	X	X
19 CES Emergency Management	X		X	X	X
19 OMRS Bioenvironmental Engineering	X		X	X	X
189 SFS	X		X	X	X
Office of Special Investigations	X		X	X	X

1. Wears two dosimeters, one on collar outside lead apron and one under. Contractors are covered by USAF dosimetry program per contract.
2. Wears two dosimeters, one on collar and one extremity ring dosimeter.
3. Only for pregnant workers.

Note: This list is current as of December 2020 and is not all inclusive. Units may gain or lose radiation safety requirements pursuant to the IRSO's judgment. Please contact Bioenvironmental Engineering at 987-7398 if you have questions about program requirements.

ATTACHMENT 3

IONIZING RADIATION DOSE LIMITS

Table A3.1. Ionizing Radiation Dose Limits.

Application	Occupational	Declared Pregnant Females	Minors (16 - 18 years)[4]	Public
Total Effective Dose Equivalent[2] Deep-dose Equivalent + Committed Dose Equivalent	50 mSv (5 rem) in a single year, and 500 mSv (50 rem) to any tissue, except lens of the eye	5 mSv (500 mrem) for remainder of pregnancy to the conceptus (embryo/fetus) (no more than 50 mrem/month is recommended)	5 mSv (500 mrem) per year 50 mSv (5 rem) to any tissue, except lens of the eye	1 mSv (100 mrem) in a year[5]
Annual Dose Equivalent				
The lens of eye[6]	150 mSv (15 rem)		15 mSv (1.5 rem)	
The skin[6]	500 mSv (50 rem)		50 mSv (5 rem)	
The hands and feet	500 mSv (50 rem)		50 mSv (5 rem)	

1. Based on the requirements of Title 10, CFR, Part 20
2. The limits apply to the sum of relevant doses from external exposure in a period of 1 calendar year and the 50 year committed dose from intakes in the same period
3. The mSv is the preferred unit of dose for radiation protection purposes. Current AF instrumentation uses the Gy or R as their basic unit of measure, and the MRER reports doses in rem. For low LET penetrating radiations (x-rays, gamma rays), the following conversions can be applied: 10 mSv = 1 cSv ≈ 1 cGy =10 mGy = 1 rad ≈ 1 R
4. Conditions for Minors: No person under the age of 16 years shall be subjected to occupational exposure, and no person under the age of 18 shall be allowed to work in a restricted area unless supervised, and then only for the purposes of training
5. In special circumstances, an effective dose of up to 5 mSv in a single year, provided the average over five years does not exceed 1 mSv per year. AFMSA/SG3PB shall be contacted to obtain this variance. Also, general public shall not be exposed to more than 0.02 mSv (2 mrem) in any one hour
6. Averaged over 1 cm^2, regardless of the area exposed

Attachment 4

ANNUAL UNIT RADIATION SAFETY PROGRAM CHECKLIST

Table A4.1. Annual Unit Radiation Safety Program Checklist.

Area	Sub-topic	Assessment
Procedures and Practices	How many procedure/year?	
	Shop Operating Instruction?	
	Appointed URSO?	
Facility Design and Classification	Interlocks?	
	Warning Lights?	
	Shielding?	
	Radiation Area Signage?	
	RAM securely stored? Form 3, RAM sign?	
Training	Written in SOP?	
	How is it documented?	
	ALARA?	
	Dosimeter Wear and Storage?	
Exposure Control	Dosimeter Wear and Storage?	
	Storage Location Memo?	
	1499, 1527 distributed?	
	Moonlighting?	
	Pregnant workers?	
	Procedures for Visitors?	
Surveillance Activities	Monitoring equipment?	
	Scatter Surveys?	
	EPDs?	

Attachment 5

UNIT LEVEL RADIATION SAFETY OPERATING INSTRUCTION OUTLINE.

A5.1. Sample Components of Unit Level Radiation Safety SOP (AFMAN 48-148, paragraph 4.1.2).

A5.2. Defines the goals of the radiation safety program, the organization and administrative controls required for use of RAM and radiation producing devices, and state a commitment to radiation protection policy.

