

**BY ORDER OF THE COMMANDER
GRAND FORKS AIR FORCE BASE**

**GRAND FORKS AIR FORCE BASE
INSTRUCTION 48-148**



7 MAY 2013

Aerospace Medicine

RADIATION SAFETY PROGRAM

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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

RELEASABILITY: There are no releasability restrictions on this publication.

OPR: 319 MDOS/SGOJ

Certified by: 319 MDG/CC
(Colonel Jane G. Denton)

Supersedes: GRANDFORKSAFBI48-103,
22 January 2003

Pages: 18

This instruction provides guidance, procedures, precautionary measures, and responsibilities for the control of radioactive materials (RAM) and radiation-producing devices. This instruction incorporates Air Force Instruction (AFI) 40-201, *Managing Radioactive Materials in the US Air Force*; AFI 48-148, *Ionizing Radiation Protection*; Air Force Occupational Safety Health (AFOSH) Standard 48-9, *Electro-Magnetic Frequency (EMF) Radiation Occupational Health Program*; AFOSH Standard 48-139, *Laser Radiation Protection Program*; and Air Force Manual (AFMAN) 48-125, *Personnel Ionizing Radiation Dosimetry*. It applies to all activities conducted on Grand Forks Air Force Base (GFAFB) to include its tenant units as well as contractors who possess, use, handle, or store sources of radiation within the GFAFB installation. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF IMT 847, *Recommendation for Change of Publication*; route AF IMT 847s from the fields through the appropriate functional's chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained In Accordance With (IAW) AFMAN 33-363, *Management of Records*, and disposed of IAW with the Air Force Records Information Management System (AFRIMS) Record Disposition Schedule (RDS). Refer recommended changes and questions about this publication to the OPR using the AF Form 847, *Recommendation for Change of Publication*; route AF Form 847s from the field through the appropriate functional's chain of command.

SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Major changes include the addition of requirements for non-ionizing radiation emitters such as electro-magnetic frequency, LASER and UV.

1. Objective: This instruction describes the Radiation Safety and “As Low as Reasonably Achievable” (ALARA) Programs for GFAFB. It requires control of RAM and radiation-producing devices to safeguard the health of military and civilian populations, while permitting maximum benefits from their use. The effectiveness of these programs depends on consistent and conscientious safety efforts of the material/device users.

2. Responsibilities:

2.1. The Commander, 319 ABW/CC:

2.1.1. In accordance with AFIs 40-201 and 48-148, AFOSH Standards 48-9 and 48139, and AFMAN 48-125, the 319 ABW/CC has designated members of the 319 MDOS/SGOJ, Bioenvironmental Engineering (BE), as the 319 ABW Radiation Safety Officers (RSOs) and Laser Safety Officers (LSOs) (both herein known as RSO).

2.2. The Commander, 319 MDG/CC will:

2.2.1. Provide the RSO, BE, Aerospace Medicine, and Optometry Clinics the resources necessary to carry out provisions in this instruction.

2.2.2. Through the GFAFB RSO, advise tenant unit commanders on radiological health and safety.

2.3. All 319 ABW Commanders will:

2.3.1. Ensure unit personnel who receive, possess, distribute, use, transfer, or dispose of RAM observe the requirements of this instruction, federal, local, and USAF policies and regulations.

2.3.2. Appoint in writing a radiation safety officer if their unit or workplace uses and/or possess radioactive material or radiation-producing devices. Send copy of the following appointment letters to 319 MDOS/SGOJ:

2.3.2.1. RAM Permit Radiation Safety Officer (PRSO), as required by AFI 40-201 and AFI 48-148. The PRSO must be a member of the using organization, and meet education and experience requirements in AFI 40-201.

2.3.2.2. Unit Laser Safety Officers (ULSO) for units using or possessing American National Standards Institute or ANSI Class 3b or 4 lasers.

2.3.2.3. Unit Device Officer (UDO) for generally licensed devices (GLDs) and or radiation-producing devices (i.e. X-rays, electro-magnetic frequency transmitters/receivers).

2.3.3. Commanders of tenant units will appoint a radiation safety officer liaison (RSOL) for the site. This individual should be someone with the most technical familiarity with electro-magnetic frequency, laser and ionizing radiation, and the applicable regulations.

This person will act as a proxy on behalf of the RSO, and refer certain matters back to the RSO.

2.4. The RSO will:

2.4.1. Initiate, supervise, and execute the 319 ABW Radiation Safety Program IAW AFIs 40-201 and 48-148, AFOSH Standards 48-9 and 48-139.

