

FORT HOOD REGULATION 385-24

SAFETY
Ionizing and Non-Ionizing Radiation
Protection Program

Department of the Army
Headquarters, III Corps & Fort Hood
Fort Hood TX 76544
14 FEBRUARY 2017

Unclassified

SUMMARY OF CHANGE

Fort Hood Regulation 385-24
Ionizing and Non-ionizing Radiation Protection Program

14 February 2017

- Revision to bring this regulation in compliance with DA PAM 385-24.
- Replaces Fort Hood Regulation 385-24 dated 23 March 2013.
- Changes the Directorate of Logistics to the Logistics Readiness Center.
- Adds Light Amplification by Stimulated Emission of Radiation Safety Officer and Radiofrequency Safety Officer.
- Clarifies procedures in Chapter 4, section 4-2, Radioactive Material and Equipment.
- Clarifies the threshold level requiring a Laser Safety Officer in Appendix D.

Safety
Ionizing and Non-ionizing Radiation Protection Program

History. This revision is a major revision.

Summary. This regulation sets policy and procedure for the use, control, handling, storage, disposal of ionizing and non-ionizing radiation sources. Replaces previous Fort Hood Regulation 385-24.

Applicability. This regulation applies to commands, contractors, tenant units, and activities assigned, attached, training at Fort Hood. This also applies to non-medical material and equipment producing ionizing and non-ionizing radiation. The Commander, Fort Hood Medical Center (MEDCEN) administers radiation protection services

for tenant medical and dental activities.

Supplementation. Local supplementation of this regulation is prohibited unless specifically approved by the Installation Safety Office.

Suggested improvements. The proponent of this regulation is the Office of the Garrison Commander, Installation Safety Office. Send comments and suggested improvements to Commander, USAG, ATTN: IMHD-SO, Fort Hood, Texas 76544-5002.

FOR THE COMMANDER:

JOHN W. REYNOLDS
COL, GS

Official



CHARLES E. GREEN, SR.
Director, Human Resources

DISTRIBUTION:
IAW FH FORM 1853, S

*Supersedes FHR 385-24 dated 26 March 2013

Contents

Chapter 1 • Introduction, page 1

General, 1-1, page 1

Purpose, 1-2, page 1

References, 1-3, page 1

Explanation of abbreviations and terms, 1-4, page 1

Chapter 2 • Policy, page 1

Overview, 2-1 page 1

Personnel Safety, 2-2, page 1

Garrison Radiation Safety Committee, 2-3, page 1

Personal Protective Equipment (PPE), 2-4, page 2

Chapter 3 • Responsibilities, page 2

Garrison Commander, 3-1, page 2
Garrison Radiation Safety Officer (GRSO), 3-2, page 2
Commander, Medical Center (MEDCEN), 3-3, page 2
Commanders or Directors, 3-4, page 2
Unit Radiation Safety Officer (URSO), 3-5, page 3
Unit LASER Safety Officer (LSO) and Radiofrequency Safety Officer (RFSO), 3-6, page 3
III Corps Radiation Safety Officer (Corps RSO), 3-7, page 3
Logistics Readiness Center (LRC), 3-8, page 4
LRC Radiation Maintenance Operations, 3-9, page 4
Directorate of Public Works (DPW), 3-10, page 4
Directorate of Emergency Services (DES), 3-11, page 4
Corps of Engineers (COE), 3-12, page 5
Mission and Installation Contracting Command (MICC), 3-13, page 5
Defense Logistics Agency - Disposition Services (DLA- DS), 3-14, page 5

Chapter 4 • Procedures, page 5

Dosimetry Records, 4-1, page 5
Radioactive Material and Equipment, 4-2, page 5
Army Radiation Permits, 4-3, page 6
Contact Information, 4-4, page 6

List of Appendices

A. References, page 7
B. Standards of Radiation Protection, page 9
C. Radiation Safety Briefings to Workers, page 11
D. Non-Ionizing Radiation, page 12
E. Transportation of Radioactive Materials, page 16
F. Accident and Incident Response Actions, page 17

Tables List

Table 1 Telephone Numbers, page 6
Table 2 Laser Classifications and Risk Assessment, page 13
Table 3 Types of RF Radiation Sources, page 15

Glossary page 19

Chapter 1 Introduction

1-1 General

Fort Hood is a large Active Army installation with a myriad of equipment and activities that use ionizing and non-ionizing radiation sources. These sources are required by law and regulation to be accounted for, as well as being maintained and stored properly. The improper handling of these sources can affect property, equipment, and personnel. Cleanup and disposal is a costly endeavor for all parties involved.

1-2 Purpose

This regulation provides policy, responsibilities, procedures, and necessary information. To use, control, handling, storage, and disposal of ionizing and non-ionizing radiation producing devices.

