BY ORDER OF THE COMMANDER
94 AIRLIFT WING

94 AIRLIFT WING INSTRUCTION
40-201

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Radiological Health and Safety

RADIATION SAFETY PROGRAM

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This instruction implements Air Force Policy Directive (AFPD) 40-2, Radioactive Materials (Non-Nuclear Weapons); AFI 48-109, *Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program*; AFI 48-139, *Laser and Optical Radiation Protection Program*; AFI 48-148, *Ionizing Radiation Protection*; Air Force Manual (AFMAN) 48-125, *Personnel Ionizing Radiation Dosimetry*; T.O. 33B-1-1, *Nondestructive Inspection Method;* and As Low As Reasonably Achievable (ALARA) concepts for exposures to ionizing and non-ionizing radiation at Dobbins ARB. This instruction applies to individuals at all levels who work with radiation emitting processes or deal with the storage and shipping of radioactive materials including all 94 Airlift Wing, Air Force tenants and BOS contractors. It also applies to persons not occupationally exposed (that is, general public) to the extent that it addresses controls to protect the public from the potential hazards from sources of ionizing and non-ionizing radiation owned and/or operated by the Air Force Reserve. The 94 MSG/SGPB (Bioenvironmental Engineering and Public Health) is the Office of Primary Responsibility (OPR) appointed by the 94 AW/CC as the Installation Radiation Safety and Laser Safety Officers (IRSO and ILSO). Refer recommended changes and questions about this publication to the OPR listed above using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate chain of command. Ensure 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/afrims/afrims/afrims/rims.cfm**. This instruction requires collecting and maintaining information protected by the Privacy Act of 1974 (5 U.S.C. 552A) and AFI 33-332, *Privacy Act Program.*

1. Overview

1.1. Purpose. The purpose of the base radiation safety program is to establish protection requirements necessary for the safe use of radiation producing devices and material. A properly managed radiation protection program will minimize the incidence of exposures to radiation to workers and the public, ensure a knowledgeable workforce exists, and maintain compliance with all Federal and Air Force regulations.

1.2. Scope. This instruction provides the responsibilities and requirements for an effective radiation safety program for those who work with or around ionizing or nonionizing radiation. In addition, it provides procedures to ensure the public's safety when near radiation. Ionizing radiation requirements apply to: x-ray emitting devices, all items on Dobbins Air Reserve Base (DARB) requiring a radioactive permit or classified as a Generally Licensed Device (GLD), and all areas that procure/transport/store such items. Non-ionizing radiation requirements apply to class 3B and 4 lasers as well as electro-magnetic frequencies between 3 kHz -300 GHz.

1.2.1. Dobbins Occupational Radiation Safety Plan (ORSP). The ORSP is a plan used to assist shops in managing RAM, lasers and EMFR sources in their work center. This document contains exposures, equipment inventories, controls and training plans for each work center. Supervisor, unit radiation safety officers (URSO) and unit laser safety officers (ULSO) shall consult this document on all radiation issues. At any time there are changes or discrepancies to the ORSP, contact the IRSO. The IRSO maintains the ORSP.

1.2.2. The standards and requirements in this instruction apply to occupational exposures and do not necessarily need to be applied to an emergency response environment.

1.3. Responsibilities

1.3.1. Installation Commander:

1.3.1.1. The 94 AW/CC is ultimately responsible for all aspects of the DARB Radiation Safety Program including:

1.3.1.2. Ensures all base personnel comply with this instruction. This includes military personnel, civilian employees, contractor personnel, and visitors.

1.3.1.3. Ensures all base activities comply with applicable Federal and Air Force directives covering the usage of radiation-producing equipment, the permitting, procurement, storage, handling, accountability for and disposal of radioactive material (RAM), and the reporting of incidents or accidents to the appropriate authorities.

1.3.1.4. Appoints, in writing, qualified individuals to be the IRSO and ILSO.

1.3.1.5. Conducts a base-wide radiation safety program through the 94 Mission Support Group (MSG)/SGPB, under the direction of the IRSO/ILSO.