2.4.2. Act as central point of contact for all requests to use RAM or radiation-producing devices, including those by contractors.

2.4.3. Provide the following in support of the 319 ABW Radiation Protection Program:

2.4.3.1. Manage the Thermoluminescent Dosimetry (TLD) Program IAW AFMAN 48-125 (when applicable).

2.4.3.2. Coordinate requests for radioactive waste disposal through USAFSAM/SDRH (Wright-Patterson AFB OH), or recycling through 88 ABW/EM (Wright-Patterson AFB OH).

2.4.4. Investigate the loss, theft, or spill of RAM, and all real or suspected overexposures to radiation IAW AFIs 40-201 and 48-148, AFOSH Standards 48-9 and 48-139 and AFMAN 48-125.

2.4.4.1. In the event of contractor loss or release of RAM, and/or suspected overexposures to ionizing radiation from RAM, the RSO will report to the USAF Radioisotope Committee (RIC) those portions of the incident that pertain to the AF involvement.

2.4.4.2. The RSO will ensure the applicability of this instruction is included in all Requests for Proposals and Invitations for Bid, to include requests for equipment, materials and services. The RSO will work through the contracting officer to ensure use of RAM or equipment containing RAM does not pose harm to the installation population.

2.4.5. Be the sole authority for contacting HQ AMC/SGO, USAF RIC, or the Nuclear Regulatory Commission regarding reportable events.

2.4.6. The RSO may be appointed temporarily as PRSO only when the using organization has no one qualified.

2.5. The Unit RSOL, PRSO, ULSO, and UDO will:

2.5.1. Unit RSOL, PRSO, ULSO and UDOs will be the RSO's single point of contact for their respective materials, devices, and instruments.

2.5.2. Maintain and update an inventory of all RAM, lasers, GLDs, and radiation-producing devices, respectively, within the organization. The unit PRSO, ULSO, and/or UDO must contact the RSO whenever changes occur.

2.5.3. The UDO will ensure workplaces using GLDs adhere to the provisions of 10 CFR 31.5, and work with the RSO to ensure all GLD's are registered with the RIC.

2.5.4. Coordinate with the RSO for assistance in developing unit radiation safety training and operating instructions (OIs).

2.5.4.1. Establish a written unit training program IAW AFI 40-201 and 48-148, AFMAN 48-125 (RAM and ionizing radiation-producing devices), and AFOSH Standards 48-9 (electro-magnetic frequency radiation) and 48-139 (lasers).

2.5.4.2. The goal of the radiation safety awareness training is to ensure exposures are kept ALARA. Document training on each member's AF Form 55, Employee Safety and Health Record, or equivalent.

2.5.4.3. Contact BE if you need assistance in conducting radiation safety awareness training.

2.5.5. Understand and enforce the requirements in Attachment 3 of this instruction pertaining to contractors bringing RAM onto GFAFB or any of its GSUs and tenant organizations.

2.6. Environmental Flight will:

2.6.1. Assist the RSO with characterizing mixed wastes.

2.6.2. Direct requests for RAM disposal to 319 MDOS/SGOJ.

2.7. Flight Medicine will:

2.7.1. Conduct pre-employment and termination medical examinations of civil service employees and Air Force personnel who may be routinely exposed to ionizing radiation.

2.7.2. Examine potentially exposed individuals as soon as practical.

2.7.3. Document all examinations in individual medical records.

2.8. **Public Health will** assist RSO and coordinate medical examinations IAW AFIs 40-201 and 48-148, AFOSH Standards 48-9 and 48-139 and AFMAN 48-125.

2.9. 319 MDOS/SGOO, Optometry will:

2.9.1. Conduct baseline and termination eye examinations for personnel working with class 3b or 4 LASERS IAW AFOSH Standard 48-139.

2.9.2. Document all examinations in individual medical records.

2.10. Workplace Supervisors will:

2.10.1. Protect the health of personnel by ensuring operations involving radiation adhere to all radiation safety instructions, technical orders, and workplace OIs.

2.10.1.1. Ensure deviations from presently approved procedures are coordinated and approved by the RSO.

2.10.1.2. Coordinate all new and revised OIs, pertaining to radiation safety, with the base RSO prior to publishing.

2.10.2. Conduct and document training on AF Form 55 or equivalent IAW AFIs 40-201, 48-148, AFMAN 48-125, and AFOSH Standards 48-9 and 48-139.