1-3. References

Appendix A outlines required and related forms and publications referenced in this regulation.

1-4 Explanation of abbreviations and terms

The glossary explains abbreviations and terms used in this regulation.

Chapter 2 Policy

2-1 Overview

Installation policy is to conform to requirements and procedures outlined in Army Regulation (AR) 385-10, The Army Safety Program; Installation Management Command (IMCOM) regulation 385-10, Safety Program; Department of the Army (DA) Pamphlet (PAM) 385-24, the Army Radiation Safety Program; for proper use, control, storage, handling, and disposal requirements.

2-2. Personnel Safety

All personnel involved in radiation work, including storage, shipment, or disposal of radioactive items will follow the As Low As is Reasonably Achievable (ALARA) philosophy. Reducing operational exposure levels to an absolute minimum.

Appendix B outlines radiation safety standards.

2-3. Garrison Radiation Safety Committee

The garrison Radiation Safety Committee (RSC), will be established, when necessary, with its purpose and membership as defined in DA PAM 385-24 para 1-8. Its focus is to gather and disseminate information about the status of the garrison Radiation Safety Program.

2-4. Personnel Protective Equipment (PPE)

Personnel will wear Personal Protective Equipment (PPE) required by an applicable regulation, activity Standing Operating Procedure (SOP), or equipment Technical Manual (TM). Optically Stimulated Luminescence Dosimeters (OSLDs) will be worn when working in radiation areas, with sources or devices that require their use or is specifically required by DA or the Nuclear Regulatory Commission (NRC).

Chapter 3 Responsibility

3-1. Garrison Commander

The Garrison Commander will –

- a. Designate in writing a trained Garrison Radiation Safety Officer (RSO) and alternate RSO.
- b. Establish an RSC in accordance with DA PAM 385-24.
- c. Issues Army radiation permits.
- d. Complies with other requirements of DA PAM 385-24 para 1-4 *n*.

3-2. Garrison Radiation Safety Officer (GRSO)

The GRSO will -

- a. Performs the duties outlined in DA PAM 385-24 para 10-4 *s*. and *t*.
- b. Establishes dosimetry services for personnel identified in DA PAM 385-24 or DA PAM 385-25, Personnel Dosimetry Guidance and Dose Recording Procedures for Personnel Occupationally Exposed to Ionizing Radiation; assigned to the Installation Safety Office.
- c. Operate the garrison Low Level Radiation Waste (LLRW) Holding Facility and ensure proper disposal of radioactive waste and contaminated radioactive items for Fort Hood garrison activities.
- d. Support the determination of possible radioactive items upon request from the Fort Hood Defense Logistics Agency- Disposition Services (DLA-DS).
- e. Provide RSO support to Fort Hood museums.

3-3. Commander, Medical Center (MEDCEN)

The Commander, MEDCEN will-

- a. Provide medical surveillance and evaluations for the installation according to paragraph 5-11, DA Pam 40-11, Preventive Medicine.
- b. Perform bioassays as needed.

3-4. Commanders or Directors

Each Commander or Director will -

- a. Designates, in writing, an RSO when the criteria in DA PAM 385-24 para 1-4 *m*. has been met.
- b. Ensures the RSO, LASER Safety Officer (LSO), Radio Frequency Safety Officer (RFSO) designee, as applicable, is trained to a level commensurate with the Radiation Safety Program scope and responsibilities.

c. Reports radiation accidents/incidents when required by DA PAM 385-40, Army Accident Investigation and Reporting or 10 Code of Federal Regulation (CFR) 19, Notices, instructions and reports to workers: inspection and investigation; to the chain of command, the appropriate

NRC license holder, and the garrison RSO.

d. Ensures that all personnel occupationally exposed to radiation sources receive appropriate training commensurate with potential work place hazards.

e. Oversees the integration of DA PAM 385-30, Risk Management into the unit Radiation Safety Program.

f. Ensure that contracts, generated by the activity, which have a potential ionizing radiation source have contractual language requiring and detailing the procedure for the submission of a request for an Army Radiation Permit (ARP).

3-5. Unit Radiation Safety Officer (USO)

Each unit RSO will -

a. Performs the RSO requirements for their unit or directorate.

b. Maintains an inventory of radiation sources and furnishes a copy to the garrison RSO annually or as inventory changes.

c. Conducts transportation surveys and ensures that radioactive commodity shipments are certified by a qualified Hazardous Material (HAZMAT) shipping official when required.

d. Provides shipping information, to include appropriate exposure rate and contamination levels to the transportation officer or HAZMAT officer prior to shipment.

e. Ensures the shipping guidance for the commodity is in accordance with applicable TM or Technical Bulletin (TB).

f. Executes other requirements as defined within DA PAM 385-24 para 1-4 *t* and *u*.