1.4. IRSO/ILSO:

1.4.1. Serves as the installation commander's single point of contact for all radiation safety matters. IRSO/ILSO investigates, evaluates, initiates corrective action, and reports

on defects or non-compliance items relating to substantial safety hazards involving RAM or radiation producing devices (RPD).

1.4.2. Terminates any operation which, in the opinion of the IRSO/ILSO, poses a substantial radiation hazard to personnel or the environment. A report of such actions will be made to the installation commander.

1.4.3. Conducts investigation of incidents of alleged or actual overexposures to radiation.

1.4.4. Provides expert consultation, advice, assistance, and direction to base agencies (i.e. Anti-Terrorism Working Group, Incident Commander and Environmental Safety, Occupational and Environmental Health Working Group and Occupational Health Council (ESOHC)) on the hazards associated with radiation and the methods to control these hazards as needed. Briefs the ESOHC at least annually IAW AFI 48-148, *Ionizing Radiation Protection*.

1.4.5. Reviews design plans for facilities to be used for RAM or RPDs that could require shielding and provide preliminary hazard evaluations.

1.4.6. Provides permit radiation safety officer (PRSO) oversight of all URSOs and radiation programs to ensure all Federal, Air Force, state, and base rules and instructions relating to radiation safety requirements are met.

1.4.7. Conducts annual RAM permit review/audit and provides the results to permittee.

1.4.8. Provides radioisotope committee (RIC) approved PRSO training and tests. Provides names of those individuals who pass to the RIC secretariat.

1.4.9. Ensures URSOs are assigned and annually trained for all units that may use, possess, or come in contact with ionizing radiation.

1.4.10. Manages and controls the receipt, shipment, transfer, and disposal/recycling of radioactive items and wastes, to include proper packaging and storage by installation organizations.

1.4.11. Coordinates base emergency response plans and checklists related to radiation with 94 MSG Emergency Management and Fire Emergency Services.

1.4.12. Provides ALARA radiation training for URSOs and users of RAM or RPDs.

1.4.13. Conducts the installation TLD, Laser, and EMFR programs in accordance with all Federal and Air Force requirements.

1.5. Unit Commanders/Permittee:

1.5.1. Appoints a PRSO in writing for approval by AFMSA/SG3PB. Contact the IRSO for specific instructions.

1.5.2. Appoints a URSO or Unit Laser Safety Officer (ULSO) to be responsible for radiation safety within the unit if unit owns, operates, or works around radiation-producing devices or items to include lasers emitters.

1.5.3. Provides required resources for PRSO or URSO to maintain compliance with this instruction.

1.5.4. Delegates authority to the PRSO, URSO or ULSO to suspend operations involving RAM that pose a significant health risk to personnel, are in clear violation of regulations or requirements, or can negatively impact Air Force operations, material, or real estate.

1.6. PRSO:

1.6.1. A PRSO may be the commander, civilian equivalent, or designated representative of an Air Force organization that owns RAM requiring a template permit. This individual is responsible for ensuring compliance with all Federal, Air Force, and permit requirements.

1.6.2. Certified by IRSO with RIC training and testing requirements.

1.6.3. Coordinates with IRSO prior to receiving, possessing, using, distributing, storing, transporting, transferring, or disposing of any RAM, or commodity containing RAM.

1.6.4. Ensures radiation safety and compliance for the use of RAM for which a specific Air Force template permit has been issued by the RIC.

1.6.5. Ensures permit RAM is not transported or transferred to another organization without prior coordination with the IRSO.

1.6.6. Develops in coordination with the IRSO written policy for permitted RAM as required by AFI 40-201, *Radioactive Materials Management*, and detailed in **Chapter 2** of this instruction.

1.6.7. Maintains a binder that includes all applicable permit documentation: appointment letter, amendments, audit reports, written policy/procedures, and important contact information.