2.10.3. Enforce the TLD Program and ensure personnel wear TLD badges IAW AFMAN 48-125.

2.10.4. Provide all necessary personal protective equipment and ensure their proper use.

2.10.5. Inform the RSO and Unit RSO immediately of new radiation sources (i.e. RAM, GLDs) or radiation-producing devices (i.e. X-rays, GLD, etc.), or changes to existing sources to ensure all radiation hazards in the workplace are evaluated.

2.10.6. Refer declared pregnant females to Public Health for a pregnancy evaluation immediately.

2.10.7. Report any suspected or alleged overexposures immediately to the 319 ABW RSO (see Chapters 3 and 4 respectively).

2.10.8. Notify the RSO of unsafe work practices or hazardous conditions involving RAM or radiation-producing devices.

2.11. Individuals/workers will:

2.11.1. Comply with AFIs 40-201, 48-148, AFOSH Standards 48-9 and 48-139 and AFMAN 48-125.

2.11.2. Minimize personal exposure to radiation in accordance with radiation safety training and/ or ALARA policy. Follow all safety precautions to ensure exposures to radiation are ALARA (ionizing) or below applicable limits (non-ionizing).

2.11.3. Report incidents of suspected overexposures to the supervisor immediately (see Chapters 3 and 4).

2.11.4. Notify the RSO of any off-duty, non-Air Force radiation work (i.e., in other employment), and provide monitoring results for inclusion in the Master Radiation Exposure Registry.

2.11.5. Individuals on the TLD Program will notify the RSO before receiving medical diagnostic testing or treatment involving RAM. If you are not on the TLD program, it is not necessary to contact the RSO.

2.11.6. Declare their condition to their supervisor and Primary Care Manager if they believe they may be pregnant. Pregnant civilian females should declare their condition to their workplace supervisor.

2.11.7. Report to the Occupational Health doctor, Medical Treatment Facility, building 109, DSN 362-5155, for examination as soon as practical if they believe they have been exposed to radiation sources.

2.12. CES/CEF, Fire and Emergency Services will:

2.12.1. Ensure the location and characteristics of RAM used or stored on GFAPB are properly identified in fire planning and updated as notified by the RSO.

2.12.2. Ensure fire protection personnel are trained on the hazards associated with radiation sources.

2.12.3. Notify the RSO and using agency source custodian of fires in facilities with RAM.

2.13. Civil Engineering will:

2.13.1. Ensure the RSO is consulted on facility designs and modifications that include the storage or use of RAM and/or radiation producing devices such as x-ray machines.

2.13.2. Consult with the RSO during response operations involving nuclear or radiological materials.

2.14. **Packing and Crating or Transportation Management will:** Ensure packages are in compliance with 49 CFR 17 through 199, and AFD 24-2.

3. Non-ionizing Radiation:

3.1. Electro-Magnetic Frequency (EMF) Radiation.

3.1.1. Unit Commanders will establish a unit EMF safety awareness training program according to AFOSH Standard 48-9, paragraph 2.13.1. BE shall review the program during its routine shop inspections.

3.1.2. Any incident in which personnel are potentially exposed to EMF in excess of the maximum permissible exposure limit will be immediately reported to the RSO and 319 MDOS/SGOJ, building 109, DSN 362-5596. Exposure incidents that occur during non duty hours will be reported to the installation Command Post, ext 6711. The Command Post will notify 319 MDOS/SGOJ.

3.1.3. Owing unit Commanders must coordinate modification and construction plans for facilities intended for use with operations involving EMF with the RSO.

3.2. LASER Radiation.

3.2.1. Incidents in which personnel suspect they have been exposed to LASER radiation in excess of the maximum permissible exposure or complaints of persistent visual disturbances after working with LASERS must be reported to the RSO and 319 MDOS/SGOJ, building 109, DSN 362-5596. After duty hours, call the Command Post, ext 6711. The Command Post will notify 319 MDOS/SGOJ.

3.2.2. The potentially exposed individuals will report to GFAFB clinic for examination as soon as practical. Individuals with suspected skin exposure will also report to GFAFB clinic for examination as soon as practical.

3.2.3. Owing unit Commanders must coordinate modification and construction plans for facilities intended for use with LASER operations with the 319 ABW RSO.

3.2.4. Personnel working with lasers classes 3b or 4 require pre-employment and termination eye examinations IAW AFOSH Standard 48-139. Personnel will schedule with the 319 MDOS/SGOO Optometry Clinic, DSN 362-5516.

3.3. Ultraviolet (UV) Radiation:

3.3.1. Personnel will not be exposed to occupationally produced UV radiation (e.g., welding arcs, damaged metal halide lamps; non-destructive inspections lamps) in excess of the Threshold Limit Value specified in the most current American Conference of Governmental Industrial Hygienist Threshold Limit Values and Biological Exposure Indices booklet. BE will assist shop supervisors and personnel in identifying areas and conducting surveys where hazards may exist.