3-6. Unit LASER Safety Officer (LSO) and Radiofrequency Safety Officer (RFSO)

Each unit LSO and/or RFSO will -

a. Perform the LSO or RFSO requirements for their unit or directorate.

b. Maintain an inventory of non-ionizing radiation sources and furnishes a copy to the garrison RSO annually or as inventory changes.

c. Executes other requirements as defined within DA PAM 385-24 para 1-4 *t* and *u*.

3-7. III Corps Radiation Safety Officer (Corps RSO)

The Corps RSO will -

a. Performs the RSO requirements for III Corps.

b. Conducts transportation surveys and ensures that radioactive commodity shipments are certified by a qualified HAZMAT shipping official when required.

c. Provides shipping information, to include appropriate exposure rate and contamination levels to the transportation officer or HAZMAT officer prior to shipment.

d. Ensures the shipping guidance for the commodity is in accordance the applicable TM or TB.

e. LLRW received from unit RSO(s) will be securely and properly stored by the III Corps RSO until coordination with the Fort Hood Garrison RSO (LLRW Operator) for disposal can be made.

- f. Provides next higher RSO support to unit/mission RSOs assigned to Fort Hood
- g. Executes other requirements as defined within DA PAM 385-24 para 1-4 *t* and *u*.

3-8. Logistics Readiness Center (LRC)

The LRC will-

- a. Inform the garrison RSO of receipt and shipment of containers that display radioactive warning labels or symbols that are physically damaged when received.
- b. Ensure proper processing of shipping documents according to 49 CFR, Department of Transportation; for all radioactive shipments from Fort Hood.
- c. Ensure trained certified Hazardous Material Class 7 shipping personnel are on staff; retraining/certification required every two years.
- d. Ensure employees preparing packages for shipment must be properly trained in hazardous materials packaging and shipping procedures.
- e. Properly post the temporary shipping, receiving and secure storage areas containing radioactive materials with radiation caution; ensure personnel working in these areas are enrolled in a dosimetry program, if applicable.

3-9. LRC Radiation Maintenance Operations

The LRC Radiation Maintenance Operations will-

- a. Have their unit RSO perform required wipe tests and maintain test results for the repair shops and storage areas.
- b. Ensure only trained authorized personnel work on components containing radioactive materials.
- c. Establish and maintain a written SOP for Radiation Maintenance Operations and ensure emergency actions are incorporated in the Emergency Response Plan.
- d. Comply with emergency actions (as outlined in Appendix F) upon suspected incident and notify the garrison RSO immediately.

3-10. Directorate of Public Works (DPW)

The Director, DPW will-

- a. Ensure that radiation sources to be procured for use by the DPW will be coordinated with the garrison RSO for approval, prior to purchase and an inventory maintained.
- b. Ensure that DPW generated contracts which have a potential ionizing radiation source have contractual language requiring and detailing the procedure for the submission of a request for an Army Radiation Permit (ARP).

3-11. Directorate of Emergency Services (DES)

The Director, DES will-

- a. Ensure that the garrison RSO is notified when responding to incident locations that involve radiation sources.
- b. Provide an inventory of reportable radiation sources in their possession and use.

3-12. Corps of Engineers (COE)

The COE will-

- a. Ensure that contractors follow the procedure for the submission of a request for an Army Radiation Permit (ARP).
- b. Ensure that the garrison RSO is notified when the contractor physically brings the ionizing radiation source on the installation.

3-13. Mission and Installation Contracting Command (MICC)

The local MICC office will-

- a. Ensure that all contracts and solicitations which have a potential ionizing radiation source have contractual language requiring and detailing the procedure for the submission of a request for an ARP.
- b. Ensure that the Contracting Officer Representatives are knowledgeable of the requirements involving an ARP.
- c. Ensure that the garrison RSO is notified when the source is brought on the installation.

3-14. Defense Logistics Agency - Disposition Services (DLA-DS)

The Defense Logistics Agency – Disposition Services (DLA-DS) will-

- a. Screen items relating to the Army Master Data File (AMDF) for radioactive components.
- b. Return components being submitted for disposal to the submitting unit for proper item processing and inform the garrison RSO.
- c. Host a walk-through survey of the DLA-DS storage yard, upon request of the garrison RSO.

Chapter 4. Procedures

4-1. Dosimetry Records

Per DA PAM 385-25, personnel who could possibly receive 10% of the maximum allowable dose 5 Roentgen Equivalent Man (REM) will be issued dosimetry.

- a. Dosimetry managers maintain exposure records and implement guidance on the dosimetry program policy according to this regulation, AR 40-5, Preventive Medicine and DA PAM 385-24. Monitor exposure of personnel assigned or attached to Fort Hood who is routinely or occasionally exposed to sources of ionizing radiation as a condition of their employment.
- b. The dosimetry manager will review quarterly dosimetry reports and annotate (sign and date) when the report was reviewed.
- c. Report exposure over the thresholds specified in DA PAM 385-24 to the garrison RSO for evaluation, investigation, and recommendation of further action.