1.6.8. Reports accidents or incidents involving RAM to the IRSO.

1.7. URSO (RAM Sources Only):

1.7.1. Must be appointed, in writing, from within the organization to ensure compliance with AFI 48-148, *Ionizing Radiation Protection*. Must have the authority to execute the necessary actions to ensure compliance. The appointed individual shall work with the IRSO to ensure compliance with applicable Federal and Air Force regulations.

1.7.2. Responsible for units owning GLDs.

1.7.2.1. Shall preserve all labels affixed to the device recognizing the radiation isotope and follow all instructions on the label.

1.7.2.2. Will ensure the device is not transferred to another organization until transfer is approved and coordinated with the IRSO.

1.7.2.3. Will ensure maintenance only be completed by the manufacturer. If shipping is required, will contact the IRSO.

1.7.2.4. Will ensure GLDs are properly disposed, contact the IRSO for instructions.

1.7.2.5. Assists the unit commander in developing policies and procedures for ionizing and non-ionizing radiation in accordance with Federal and Air Force regulations.

1.8. ULSO.

1.8.1. Responsible for all safety requirements regarding hazard class 3B and 4 Lasers operated by their unit, to include conducting and documenting initial and annual training regarding the proper use of lasers and the hazards of lasers. The IRSO will assist with development of training material.

1.8.2. Reports all suspected laser exposures to the unit commander and the ILSO.

1.9. Installation Contracting Office:

1.9.1. Coordinates with the IRSO to ensure RAM terms and conditions are included in relevant contracts. This will include the requirement that non-Air Force organizations that need to use RAM either licensed by the Nuclear Regulatory Commission (NRC) or an Agreement State on the installation have one of the following:

1.9.1.1. An NRC or Agreement State license. A copy of the NRC Form 241, NRC Reciprocity Form or equivalent, must be an adjunct to the agreement state license for those areas of exclusive Federal jurisdiction in agreement states. For those areas of concurrent or proprietary jurisdiction in an agreement state, then the respective agreement state license is a valid authorization.

1.9.1.2. Written certification that they are exempt from NRC license requirements.

1.9.1.3. Written approval from the IRSO to transfer, transport, or use temporary storage areas for RAM on the installation.

1.9.2. Provides all design reviews and work order requests involving potential use, movement, or disposal of RAM to the IRSO for review and approval prior to allowing work to commence on contract. Work requests without prior approval of the IRSO will be denied.

1.9.3. In coordination with the IRSO, and in accordance with the terms and conditions of the contract, suspends contractor operations that violate AFI 40-201, *Radioactive Materials Management*, a permit or license, or Federal regulations until corrective action is taken.

1.10. 94 LRS/Base Supply Shipping and Receiving:

1.10.1. Ensure that RAM shipments are prepared and transported in accordance with 10 CFR 71, Packaging and Transportation of Radioactive Material; 49 CFR 40, Transportation; and Defense Transportation Regulation (DTR) DOD 4500.9-R-Part II, Cargo Movement, as applicable.

1.10.2. Ensure personnel performing transportation (e.g. receipt, shipment, and packaging) of RAM comply with training requirements specified in 49 CFR 172.704 and DTR DOD 4500.9-R-Part II.

1.10.3. Ensure RAM is not transferred to units on the installation without prior coordination with the IRSO.

1.10.4. Ensure RAM is stored in a secure location.

1.11. Command Post: Ensures IRSO is notified immediately of any suspected exposure to radiation, laser, or EMFR.

1.12. Work center Supervisors:

1.12.1. Identify any use, receipt, or ordering of ionizing, laser or EMFR in their work center to IRSO immediately.

1.12.2. Ensure any planned changes in laser operations are coordinated with their respective ULSO. The ULSO will then coordinate with the IRSO prior to becoming operational.

1.12.3. Aid the PRSO or URSO in ensuring required warning signs, safety devices, and personal protective equipment (PPE), as recommended or required by BE are functional and properly worn or placed before beginning work.