3.3.1.1. Workers required to perform duties outdoors for extended periods in the sun are urged to keep skin covered (e.g., long sleeved shirts, hats, etc., consistent with duties and safety requirements) and use sun block on exposed skin.

3.3.2. Incidents in which personnel suspect they have been occupationally exposed to UV radiation or complain of persistent visual disturbances after working with UV must report the incident to the RSO (building 109, DSN 362-5596) and seek immediate medical assistance. Exposure incidents that occur during non duty hours will be reported to the 319 ABW Command Post, ext. 6711. The Command Post will notify 319 MDOS/SGOJ. Individuals will report to the GFAFB Clinic for medical assistance (Except occupationally related sunburns will be not reported to the RSO).

3.3.2.1. Any applicable unit safety incident reporting procedures will also be followed.

3.3.3. Coordinate modification and construction plans for facilities intended for use with UV radiation operations with the RSO.

3.4. Non-Air Force organizations, including contractors/subcontractors, who desire to bring a non-ionizing radiation source/device onto a GFAFB must follow the procedures in Attachment 3.

4. Ionizing Radiation:

4.1. Ionizing radiation exposures must be maintained below limits published in 10 CFR 20, AFMAN 48-125, and AFI 48-148, and they will also be kept ALARA. BE will assist shop supervisors and personnel in identifying areas and conducting surveys where ionizing radiation hazards may exist.

4.1.1. Local TLD investigation action levels are shown in Attachment 2 (if applicable). The RSO established these on the basis of dose histories in these workplaces.

4.2. Personnel involved in radiological operations on GFAFB must use all reasonable means available (i.e., time, distance, and shielding) to minimize potential radiation exposure from all ionizing radiation sources (e.g. RAM, GLD, X-rays).

4.2.1. BE manages the TLD Program for civil service and USAF personnel at GFAFB IAW AFMAN 48-125. Personnel enrolled in the TLD Program will receive TLD training from BE prior to performing radiation duties.

4.2.2. Upon initial assignment, personnel assigned to shops enrolled in the TLD Program must contact BE, building 109, for enrollment in the program and issue of a TLD prior to beginning duties. Contractors are responsible for their own monitoring program. Air Force personnel are not authorized to wear contractors' monitoring devices unless a suitable Air Force monitoring device accompanies the devices.

4.2.3. Personnel will wear and store their TLDs IAW guidelines provided by BE and AFMAN 48-125. Misuse or mishandling of TLDs (medical-legal documentation), intentional or otherwise, will be investigated.

4.3. All personnel working with RAM (both permitted and exempt GLD) must adhere to safe and healthful work practices whenever handling RAM. Obtain additional guidance on safe practices and contamination control from the GFAFB RSO (Reference: AFI 40-201 and AFI 48-148).

4.4. Any incident in which personnel are potentially exposed to ionizing radiation in excess of exposure limits must be immediately reported to the RSO, 319 MDOS/SGOJ, building

109, DSN 362-5596. Exposure incidents that occur during non duty hours will be reported to the 319 ABW Command Post, ext 6711. The Command Post will notify 319 MDOS/SGOJ.

4.4.1. Supervisors must account for all affected personnel and be assembled in an area away from the hazard area. Do not allow personnel to leave the area until cleared by the GFAFB RSO or designated representative. *Note: Record events leading to exposures, including circumstances, operating parameters, amount and type of isotopes if applicable, names of personnel exposed, where the incident occurred, and an estimate of the extent of contamination (if RAM or GLD is dispersed).*

4.4.2. Within 5 working days from the date of the incident, the RSO must receive a complete written report from the user. The report must contain a detailed description of the incident, a chronological description of how the incident was handled, and preventive measures taken to ensure the incident will not be repeated. Other reporting instructions are detailed in AFI 40-201 and AFI 48-148. The RSO will communicate with HQ AMC/SGO and the USAF RIC as necessary. *Note: The USAF RIC makes all required notices to the Nuclear Regulatory Commission).*

4.4.3. Any applicable unit safety incident reporting procedures will also be followed.

4.4.4. New or modified uses of RAM or ionizing radiation-producing devices must be reported to and approved by the RSO.

4.5. Modifications and construction plans for facilities intended for use with operations involving ionizing radiation or RAM must be coordinated with the RSO.