4-2. Radioactive Material and Equipment

- a. The equipment item manager or the inventory control point will provide instructions

- for proper disposition. These items are usually have De-Militarization (DEMIL) code F.
- b. Unserviceable or non-repairable radioactive materials will be disposed of as Radioactive Waste (radwaste) unless the item must be returned to a depot or vendor.
 - c. Equipment will be properly accounted for in accordance with AR 710-3.
 - d. Radwaste will be securely and properly stored by the unit RSO until coordination with the respective command RSO for disposal can be made.
 - e. Units may seek help in identifying radioactive items from TB 43-0116, Identification of Radioactive Items in the Army or from their next higher unit RSO.
 - f. DLA-DS will not accept radioactive items for turn-in and disposal. Units will have the materials returned to follow proper disposition instructions.
 - g. Damaged radioactive commodities will be separated by isotope; double plastic bagged, sealed with tape, marked with the National Stock Number (NSN), radioactive isotope and the quantity.
 - h. DLA-DS requires a DEMIL code F item be certified free of radioactive commodities prior to acceptance for disposal.

4-3. Army Radiation Permits

- a. Activities (for example, DPW, Directorate of Family, Morale, Welfare and Recreation (DFMWR), or Fort Worth District Corps of Engineers) responsible for non-Army personnel who plan to use radioactive sources on the installation, must notify the garrison RSO when the approved permitted sources are brought onto the installation.
- b. Non-Army applicants will apply by letter with supporting documentation to Head Quarters (HQ), United States (US) Army Garrison Fort Hood, ATTN: IMHD-SO (RSO), Rm C101, Building 1001 761st Tank Battalion Avenue, Fort Hood, TX 76544-5000 for processing at least 30 calendar days prior to the date the source is desired to be used on the installation.
- c. The Army radiation permit application will specify start and stop dates for the Army radiation permit and describe the purpose for the Army radiation permit.
- d. Supporting documentation for the applicant’s qualifications must be submitted with the application, otherwise the application will be returned for additional information and the processing delayed.
- e. This is a requirement of 32 CFR 655, Radiation Sources on Army Land.

4-4. Contact Information

Table 1 Telephone numbers

Activity	Telephone number
Garrison RSO	254-287-3343
III Corps RSO	254-288-6886
Installation Operations Center(IOC) for After Hours	254-287-2520/2054/4963

Appendix A References

Section I Required Publications

AR 40-5

Preventive Medicine, cited in paragraph 4-1, D-1

AR 385-10

The Army Safety Program cited in paragraph 2-1

AR 710-3

Inventory Management Asset and Transaction Reporting System, cited in paragraph 4-2

DA PAM 385-24

The Army Radiation Safety Program cited in paragraph 2-1,2-3, 3-1, 3-2, 3-4, 3-5, 3-6, 3-7, 4-1, D-1

DA PAM 385-25

Occupational Dosimetry and Dose Recording for Exposure to Ionizing Radiation, cited in paragraphs 3-2, 4-1

DA PAM 385-30

Risk Management, cited in paragraph 3-4.

DA PAM 385-40

Army Accident Investigation and Reporting cited in paragraph 3-4.

DTR 4500.9-R (Part II)

Defense Transportation Regulation (DTR) – Cargo Movement, cited in paragraph E-2

DODI 6055.11

Protecting personnel from Electromagnetic Fields, cited in D-1

IMCOM 385-10

Safety Program cited in paragraph 2-1

10 CFR 19

Notices, instructions and reports to workers: inspection and investigation cited in paragraphs 3-4, B-4.

10 CFR 71

Packaging and transportation of radioactive material, cited paragraph E-2

32 CFR 655

Radiation Sources on Army Land, cited paragraph 4-3

49 CFR

Transportation cited in paragraph 3-8, E-2.

Section II**Related Publications****DA PAM 40-11**

Preventive Medicine cited in paragraph 3-3

MIL-STD-129J

Military Markings for Shipping and Storage, cited in paragraph E-1

TB Med 521

Occupational and Environmental Health: Management and Control of Diagnostic, Therapeutic, and Medical Research X-Ray Systems and Facilities, cited in paragraph D-5

TB Med 524

Occupational and Environmental Health: Control of Hazards to Health from Laser Radiation. Cited in paragraphs D-1, D-4

TB Med 525

Control of Hazards to Health from Ionizing Radiation used by the Army Medical Department, cited in paragraph D-5

TB 43-0116

Identification of Radioactive Items in the Army, cited in paragraph 4-2

TB 43-0137

Transportation Information for US Army Radioactive Commodities, cited in paragraph E-2

Energy Reorganization Act of 1974

Section 206 Noncompliance Application of civil penalties to individuals for violations dealing with nuclear materials, cited in paragraph B-4

Section I Referenced forms**DD Form 836**

Dangerous goods shipping paper/declaration and emergency response information for hazardous materials transported by government vehicles, cited in paragraph E-1

APPENDIX B

Standards of Radiation Protection

B-1 Purpose

This appendix prescribes procedures for control and protection from ionizing radiation and non- ionizing radioactive sources and materials. Every effort will be made to maintain the radiation dose equivalent as far below the radiation protection standards as possible, and ALAR.