1.12.4. Report incidents, accidents, and hazardous conditions immediately to URSO, PRSO, or IRSO.

1.12.5. Ensure that all personnel that enter into any radiation area be given a one-time awareness level training concerning that hazards of that area. This training is outlined in the

1.13. Individuals:

1.13.1. Learn and implement the rules of radiation safety as described in applicable Federal, Air Force, and DARB instructions as well as in organizational operating plans.

1.13.2. Perform all duties to keep radiation exposures ALARA.

1.13.3. Wear personal monitoring devices if directed by their supervisors and the IRSO.

1.13.4. Wear appropriate protective clothing and equipment as prescribed by supervisors and the IRSO.

1.13.5. Report incidents, accidents, and hazardous conditions immediately to their supervisors.

1.13.6. Not override engineering controls, modify PPE or tamper with radiation dosimeters or purposely expose radiation dosimeters to radiation or RAM.

1.13.7. Inform their supervisors of any changes in equipment, procedures or other factors involving RAM or RPDs that may alter the radiation safety practices or radiation levels

2. RADIOACTIVE MATERIALS (RAM).

2.1. RAM: RAM are materials whose nuclei, because of their unstable nature, decay by emission of ionizing radiation. The radiation emitted may be alpha or beta particles, gamma or x-rays, or neutrons. If supervisors suspect or have RAM, contact the IRSO immediately to determine requirements.

2.2. Template permits: Template permits are issued for devices or applications that pose relatively little radiological risk and employ standardized permit conditions (e.g., Sniper Pods).

2.3. RAM Permit Requests:

2.3.1. All AF organizations must obtain a RAM permit from AFMSA/SG3PB prior to receiving, storing, distributing, using, transferring, or disposing permit required RAM. No organization shall apply for a RAM permit without prior coordination with the IRSO.

2.3.2. All template permit requests (new, amendments, renewals, or termination) will be accomplished in accordance with guidance given in AFI 40-201, *Radioactive Materials Management*. All requests will be routed through the IRSO who will route the request to AFMSA/SG3PB.

2.4. Recordkeeping: Posting notices to workers: an emergency contact list (Attachment 2); NRC Form 3; supplemental notice (Attachment 3); and a copy of the permit in a conspicuous location where the particular permitted RAM is stored or used.

2.5. General Guidelines:

2.5.1. All conditions identified within the permit must be known and followed.

2.5.2. All permitted RAM must be secured from unauthorized access or removal.

2.5.3. Users of permitted RAM shall receive training in accordance with permit conditions.

2.6. GLD:

2.6.1. The NRC issues a general license to acquire, receive, use, store, or transfer certain devices that contain RAM which have been manufactured, tested, and labeled by the manufacturer in accordance with the specifications contained in a specific license issued to the manufacturer by the NRC. These devices are labeled as being generally licensed. GLDs do not require a template permit.

2.6.2. GLDs should be purchased in accordance with Defense Federal Acquisition Regulations, assigned a National Stock Number, and registered in the Federal Logistics Information System and Hazardous Material Information Resource System. Local purchase of these devices is strongly discouraged. In either case, devices shall be registered in the Air Force logistics system and identified as radioactive. The IRSO will be notified of all GLDs on base.

2.6.3. GLDs will be leak tested every 6 months. The IRSO will coordinate with shop to perform test.

2.6.4. GLDs must not be stored for more than two years without use. Unused GLDs should be reported to the IRSO for proper disposal/recycling procedures.

2.6.5. The IRSO will ensure that GLDs are disposed in accordance with AFI 40-201, *Radioactive Materials Management*. GLDs will not be brought to DRMO for disposal.

2.7. Non-Permitted RAM Sources

2.7.1. These items are RAM sources that do not require permitting. These items are low activity and are generally used for calibration of equipment.

2.7.2. The URSO is responsible for notifying the IRSO of purchases or receipt of these devices as soon as possible.

2.8. Disposal/Recycling of RAM:

2.8.1. All RAM must be disposed of or recycled in accordance with AFI 40-201, *Radioactive Materials Management*, and 10 CFR 20, Subpart K, Waste Disposal. All requests for disposal/recycling must be coordinated with the IRSO in writing.