4.6. RAM.

4.6.1. Permitted RAM will be handled IAW AFI 40-201.

4.6.2. GLDs will be handled IAW 10 CRF 31.5 and USAF RIC guidance.

4.6.3. The UDO must ensure all generally licensed devices are leak tested and inventoried IAW 10 CFR 31.5 or manufacturer's specifications, whichever is stricter.

4.6.4. The PRSO must ensure all permitted RAM is leak tested and inventoried IAW the permit conditions.

4.6.4.1. The unit or organization permittee shall retain custodianship, control, receipt, storage, and issue of NRC licensed RAM covered by an AF-held license.

5. RAM Permits:

5.1. Organizations acquiring/using RAM and/or radiation-producing devices through any contracting mechanism (e.g., US Army Corps of Engineers, SABER, GSU, Ops/Maint, contracts etc.) must:

5.2. Comply with AFI 40-201 requirements for non-Air Force use of RAM and radiation-producing devices.

5.2.1. Non-Air Force organizations must send written requests to the RSO at least 30 calendar days prior to use. At GSUs, contractors will submit this information to the RSOL, who will pass it to the RSO. The request must include the information listed in Attachment 3.

5.2.2. For contractors, these requirements must be included in the statement of work.

5.2.2.1. Contractors will not bring RAM onto GFAFB without the written consent of the RSO.

5.3. USAF RAM Permits.

5.3.1. The RSO will determine if a permit or license is needed before anyone can possess or use RAM on GFAFB property.

5.3.2. The requestor must submit applications for permits through the RSO. The requestor will prepare the application in accordance with AFI 40-201, paragraph 3.3.2.

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

5.3.4. Organizations with permits no longer requiring the use of RAM should transfer, terminate, or dispose of the material. Transfer, termination, or disposal guidelines are outlined in AFI 40-201, paragraphs 3.7, 3.15 and 3.14 respectively. Contact the PRSO and RSO for assistance with transfer, termination, or disposal.

6. RAM Receipt or Shipment:

6.1. Shipping and receiving RAM (including GLDs) must be done in accordance with 10 CFR 71 and 49 CFR 100 through 199, and AFD 24-2.

6.2. Shipping and receiving procedures are summarized in Attachment 4.

6.3. The RSO will provide instructions and assistance as needed. At GSUs, this information will flow through the RSOL.

7. RAM Storage:

7.1. Keep all RAM in a RAM storage area or a locked enclosure separate from other items to insure personnel not familiar with RAM are not accidentally exposed to ionizing radiation. Proper storage techniques and labeling requirements are outlined in AFI 40-201 and 10 CFR Part 20.

7.2. A storage area from which RAM has been permanently removed must be surveyed by qualified individual approved by the RSO. Written clearance must be received before the area may be used for other purposes.

8. RAM Movement on GFAFB:

8.1. Personnel must account for the location of RAM and prevent the movement of RAM to unauthorized persons, or locations, without adequate handling or storage facilities. Notify the RSO if you plan to move RAM.

8.1.1. Transport RAM off installation only in adequately shielded and authorized containers per Department of Transportation (DOT) regulations (49 CFR171-199) and as authorized by the permit.

8.1.2. Vehicles will require the appropriate DOT placards.

8.1.3. All users must have proper survey instruments when transporting RAM. Ask BE for assistance.

9. RAM Disposition:

9.1. Disposition of licensed/permitted RAM must be coordinated through the RSO and may only be carried out by transfer to another licensed agency or to a licensed disposal contractor IAW 40-201.

9.2. Disposal of RAM is the responsibility of the using organization. Disposal procedures for Air Force owned RAM are specified in AFI 40-201.

TIMOTHY E. BUSH, Colonel, USAF
Commander, 319th Air Base Wing

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

10 CFR Part 20, *Standards for Protection Against Radiation*,
10 CFR Part 31.5, *NRC General License Requirements*
29 CFR 1910.1096, *Ionizing Radiation*
49 CFR Parts 171 through 199, *Transportation Requirements*
AFI 40-201, *Managing Radioactive Materials in the USAF*, 16 March 2011
AFMAN 48-125, *Personnel Ionizing Radiation Dosimetry*, 4 October 2011
AFI 48-148, *Ionizing Radiation Protection*, 21 September 2011
AFI 84-103_ANGSUP1, *Museum System*, 12 October 2000
AFI 91-204, *Safety Investigations and Reports*, 24 September 2008
AFOSH Standard 48-9, *Electro-Magnetic Frequency (EMF) Radiation Occupational Health Program*, 14 December 2011
AFI 48-139, *Laser and Optical Radiation Protection Program*, 25 July 2012
AFM 32-4004, *Emergency Response Operations*, 1 December 1995
AFPD 24-2, *Preparation and Movement of US Air Force Material*, 27 April 2011

Prescribed and Adopted Forms

Prescribed Forms: There are no forms prescribed by this publication.