B-2 General

Commanders and activity managers are responsible for minimizing radiation exposure and controlling radioactive material including:

- a. The orientation and indoctrination of personnel subject to radiation hazards.
- b. Implementing applicable directives and SOPs.
- c. Provisions for dosimetry service and medical examination as required.

B-3 Controlled Area

A controlled area is an area in which the occupational exposure of personnel to radiation is under the supervision of an assigned unit RSO or an area that is solely used for maintenance on equipment containing radioactive materials.

B-4 Postings

Units and activities will post the following documents and signs in controlled areas:

- a. "Caution-Radioactive Material" sign (fabricated) or another appropriate sign.
- b. Copy of title 10 CFR 19, Parts 19-21.
- c. Section 206 of the Energy Reorganization Act.
- d. Copy of NRC license and all incorporated documents (when applicable).
- e. Copy of SOP.
- f. NRC Form 3.
- g. Any reports of violations.

B-5 Radioactive Material Areas

Radioactive material areas are those areas where radioactive materials are stored because of their radioactive component.

Each area and principal container in which radioactive material is stored or used will be conspicuously posted with a sign or label bearing the radiation symbol and the words "Caution Radioactive Material".

B-6 Supervisor Responsibility

Supervisor will-

- a. Ensure the appropriate warning signs and notices are posted.
- b. Ensure that all personnel who use radioactive commodities or radiation producing devices are adequately trained with annual and refresher training, receive adequate instruction; if required receive medical examinations prior to working in their assigned duties.
- c. Ensure that personnel exposure levels are kept ALARA
- d. Ensure that radioactive commodities are secured against unauthorized use
- e. Ensure that a written SOP is available, enforced, and reviewed by all personnel whose work requires protection from radiation hazards.
- f. Garrison, Corps, or Division RSO, as applicable, must review and concur with the SOP.
- g. Ensures that assigned OSLDs are worn and stored properly
- h. The garrison, Corps, or Division RSO as applicable approves the storage areas.
- i. Ensures that radiation program files are maintained according to Army Records Information Management System (ARIMS).
- j. Reports to the garrison RSO any accident, unusual incident, personal injury, suspected overexposure, and broken or damaged equipment containing radioactive materials.

B-7 Worker Responsibilities

Workers will-

- a. Read and follow SOPs, rules, regulations and special instructions.
- b. Maintain and use safety equipment properly.
- c. Wear assigned OSLDs properly and return them to approved storage area at end of work day.
- d. Report any accident, unusual incident, personal injury, suspected overexposure, or contamination as soon as possible to their supervisor.

Appendix C

Radiation Safety Briefings to Workers

C-1 Briefings

Individuals working in or frequenting any portion of an area where radiation, or radioactive materials are used or stored, must be informed of:

- a. Proper storage, transfer, or use of radioactive materials or radiation devices.
- b. Health protection problems associated with radiation, or radioactive materials.
- c. Precautions and procedures to minimize radiation exposure.
- d. Appropriate response to warning devices.
- e. The individual's right to request and receive radiation exposure reports and records.
- f. Fundamentals of radiation safety.
- g. The use of protective equipment and the operational steps must be demonstrated.
- h. Procedures to minimize contamination, and to secure sources of radiation from unauthorized use.
- i. Emergency procedures to follow in case of a radiation accident or incident.
- j. The individual's responsibility to report unsafe and/or illegal conditions which may lead to or cause a violation of NRC regulations, licenses, or individual injury or overexposure.

C-2 Extent of Instruction

The extent of instruction will commensurate with potential radiological health protection problems. Instruction is at least annually and documented by placing record of training in official files.

Appendix D Non-Ionizing Radiation

D-1 Purpose

To establish responsibility for the implementation of non-ionizing radiation hazards control. Non-ionizing radiation sources consist of:

- a. High intensity light sources.
- b. Ultraviolet or infrared.
- c. Ultrasound
- d. Radio Frequency (RF).
- e. Microwave Laser radiation.

Control of non-ionizing radiation hazards is according to ARs 40-5, DA Pam 385-24, DODI 6055.11, and TB Med 524.

Non-ionizing radiation generates thermal energy, which is absorbed by the body.