2.8.2. Only the PRSO will work with the IRSO to dispose/recycle RAM.

3. NDI OPERATIONS.

3.1. NDI Work center:

3.1.1. Reviews the safe use and operation of aircraft x-ray equipment operating procedures annually to ensure currency and compliance with T.O. 33B-1-1, Nondestructive Inspection Method, **Chapter 6**, Section VIII. The operating plan must be forwarded to IRSO for approval.

3.1.2. Notifies IRSO if the process or workload changes or receive new x-ray equipment; as an x-ray scatter survey is required to be performed on all shielded/unshielded facilities when changes are made.

3.1.3. Supervisors must inform the IRSO when aircraft x-rays will be taken in a shielded/unshielded building, where an x-ray scatter survey has not been performed.

3.1.4. Follows recommendations for controls detailed in SGPB routine occupational environmental health (OEH) surveillance letters.

3.2. SGPB:

3.2.1. Performs routine OEH surveillance of the NDI work center to ensure compliance with AFI 48-148, *Ionizing Radiation Protection*.

3.2.2. Performs routine annual radiation audit of the NDI work center to ensure T.O. 33B-1-1, **Chapter 6**, Section VIII requirements are met.

3.2.3. Verify the adequacy of operating procedures, safety precautions, administrative or physical controls, the presence and proper use of radiation warning signs and signals, as well as the need for additional surveys.

3.2.4. Monitors exposures accumulated in controlled and uncontrolled areas.

3.2.5. Documents findings, recommendations, and restrictions and communicates to NDI supervisor.

4. DENTAL/ X-RAY.

4.1. Dental Services:

4.1.1. Must annually review/update the dental x-ray plan pertaining to the safe use and operations of x-ray equipment. This instruction must be forwarded to the IRSO for approval.

4.1.2. Notify the IRSO if new x-ray equipment is received, as an x-ray scatter survey is required to be performed on facilities before the new equipment will be used.

4.1.3. Follow recommendations for controls detailed in SGPB routine OEH surveillance letters.

4.2. SGPB: Must perform routine OEH surveillance of the dental services x-ray operations to ensure adequate controls are in place and check for any operation changes.

5. TLD.

5.1. NDI: Personnel are required to wear a whole body TLD with each aircraft x-ray session for the entire duration of the session.

5.2. Additional Personnel: As identified by the IRSO, additional personnel may be required to wear TLDs. The IRSO will take into account historical data, surveillance data, Air Force guidelines, and precedents when deciding who to place on the TLD program. Individuals who have the potential to get more than 10% of the annual limit must be enrolled on the TLD program.

5.3. General Guidelines:

5.3.1. The work center supervisor must ensure TLDs are stored in the area specified by the IRSO to ensure no dose is received. The location must be a clean/dry area away from all x-ray operations. The control badge must remain in this location at all times.

5.3.2. Individuals need to ensure TLDs are kept in the work center and not worn outside. Excessive heat and sunlight may potentially damage the TLD.

5.3.3. TLDs will be exchanged by SGPB quarterly. The work center supervisor must inform SGPB when a female on the TLD program becomes pregnant. SGPB will then enroll the individual on the TLD monthly monitoring program.

5.3.4. Individuals must first complete the ALARA/TLD training through SGPB before being placed on the TLD program.

5.3.5. Quarterly TLD dose records (RDL 1499-1 and 1499-2) will be reviewed by the IRSO and sent to the shop supervisor for filing.

5.3.6. Annually SGPB will provide yearly cumulative dose record (AF FM 1527-1) to all enrolled individuals. These forms will be signed by the IRSO and enrolled individual. After these forms are signed, they will be maintained within the individual's medical records.