Adopted Forms: AF Form 847, *Recommendation for Change of Publication*.

Abbreviations and Acronyms

BE—Bioenvironmental Engineering

EMF—Electro-Magnetic Frequency

RIC—Radioisotope Committee

RSOL—Radiation Safety Officer Liaison

Terms

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

Generally Licensed Devices (GLD)—A generally licensed item, as defined and listed in 10 CFR 31.5, is a device that contains RAM and is used for detecting, measuring, or controlling moisture, density, chemical composition, and level, and for producing light or producing an ionized atmosphere. Examples of these devices include IBIS (Inflight Blade Inspection System) indicators, ice detectors, self-luminous exit signs, gas chromatographs, compasses (with tritium

dials), certain fill-level gauges, certain density gauges, certain fixed and portable gauges, certain chemical agent monitors, counterweights, and certain lenses. There are other categories of generally licensed devices defined in 10 CFR 31.3, 31.7, 31.8, 31.10, 10 CFR 40.13, and 10 CFR 40.22.

Unit Device Officer (UDO)—Organization focal point for generally licensed devices and radiation-producing devices appointed in writing by the unit commander. Must meet requirements specified in AFI 48-148 and 10 CFR 31

Radiation Safety Officer—Individual appointed in writing by the 319 ABW Commander responsible for the installation radiation safety program. Must meet requirements specified in AFI 40-201.

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

LASER—Acronym of Light Amplification by Stimulated Emission of Radiation. Lasers, broadly speaking, are devices that generate or amplify light, just as transistors generate and amplify electronic signals at audio, radio, or microwave frequencies.

LASER Safety Officer or Unit LASER Safety Officer (ULSO)—Organization focal point for laser safety and appointed in writing by the unit commander. Must meet requirements specified in AFOSH Standard 48-139.

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

Radioactive Materials (RAM)—Unstable elements, the decay of which produces ionizing radiation.

RAM Permit—A permit issued by the USAF Radioisotope Committee (HQ AFMOA/SGOR, Bolling AFB DC) IAW AFI 40-201 regulating the possession, use, maintenance, and disposal of a non exempted instrument or items containing RAM (for AF agencies). For non-AF agencies, a permit issued by the Nuclear Regulatory Commission or an agreement state.

Radiation—Producing Devices—Includes ionizing and non-ionizing radiation devices exempt from permits or other regulations under 40-201. Examples are electro-magnetic frequency emitters/antennas and X-ray machines.

Thermoluminescent Dosimeter (TLD)—Badge issued by BE (319 MDOS/SGOJ) to monitor personal exposure to ionizing radiation in certain jobs identified as having an exposure risk by the GFAFB Radiation Safety Officer.

Attachment 2**ABNORMAL EXPOSURE CRITERIA**

The RSO investigates levels above the Investigation Action Levels (IALs). IALs are established by the IRSO and are normally tailored to each section's historical dosimetry data in order to promptly identify and correct adverse trends. All IALs for Grand Forks AFB are set at the following levels:

Investigation Action

Workplace	Levels (IAL)
Declared pregnant females	25 mRem
Occupational workers	50 mRem

Attachment 3

NON-AIR FORCE USE OF RADIATION SOURCES APPLICATION REQUIREMENTS

A3.1. Use of RAM:

A3.1.1. Air Force Instruction 40-201, *Managing Radioactive Materials in the US Air Force*, sets USAF policy for using radioactive materials (RAM). It applies to all civilians, civilian contractors, Department of Defense, Department of Energy (DOE), and DOE prime contractor personnel bringing RAM onto Air Force installations.

A3.1.2. Non-Air Force organizations that bring RAM onto USAF installations, or conduct operations involving RAM on USAF installations, must obtain the approval in writing of the installation commander or his designee. To obtain this approval, an application must be forwarded to the 319 ABW Radiation Safety Officer (RSO), 319 MDOS/SGOJ, building 109, DSN 362-5596, with a courtesy copy to the contracting officer at least 30 calendar days before the planned date for commencement of activities on the installation. Contractors operating at GFAFB, 69 RG and Cavalier Air Station will forward the following requirements to the RSO via the site RSO liaison (RSOL):

A3.1.2.1. A description of the proposed activities on NRC Form 241

A3.1.2.2. The procedures established to ensure radiological health and safety of Air Force personnel and the public while on Air Force installations; the name, local address, and telephone number for the responsible local representative; and the name, address, and telephone number of the RSO named on their license.