When heat dissipates, thermal effects on the body are reversed and effects are not cumulative as in ionizing radiation exposures.

Extreme exposure may produce cataracts, burns, or erythema.

D-2 Non- ionizing Radiation Safety Program

The garrison RSO is the local consulting authority for the non-ionizing radiation protection program and is the Installation LSO.

The III Corps RSO:

- a. Monitor units that are required to maintain a non-ionizing radiation program SOP. Provide support and direction to units on non-ionizing issues.
- b. Conduct required investigations on Radio Frequency Radiation (RFR)/laser incidents or accidents.
- c. Make required notification to higher headquarters.
- d. Coordinate with the garrison RSO.
- e. Coordinate with HQ, MEDCEN on:
 1. Any reported potential exposure to non-ionizing radiation.
 2. Ensure that immediate and follow-up medical examinations are provided.

D-3 Lasers

The word LASER comes from the words Light Amplification by the Stimulated Emission of Radiation (LASER). Lasers provide a light source which can be used to measure distance.

- a. Lasers are used in; medicine, biology, chemistry, electronics, wood working, military, construction and many other applications.
- b. Typical military uses are; target acquisition, fire control, training devices.
- c. These lasers are termed rangefinders, target designators, and direct fire simulators and should be: confined to ranges and/or designated non-live fire training areas.
- d. Used where no line-of-sight exists between lasers and uncontrolled, potentially occupied areas; by removing specular surfaces from targets and the area downrange.

D-4 Hazard Classification of Lasers

Three aspects of a laser application influence the total hazard evaluation and thereby influence the application of control measures:

- a. Laser device’s capability of injuring personnel.
- b. Environment in which the laser is used.
- c. Personnel who may be exposed.

Table 2 discusses categories, classification, hazard controls of lasers; Class 3B and 4 lasers require an inventory and LSO.

Warning labels and signs may be found in TB Medical (MED) 524, or contact the appropriate RSO for examples.

D-5 Commanders/Directors

Unit commanders and directors will-

- a. Publish, post, and enforce SOPs.
- b. Ensure persons working in or frequenting any portion of a controlled area know the radiation hazards involved and that they receive proper training.
- c. Maintain an inventory (updated annually) of all non-ionizing radiation producing equipment and provide a copy to the garrison RSO.
- d. Ensure controlled areas are properly marked, have proper warning signs, where required, to have proper warning signals, and safety switches (TB MED 521 and 525).
- e. Report all RF radiation and laser overexposures or incidents to the garrison RSO or Corps RSO immediately.

TABLE 2 Laser Classifications and Risk Assessment

Class¹	Energy	Hazards	Risk Assessment Matrix²
Class 1	Depends on wavelength. Example: AN/PAQ-4C, Infrared Aiming Light (830 nm) below 0.7 milliWatt (mW).	Incapable of producing damaging radiation.	Effect: Negligible (IV) Hazard Probability: Unlikely (E) Risk Assessment: LOW
Class 2 (visible lasers only)	Depends on wavelength. Example CW helium neon alignment lasers: Cannot exceed 1 mW.	Eye protection is normally afforded by the aversion response (0.25 seconds (s) for visible). Hazards comparable to projectors or the sun.	Effect: Moderate (III) Hazard Probability: Unlikely (E) Risk Assessment: LOW
Class 3 (3a (3R) and 3b)	Class 3a (Class 3R). Depending on wavelength: Between 1 and 5 times the Class 1 or Class 2 accessible emission limit (AEL) Example: Multiple Integrated Laser Engagement System (MILES) devices.	Direct and specular reflection viewing hazards. Diffuse reflection is usually not a hazard.	Effect: Moderate (III) Hazard Probability: Seldom (D)–Unlikely (E) Risk Assessment: LOW–MEDIUM

TABLE 2 Laser Classifications and Risk Assessment (continued)

	<p>Class 3b. CW and repetitively pulsed lasers: cannot exceed 0.5 Watts (W) for 0.25 s. Example: Airborne Infrared Multipurpose (AIM)-1/D, Infrared Aiming Light Pulsed lasers: Cannot exceed 0.030 Joule (C_A J/ pulse or 0.125 J within 0.25 s). Example: Army Navy/Ground Vehicular, Visible Light, Fire Control (AN/VVG)-3, M1 laser rangefinder.</p>	<p>Direct and specular reflection viewing hazards. Diffuse reflection is usually not a hazard.</p>	<p>Class 3b Effect: Critical (II)–Catastrophic (I) Hazard Probability: Frequent (A)–Unlikely (E) Risk Assessment: LOW–EXTREMELY HIGH</p>
Class 4	<p>Average power above 0.5 W Pulsed lasers: Exceeds 0.030 C_A J/pulse or 0.125 J within 0.25 s Example: Ground/Vehicular Laser Locator Designator (G/VLLD)</p>	<p>Direct and specular reflection viewing hazards. Diffuse reflection may present a hazard. May pose a fire hazard May generate plasma radiation.</p>	<p>Effect: Catastrophic (I) Hazard Probability: Frequent (A)–Unlikely (E) Risk Assessment: MEDIUM–EXTREMELY HIGH</p>
<p>Notes: ¹ ANSI Z136.1 ² DA PAM 385-30</p>			