5.4. TDY & Deployments:

5.4.1. Program badges:

5.4.1.1. For deployments less than 90 days, individuals will take their dosimeter and a designated transit control dosimeter with them. The accompanying control dosimeter may be issued from spare dosimeters provided to the home base. Contact the IRSO for this control badge. Note: TDY badges should be hand carried onto the aircraft and not allowed to go through the checked and carry-on baggage scanners; the baggage may be subject to x-ray radiation at a level that could damage the TLD.

5.4.1.2. For deployments over 90 days, individuals will become a member of the deployed organizations' TLD program. No badge will be taken from Dobbins for the deployment.

5.4.2. Locations with an established dosimetry program: While TDY to a location with an established dosimetry program, individuals will obtain necessary dosimetry at the TDY location. If dosimetry support is provided by other than United States Air Force School of Aerospace Medicine (USAFSAM), the individual is responsible for ensuring copies of their dosimetry results are provided to USAFSAM.

5.4.3. Locations without an established dosimetry program: While TDY to a location without an established dosimetry program, individuals will receive dosimetry support from their sponsoring organization for the duration of the TDY. Support will necessitate providing dosimetry controls and ensuring exchanges are made in a timely fashion. Gaining organizations anticipating ongoing requirements of this nature are encouraged to establish their own dosimetry programs.

5.5. Investigation Limits: As of the date of this instruction, the IRSO has set the Investigative Action level for radiation workers at 0.03 REM. The purpose of these limits is to enable the IRSO to maintain exposure ALARA. Exceeding these limits does not mean the individual is overexposed. The IRSO will initiate and conduct an investigation and report quarterly if TLD results are at or above these set limits.

6. LASER SAFETY PROGRAM.

6.1. Laser Classification: Laser classification is determined in accordance with AFI 48-139, *Laser and Optical Radiation Protection*. Classifications provide a practical means for delineating the degree of hazard and specifying appropriate controls for each.

6.1.1. The ILSO must be notified of any unit owning or operating a class 3B or 4 lasers, for addition to the base laser inventory. Classification can be found labeled on the equipment or in the manual. SGPB will routinely assess and document potential laser hazards in conjunction with the routine OEH surveillance schedule. The work center will notify the ILSO prior to purchase of class 3B or 4 lasers for approval.

6.2. Laser Safety Training and Controls:

6.2.1. Annual laser safety training is required for users of class 3B or 4 lasers and will be conducted by either the ULSO or the ILSO.

6.2.2. Protective equipment:

6.2.2.1. Enclosure of the laser equipment or beam path is the preferred method of control, since the enclosure will isolate or minimize the hazard. Though enclosure is the optimal method of control, this method may not be warranted for some systems and facilities (e.g., laser pointers).

6.2.2.2. The ILSO will recommend the appropriate laser protective eyewear and skin protection for each laser system. Not all lasers will require protective equipment. Users should only wear protective eyewear certified for use by the ILSO.

6.3. Medical Surveillance: Medical surveillance requirements are limited to personnel who work with class 3B or 4 lasers and will be determined by the Occupation and Environmental Health Working Group Flight Surgeon.

6.4. Laser Overexposures: Should any suspected adverse exposure to a laser occur, the member should contact the ILSO immediately by whatever is the most expedient method. All other notification and requirements will come through the ILSO as directed by AFI 48-139, *Laser and Optical Radiation Protection*.

7. EMFR SAFETY PROGRAM.

7.1. Recognizing EMFR Systems: Recognition of EMFR systems will be accomplished during SGPB routine OEH surveillance. Shop supervisors should notify SGPB of any EMFR

systems acquired between these periodic surveys. SGPB will evaluate all installation EMFR systems.

7.2. SGPB:

7.2.1. Evaluates identified EMFR systems to determine whether a system is hazardous. A hazardous system is one capable of producing levels above the EMFR exposure limit in areas accessible by personnel.

7.2.2. SGPB provides control recommendations for hazardous EMFR systems.

7.3. EMFR Exposures: An individual may be exposed to the EMFR exposure limit without exhibiting any damaging biological effects. The level incorporates, at minimum, a safety factor of 10 times below the threshold for occurrence of biological effects in humans. Limits can be found in AFI 48-109, *Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program*.