A3.1.2.3. A current copy of the applicable NRC, or Agreement State License. Expired licenses are unacceptable. To be valid at the installation, the license must either specifically state the installation by name on the license, or state approval for work at temporary job sites anywhere in the United States where the NRC or Agreement State maintains jurisdiction. DOE or DOE prime contractors must provide, in lieu of a license, written certification of their exemption from NRC licensing requirements and cite the applicable exemption of 10 CFR.

A3.1.2.4. The part of the Air Force contract describing work to be done at the installation and the inclusive dates of such work.

A3.1.2.5. An acknowledgement that the RSOL or RSO can make periodic checks to ensure the contractor is following applicable radiological health and safety practices, which prevent unnecessary exposures to Air Force personnel and prevent potential contamination of government property. The RSOL or RSO must identify deficiencies to the contracting officer for corrective actions. In addition, the RSOL and RSO, in coordination with the Chief of the Contracting Office, have authority to suspend contractor operations believed to be unsafe.

A3.1.2.6. Copies of the most recent leak test results (not over 180 days old) for sealed sources.

A3.1.2.7. Copies of training certificates for authorized users.

A3.2. Contractors will adhere to 10 CFR and 49 CFR sections pertaining to transportation of RAM.

A3.3. Contractors must notify the GSU RSOL or RSO when RAM arrives on installation, and when the RAM is removed from the installation.

A3.4. Use of LASERs:

A3.4.1. Non-Air Force organizations required to use LASER Classes 3 or 4, on GFAFB property must submit a written request for approval at least 30 calendar days before commencement of activities, which require the use of a laser.

A3.4.2. Contractors must submit their request to 319 MDOS/SGOJ, building 109, DSN 362-5596, with a courtesy copy to the contracting officer, and will include:

A3.4.2.1. Description/Characteristics:

A3.4.2.1.1. Manufacturer

A3.4.2.1.2. Model

A3.4.2.1.3. Number of same units

A3.4.2.1.4. Serial numbers

A3.4.2.1.5. LASER medium

A3.4.2.1.6. Mode of operation (i.e. continuous wave (CW), single pulse, multiple pulse)

A3.4.2.1.7. Maximum exposure time (train length)

A3.4.2.1.8. Time (sec) & wavelength

A3.4.2.1.9. Energy/pulse (J) or CW power (W)

A3.4.2.1.10. Pulse repetition frequency

A3.4.2.1.11. Pulse width

A3.4.2.1.12. Beam diameter (at 1/e point)

A3.4.2.1.13. Beam divergence (at 1/e point)

A3.4.2.2. The part of the Air Force contract describing work to be done at the installation and the inclusive dates of such work. Additional information required to be included: where the LASER will be used (location, indoors, outdoors, enclosures, etc.), and the safety features of the device.

A3.4.2.3. An acknowledgement that the RSO can make initial and periodic checks to ensure the contractor is following applicable radiological health and safety practices, which prevent unnecessary exposures to Air Force personnel.

A3.5. Use of Electro-Magnetic Frequency (EMF) Radiation:

A3.5.1. Non-Air Force organizations required to use equipment generating EMF in excess of 7 watts peak power and a frequency of 100 MHz or greater on GFAFB property must submit a written request for approval at least 30 calendar days before commencement of activities, which require the use of the EMF generating device.

A3.5.2. Contractors must submit their requests to 319 MDOS/SGOJ, building 109, DSN 362-5596, via the site RSOL, if applicable, with a courtesy copy to the contracting officer; and will include:

A3.5.2.1. Description/Characteristics:

A3.5.2.1.1. Description

A3.5.2.1.2. Nomenclature

A3.5.2.1.3. Location of emitters

A3.5.2.1.4. Quantity

A3.5.2.1.5. Frequency (MHz)

A3.5.2.1.6. Pulse width (microsecond.)

A3.5.2.1.7. Pulse repetition freq. (pps)

A3.5.2.1.8. Peak power (kW)

A3.5.2.1.9. Antenna size (feet--horizontal/vertical)

A3.5.2.1.10. Antenna band width (degrees--horizontal/vertical)

A3.5.2.1.11. Antenna gain (dB)

A3.5.2.1.12. Scan rate (rpm)

A3.5.2.2. The part of the Air Force contract describing work to be done at the installation and the inclusive dates of such work. Additional information required to be included where the EMF generating device will be used (location, indoors, outdoors, enclosures, etc.), and the safety features of the device.