Legend

- C_A – Wavelength correction factor
- CW – Continuous Wave
- m – milli
- s – seconds
- W – Watts
- mW – milliWatts

Table 3 Types of RF Radiation Sources

RFR Sources	Activities Operating RF Radiating Sources	RF Damage
Radar systems	Air defense sites.	Potential locations for RF burn are antennas, cables, connectors, all RF circuits, and microphones. An RF burn can occur when RF current enters through a small cross section of the body. Burns can occur at any RF frequency.
Radio Sets	Military Auxiliary Radio System (MARS) stations. Signal battalions	
Electronic Countermeasures Equipment (jammers).	Military intelligence units. Communications and electronics shops. Avionics activities.	
Satellite Communications (SATCOM) Systems	Signal battalions	
RF Diathermy Sets, MRIs	Physical therapy clinics in hospitals	

Legend

RF – Radio Frequency
RFR – Radio Frequency Radiation
MRI – Magnetic Resonance Imaging

Appendix E Transportation of Radioactive Materials

E-1 On-Post Transportation

It is usually inconvenient to package and transport radioactive materials for on-post movement in the same manner required for off-post shipments. When transporting radioactive materials on Fort Hood:

- a. Use only military vehicles.
- b. Secure radioactive materials in the vehicle to prevent movement.
- c. Arrange material so that the dose rate does not exceed 0.5 Millirem Per Hour (mrem/hr), (TB 43-0137), at any point on the external surface of the package.
- d. Use sturdy containers for transport.
- e. The radioactive material container must be marked as specified in MIL-STD-129J.
- f. MIL-STD-129J requires that each non-accompanied radioactive material container be marked with "CAUTION-RADIOACTIVE MATERIALS".

E-2 Off-Post Transportation

Transport radioactive materials according to applicable; Department of Transportation (DOT) regulations (49 CFR), DTR 4500.9-R (Part II), 10 CFR 71, TB 43-0137.

- a. Radioactive Material Movement Form will accompany the shipment.
- b. 49 CFR 172.403 and 49 CFR 173.444 provide labeling requirements for the transportation of radioactive materials or devices containing radioactive materials.
- c. Shipping containers will be constructed to meet DOT specification for shipment of radioactive materials (for example, strong, tight container, fiberboard box, seams sealed with tape).
- d. Garrison activities will get garrison RSO guidance and assistance for all off-post shipments of radioactive material.
- e. Units will get III Corps RSO guidance and assistance for all off-post shipments of radioactive material.
- f. The unit RSO will affix appropriate labels to shipping documents, monitor the surface radioactive activity of each package, and furnish Radioactive Materials Movement Form, signed and dated.

E-3 Receipt and Shipment of Radioactive Label Shipments

Upon receipt of a package containing radioactive material and labeled with a DOT Class 7 Radioactive White I, and Yellow II, or Yellow III label, the central receiving point will contact the garrison RSO.

- a. If the packaged radioactive commodity is damaged or leaking, the receiving activity can decline acceptance from the transporter or shipper until the garrison RSO completes monitoring.
- b. Inform the driver of the transport vehicle that a survey of the vehicle is necessary to establish contamination level, and whether shipper or transporter is responsible for bearing the costs, if any, of decontamination to acceptable limits of vehicle.
- c. Commercial transporters can decline the Army installation survey, but the item

will not be downloaded or received.

d. Within three hours of the time of receipt (18 if received after normal duty hours), the garrison RSO will monitor the package and determine if any further action is necessary.

e. If the package has a DOT Yellow III label, the garrison RSO will be notified the package is being unloaded and garrison RSO will measure dose rates in and around the vehicle if necessary.

f. Off-post shipments must comply with regulations established by the DOT, NRC, and affected states in addition to Army regulations.

g. The appropriate RSO, in section E-2, or DOT Class 7 HAZMAT certifier must be consulted in the earliest stages of shipment and the trained DOT Class 7 HAZMAT certifier from the LRC must certify that the package meets all regulatory requirements.

Appendix F

Accident and Incident Response Actions

F-1-1 General

The following is provided in the event of a radiation contamination accident and incident:

1. Accident response.

Stop work.

Warn others in the area.

Isolate the area.

Minimize exposure.

Notify the Garrison RSO at 287-3343 or III Corps RSO at 288-6886.