7.3.1. EMFR exposure levels are established for lower and upper tier environments. Lower tier environments represent locations where EMFR exposures do not exceed the Maximum Permissible Exposures (MPEs) of AFI 48-109, *Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program*. Such locations generally represent work centers or public access areas where personnel would not expect to encounter higher levels of EMFR energy. Upper tier environments represent areas that may be occupied by personnel who accept potential exposure as part of employment or duty, by individuals who knowingly enter areas where such levels are to be expected, or by personnel passing through such areas. Existing physical arrangements or areas, such as fences, perimeters, or weather decks of a ship may be used in establishing these environments.

7.3.2. There are no special EMFR exposure limits for pregnant females. Any level EMFR environment that is safe for the mother is also safe for the developing embryo or fetus. Pregnant workers will follow medical profile requirements.

7.4. Mandatory Posting Requirements:

7.4.1. Appropriate warning signs will be placed at all access points to controlled areas where EMFR levels exceed limits; signs will be visible from all directions of approach. BE will determine the need for posting in areas where EMFR levels may exceed the controlled exposure limit.

7.4.2. Work center supervisors will ensure required warning signs and safety devices required by BE are functional before beginning work.

7.5. EMFR Safety Training:

7.5.1. Work center supervisors will ensure individuals who work regularly with or around EMFR systems determined by SGPB as hazardous are trained on EMFR safety upon initial assignment to the unit and annually thereafter. The work center supervisor may contact SGPB to obtain training material.

7.5.2. The training plan will include: EMFR equipment, locations where MPE can be exceeded, control measures, overview of biological effects, and exposure incident reporting procedures.

7.6. EMFR Overexposure: May produce reddened or burned skin. Workers may hear "clicking" or "popping". Symptoms of shock and burns may be evident and should be treated accordingly.

7.6.1. Once a supervisor has been notified of an individual(s) overexposure to EMFR they must contact the IRSO. The IRSO will direct all follow ups and investigation IAW AFI 48-109, *Laser and Optical Radiation Protection*.

8. ALARA CONCEPT.

8.1. ALARA

8.1.1. Developed in response to epidemiological and historical radiation dose data which suggests that no level of ionizing radiation exposure is entirely risk-free. Although there are federal regulations that specify acceptable, conservative levels to ensure low risk of adverse health effects, it is prudent to reduce exposures to the lowest levels reasonably achievable, thereby lowering the health risk associated with that exposure. As a result, it is Air Force policy that all exposures to ionizing radiation be ALARA.

8.1.2. There should be no exposure to ionizing radiation without an expected benefit, and the dose received should be the lowest possible, consistent with the state of technology, cost, and operational requirements.

8.1.3. While the ALARA concept may not directly apply to lasers or EMFR systems, all efforts to keep laser and EMFR exposure to ALARA levels will be made.

8.1.4. In an effort to ensure exposures are maintained ALARA, the IRSO will conduct, document, and report periodic program reviews to the ESOHC and the Occupational Environmental Health Working Group.

8.2. General Guidelines:

8.2.1. Organizations requiring annual ALARA training will be identified by SGPB through routine OEH surveillance. Contact SGPB regarding requests for ALARA training.

8.2.2. SGPB will provide each organization training material specific to the unit's occupational radiation hazard.

9. HISTORICAL OFFICE/STATIC DISPLAY MANAGER.

9.1. Museum-Accessioned Historical Property Radiation: Handling of artifacts that contain RAM is not authorized. All entries made into static display aircraft must be coordinated with the IRSO.

9.2. Radiation Exposure: All displays that contain RAM should be designed to keep exposure levels to visitors and staff ALARA. The IRSO will be the final authority on whether emissions from any exhibits are within safe limits.

10. OVEREXPOSURE PROCEDURES.

10.1. General Guidelines:

10.1.1. Every incident involving a suspected radiation overexposure to personnel covered by this instruction will be investigated and documented.