A5.2.1. Program Management.

A5.2.1.1. Appoint unit radiation safety officer. Confer with IRSO for training requirements.

A5.2.1.2. Maintain reports for 3 years.

A5.2.1.3. Annual reviews; annual inventory of RAM or Devices (with serial numbers).

A5.3. Describe the actions or steps necessary to safely conduct a particular task involving a radiation source and document performance of the task.

A5.3.1. Procedures/Practices.

A5.3.1.1. Processes; Technique charts, Technical Order.

A5.3.1.2. Safety/equipment checks (patient identification, pregnant, function check).

A5.3.1.3. Use labels to identify limbs (i.e., right, left)? Lead vests for patient if applicable.

A5.3.1.4. Operator stands behind leaded glass; ensure door is shut.

A5.3.1.5. Procedures for visitors.

A5.3.1.5.1. Can request additional dosimeter from IRSO.

A5.3.1.5.2. Submit visitor logbook to IRSO quarterly.

A5.3.2. Personnel training plan.

A5.3.2.1. Risks of radiation.

A5.3.2.2. Methods to minimize exposure; ALARA principle.

A5.3.2.3. Moonlighting.

A5.3.2.4. Declared pregnancy.

A5.3.2.5. Annually documented on form xxx found at folder YYYY.

A5.4. Describe the safety controls and procedural safeguards necessary to limit exposure and actions to be followed in the event of a mishap or emergency.

A5.4.1. Facility Design and Classification

A5.4.1.1. Restricted area; Radiation area designation.

A5.4.1.2. Specific features: interlocks, lights, kill switch, shielding.

A5.4.1.3. Inform facility management when radiation x-ray light or radiation area signs are inoperable.

A5.4.1.4. RAM is stored in ____; RAM signs are displayed.

A5.4.2. Exposure Control - Dosimeters/EPDs.

A5.4.2.1. Wear when working; store dosimeters in room ### when not in use.

A5.4.2.2. Receive training from IRSO.

A5.4.3. Surveillance activities.

A5.4.3.1. Maintain scatter surveys, storage memo, dose reports.

A5.4.3.2. Suspected overexposures; report to IRSO for investigation.

A5.4.4. Emergency Procedures.

A5.4.4.1. Activate Emergency Cut-Off.

A5.4.4.2. Leave Area.

A5.4.4.3. Contact URSO.

A5.5. **Contact IRSO for clarification or suggestions on specific unit applicability**

Attachment 6

CONTRACTOR RAM REQUEST

A6.1. REQUEST TO TRANSPORT AND/OR USE RADIOACTIVE MATERIAL (RAM) OR RADIATION PRODUCING DEVICES ON LITTLE ROCK AFB

A6.1.1. Reference: AFMAN 40-201, paragraph A2.4.2.

Table A6.1. Contact Information:

	Name	Local Address or LRAFB Bldg	Phone Number	Email Address
Contract Office Representative				
Sponsoring Unit Point of Contact				
Responsible local contractor representative (must provide local contact information)				

Table A6.2. Description of Proposed Activities:

Process to be done on the base	
Dates that devices will be on the base	
Where/how device will be stored when not in use	
Safety and control procedures	

Table A6.3. Device Characteristics:

Manufacturer	
Model	
Serial Number	
Maximum kVp, mA, sec	
Radioisotope	
Activity	
Activity Date	

A6.1.2. By submitting this document, the Contractor acknowledges that the IRSO can make initial and periodic checks to ensure the contractor follows appropriate safety practices to prevent exposure of Air Force personnel, as well as, suspend operations believed to be unsafe.

A6.1.3. Email this form and applicable copies of the license, swipe sample results, and pertinent training certificates to **michael.k.kan.mil@mail.mil**. If you have questions or concerns, please call 501-987-7344.

Attachment 7

SAMPLE CONTRACTOR RAM APPROVAL (ON LETTERHEAD)

Figure A7.1. Sample Contractor Ram Approval (On Letterhead).