A3.5.2.3. An acknowledgement that the site RSOL and RSO can make initial and periodic checks to ensure the contractor is following applicable radiological health and safety practices, which prevent unnecessary exposures to Air Force personnel.

A3.6. Use of Ionizing Radiation Generating Devices:

A3.6.1. Non-Air Force organizations required to use ionizing radiation-producing devices (for RAM, see Section 1) on GFAFB must submit a written request for approval at least 30 calendar days before commencement of activities, which require the use of ionizing radiation-producing devices.

A3.6.2. Contractors must submit their request to 319 MDOS/SGOJ, building 109, DSN 362-5596, with a courtesy copy to the contracting officer; and will include:

A3.6.2.1. Description/Characteristics:

A3.6.2.1.1. X-ray unit manufacturer

A3.6.2.1.2. Model number

A3.6.2.1.3. Serial number

A3.6.2.1.4. Maximum kVp, mA, Sec

A3.6.2.1.5. Ionizing radiation source/emitter (electron tube)

A3.6.2.2. The part of the Air Force contract describing work to be done at the installation and the inclusive dates of such work. Additional information required to be included: where the ionizing radiation-producing device will be used (location, indoors, outdoors, enclosures, etc.), and the safety features of the device.

A3.6.2.3. An acknowledgement that the site RSOL and RSO can make initial and periodic checks to ensure the contractor is following applicable radiological health and safety practices, which prevent unnecessary exposures to Air Force personnel.

A3.7. Use of Ultraviolet (UV) Radiation-Producing Devices:

A3.7.1. Non-Air Force organizations required to use UV generating devices, including welders, on GFAFB must submit a written request for approval at least 30 calendar days before commencement of activities, which require the use of UV generating devices.

A3.7.2. Contractors must submit their request to 319 MDOS/SGOJ, building 109, DSN 362-5596, with a courtesy copy to the contracting officer; and will include:

A3.7.2.1. Description/Characteristics:

A3.7.2.1.1. Description

A3.7.2.1.2. Nomenclature

A3.7.2.1.3. Location of devices

A3.7.2.1.4. Quantity

A3.7.2.1.5. Wavelength

A3.7.2.1.6. Effective Irradiance

A3.7.2.2. The part of the Air Force contract describing work to be done at the installation and the inclusive dates of such work. Additional information required to be included: where the UV generating device will be used (location, indoors, outdoors, enclosures, etc.), and the safety features of the device.

A3.7.2.3. An acknowledgement that the site RSOL and RSO can make initial and periodic checks to ensure the contractor is following applicable radiological health and safety practices, which prevent unnecessary exposures to Air Force personnel.

Attachment 4

BASIC RAM SHIPPING PROCEDURES

A4.1. Each receiving or shipping agency must have a separate, marked, and locked enclosure for the receipt, handling, or shipment of radioactive packages. This separate area is to ensure personnel not familiar with the proper handling or RAM are not accidentally exposed to ionizing radiation. This location must be coordinated with 319 MDOS/SGOJ, building 109, DSN 362-5596.

A4.2. All RAM that are covered by a license or permit must be accounted for by a RAM transfer receipt, which is separate from any contractual, security, or other receipt documents. **Contract shipping and receiving agencies should obtain transfer receipts when items are dispensed to the GFAFB organizations.**

A4.3. When RAM is received at, or is to be shipped from GFAFB, the RSO must be contacted by the receiving or shipping agency. The RSO or designated representative will monitor the container. **NOTE:** In accordance with 10 CFR 20.1906, all packages labeled with a Radioactive White I, Yellow II, or Yellow III, as specified DOT regulations (49 CFR 172.403 and 172.436-440), must be monitored as soon as possible but not later than 3 hours after the package is received. If the package is received after normal duty hours, the package must be surveyed not later than 3 hours from the beginning of the next workday.

A4.3.1. If the RAM received is a sealed source, the most recent leak test results must accompany the package, and a copy of these results must be sent to the RSO. If this test does not accompany the sealed source, an individual approved by the RSO performs the leak test before the item is placed into use. Current leak test results must accompany sealed sources shipped from GFAFB.

A4.3.2. Once the package has been monitored and cleared by an individual approved by the RSO, contact the user or custodian and transport the material directly to the user or custodian. If the user or custodian cannot be located, store the RAM until the user or custodian accepts receipt. **Note:** Only authorized personnel will open or package containers of RAM or items.

A4.4. If the RAM is to be transported from GFAFB, prepare for shipment and packaging per applicable NRC and Department of Transportation regulations. Contact the RSO for assistance and shipping surveys.