10.1.2. Immediately upon suspected overexposure the IRSO will be contacted.

10.2. Ionizing Radiation Overexposure: Acute health effects include burns, nausea, weakness, hair loss, skin burns, or diminished organ function.

10.2.1. The IRSO, once notified, will be responsible for up channeling any ionizing radiation overexposure investigation notification and will forward all reports and documentation required to the appropriate higher agencies in accordance with AFI 40-201.

10.2.2. Permitted RAM: The permittee (unit commander) is responsible for ensuring an investigation and a prepared report on events that involve permitted RAM is completed. The PRSO, assisted by the IRSO, normally performs the investigation.

10.2.3. Non-permitted RAM: The commander of the affected organization is responsible for ensuring the investigation and report has been completed.

10.3. Nonionizing radiation overexposure. Refer to **Chapters 6** and 7 of this instruction for nonionizing radiation overexposure requirements.

STEVEN B. PARKER, Brig General, USAF
Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFPD 40-2, *Radioactive Materials (Non-Nuclear Weapons),* 15 March 2007

AFI 40-201, *Radioactive Materials Management,* 17 September 2014

AFI 48-109, *Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program,* 01 August 2014

AFI 48-139, *Laser and Optical Radiation Protection,* 30 September 2014

AFI 48-148, *Ionizing Radiation Protection,* 20 November 2014

AFMAN 33-363, *Management of Records,* 01 March 2008

AFMAN 48-125, *Personnel Ionizing Radiation Dosimetry,* 04 October 2011 AFPD 48-1, *Aerospace Medicine Enterprise,* 23 August 2011

T.O. 33B-1-1, *Nondestructive Inspection Method,* 1 October 2009

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

94 AW/CC—94 Airlift Wing Commander

AFMSA/SG3PB—Air Force Medical Support Agency/Bioenvironmental Engineering Division

ALARA—As Low as Reasonably Achievable

EMFR—Electromagnetic Field Radiation

ESOHC—Environmental Safety and Health Council

GLD—Generally License Device

ILSO—Installation Laser Safety Officer

IRSO—Installation Radiation Safety Officer

MPE—Maximum Permissible Exposure

NDI—Non Destructive Inspection

NRC—Nuclear Regulatory Commission

OEH—Occupational Environmental Health

PPE—Personal Protective Equipment

PRSO—Permit Radiation Safety Officer

RAM—Radioactive Material

RIC—Radioisotope Committee

RPD—Radiation Producing Devices

SGPB—Bioenvironmental Engineering/Public Health

TLD—Thermoluminescent Dosimeter

ULSO—Unit Laser Safety Officer

URSO—Unit Radiation Safety Officer

Terms

ALARA—Acronym for "as low as is 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.

EMFR—A non-ionizing radiation is described as a series of energy waves composed of oscillating electric and magnetic fields traveling at the speed of light. EMFR includes the spectrum of ultraviolet, visible light, infrared, microwave, radio frequency and extremely low frequency.

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.

Installation Laser Safety Officer—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.

Installation Radiation Safety Officer—The person that the commander designates, in writing, as the person responsible for the installation, organization or unit radiation safety program. It is the same as a radiation protection officer or health physics officer.

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.

Permitted RAM—Radioactive material that is controlled by a permit/license issued by the AF Radioisotope Committee (RIC). The amount and activity of the material is strictly limited by the permit and is licensed only to the PRSO.

PRSO—The PRSO is responsible for the oversight of permitted RAM. A PRSO is assigned specifically for specific permit and is named as such on the permit. A PRSO must be all the material control and training requirements listed in AFI 40-201 prior to receiving any permitted material.

ULSO—The ULSO is responsible for the control and operation of the laser he is trained and appointed for. The ULSO is appointed in writing by the unit commander and must receive training for radiation safety, through the IRSO, and on the equipment they are responsible for.

URSO—The URSO is responsible for the control and operation of all RPD under his/her control. The URSO is appointed in writing by the unit commander.