19 November 2019

MEMORANDUM FOR UNITED STATES ARMY CORPS OF ENGINEERS
ATTN: JOHN DOE

FROM: 19 OMRS/SGXB

SUBJECT: Approval to Use Troxler Nuclear Density Gauge for Visiting Quarters Construction Project

1. A request to transport and/or use radioactive material on Little Rock Air Force Base (see attachment) containing the AF3000, portable nuclear gauge training certificates, Arkansas Department of Health Radioactive Material License ARK-0820-03121, swipe samples, and radiation safety procedures was emailed to and reviewed by the Installation Radiation Safety Officer (IRSO) on 19 November 2019.

2. The Troxler 3400 series nuclear moisture and density gauges are **approved** for use for the Visiting Quarters construction project (W912QR19C0028) in accordance with the information in the aforementioned request package submitted on 19 November 2019. **Deviations must be approved by the IRSO. Incidents involving radiation safety and/or radioactive materials must be immediately reported to the IRSO.**

3. As previously acknowledged with the submission of the request package, please remember that the IRSO can make initial and periodic checks to ensure the contractor follows appropriate safety practices to prevent exposure of Air Force personnel, as well as, suspend operations believed to be unsafe.

4. Please contact the IRSO, Maj Michael Kan, at 501-987-7344, 501-987-7398, or michael.k.kan.mil@mail.mil if you have questions or concerns.

MICHAEL K. KAN, Maj, USAF, BSC
Installation Radiation Safety Officer

Attachment:
Request to Transport and/or use RAM on Little Rock AFB Package.

Attachment 8

RADIOACTIVE MATERIAL, RADIATION PRODUCING DEVICE, AND RADIATION AREA INVENTORY

Table A8.1. Radioactive Material and/or Radiation Producing Device Inventory.

RSO		Signature						
Owning Unit/Office Symbol	Radionuclide	Serial Number	Activity	Manufacture Date	National Stock Number, if applicable	Location (Building and Room)	Date of the Inventory	Individual Conducting Inventory

Table A8.2. Radiation.

RSO		Signature		
Unit	Building	Room	Radiation Area Classification	Controls

Attachment 9

TRAINING GUIDANCE FOR RADIATION SAFETY OFFICERS AND RADIATION WORKERS.

A9.1. AFMAN 48-148, paragraph 3.5. Radiation Workers. All radiation workers will have the training listed in **Table A9.1** Initial and annual training can often be provided by the IRSO, URSO, or PRSO depending on scope of use.

Table A9.1. Training guidance for radiation safety officers and radiation workers.

Topic	IRSO	URSO (only machine produced)	URSO (Non-Destructive Inspection)	Radiation Worker	PRSO
Radiation vs. contamination	X	X	X	X	X
Internal vs. external exposure & dose	X			X	X
Biological effects of radiation	X	X	X	X	X
Types and hazards associated with RAM or devices possessed	X	X	X	X	X
ALARA concept	X	X	X	X	X
Training in the principles of time, distance, and shielding to minimize exposure	X	X	X	X	X
Radiation detection & measurement	X	X	X	If Required by Position	X
Personnel dosimetry	X	X	X	X	X
Applicable regulations	X	X	X	X	X
License/Permit conditions, renewals, amendments	X				X
Locations of use & storage of RAM	X	X			X
Material control & accountability	X	X			X
Annual audit of radiation safety program	X	If Required by Position	If Required by Position	If Required by Position	X
Transfer and disposal	X	X			X
Record keeping	X	X	X	X	X
Prior events involving permitted material	X				X
Managing incidents/mishaps	X	X	X	X	X

Recognition and assurance of radiation warning signs; visibility and legibility	X	X	X	X	X
Inspection by regulatory agencies	X	X	X		X
Requirement for complete and accurate information	X	X	X		X
Employee protection	X	X	X	X	X
Deliberate misconduct	X	X	X	X	X
Emergency response procedures	X	X	X	X	X
Protective action guides	X				
Air monitoring procedures	X				
Bioassay techniques	X				X
Special Requirements	X	X	TO 33B-1-1		AFMAN 40-201