Remember: SWIMN

2. Emergency response (immediate actions done by the user):

Bag the device (contain it).

Label the bag to prevent further exposure.

Describe the device (NSN, nomenclature, etc.).

Write a caution on the bag: "DO NOT OPEN!"

Identify yourself (Name, telephone number, etc.).

Control the package.

Place it in a safe and secure isolated area.

Notify the Garrison or III Corps RSO.

3. Emergency response (actions by the Garrison or III Corps RSO):

Ensure that immediate actions have been taken.

Ensure current control of the device.

Isolate the area where further exposure may occur.

Identify personnel who may have been exposed, and may have internal activity.
Have a bioassay sample taken, if required (this decision is made only by the RSO). Sample must be taken at least four hours after suspected exposure.
Conduct a wipe survey of the area.
Have wipes analyzed.
Decontaminate the area if necessary. Notify the licensee, if required.

F-2-2 Written Report

When an incident involves lost, damaged, or stolen radioactive material, commanders/Directors must submit a written report to:
Commander, USAG Fort Hood, ATTN: IMHD-SO (RSO) or Commander, III Corps, ATTN: AFZF-GA-SAFE (RSO).

The license agreement requires this information this to be furnished to the NRC.

Forward the report through HQ, U.S. Army Forces Command (FORSCOM); to HQ, U.S. Army Medical Command (AMC)-Rock Island.

Commanders/Directors will be notified in writing to furnish reports by the Garrison RSO or III Corps RSO.

Information required in written reports:

1. Description of licensed material involved:
 - a. Kind.
 - b. Quantity.
 - c. Chemical.
 - d. Physical form.
2. Description of the circumstances under which the loss occurred.
3. Description of disposition, or probable disposition of the licensed material involved.
4. Exposures of individuals to radiation, circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas.
5. Actions taken to recover the material.
6. Procedures or measures that have been or will be adopted to ensure against a recurrence of the event. Identify any common trends if a similar occurrence has occurred at location previously.

Contact the Garrison (287-3343) or III Corps (288-6886) RSO for assistance if necessary.

GLOSSARY

Section I 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 practically 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, radioactive materials, and ionizing radiation in the public interest.

Becquerel

A unit of radioactivity: equivalent to one nuclear transformation per second.

Bioassay

The purpose of bioassay is to determine the dose contribution from internal intake of radioactive material. This may be by whole-body counting, selected organ counting, or by analysis of materials excreted or removed from the human body.

Controlled Area

A controlled area is an area in which the occupational exposure of personnel to radiation is under the supervision of an assigned RSO or an area that is solely used for maintenance on equipment containing radioactive materials.

Curie

A unit of radioactivity equal to 37 billion Becquerel

Electromagnetic radiation

Electric and magnetic fields, that oscillates at right angles to each other and to their direction of propagation that travel at the speed of light in a vacuum (300,000 kilometers per second). Electromagnetic radiation includes gamma rays, x rays, ultraviolet radiation, visible light, infrared radiation, RF radiation, and extremely low frequency electromagnetic radiation.

Electron Volt

A unit of energy equal to 1.6×10^{-19} joules.

Garrison

The garrison is a Table of Distribution Allowance (TDA) organization that operates the installation and provides base operations services to tenant organizations. The garrison normally belongs to the IMCOM.

Gray

A unit of absorbed dose: one gray is equal to an absorbed dose of 1 joule/kilogram (100 rads).

Installation

An aggregation of contiguous or near contiguous, common mission-supporting real property holdings under the jurisdiction of DOD or a state, the District of Columbia, territory, commonwealth, or possession, controlled by and at which an Army unit or activity (active, U.S. Army Reserve (USAR), or U.S. Army National Guard (ARNG)) is permanently assigned.

Ionizing radiation

Charged subatomic particles and ionized atoms with kinetic energies greater than 12.4 eV, electromagnetic radiation with photon energies greater than 12.4 eV, and all free neutrons and other uncharged subatomic particles (except neutrinos and antineutrinos).

Low-level radioactive waste

Material the NRC classifies as low-level radioactive waste; waste not classified as high-level radioactive waste (spent nuclear fuel), as transuranic waste, or as uranium or thorium tailings and waste; material acceptable for burial in a land disposal facility.

Rad

A unit of absorbed dose; one rad is equal to an absorbed dose of 0.01 joule/kilogram (0.01gray).

Radiation

For the purposes of this regulation, unless otherwise specified, radiation includes both ionizing and non-ionizing radiation.

Radiation Safety Committee

An advisory committee for the commander/director to assess the adequacy of the command's Radiation Safety Program. Same as "radiation control committee" and "radiation protection committee."

Radiation safety officer

The person that the commander designates in writing as the executive agent for the command's Radiation Safety Program (same as "radiation protection officer"). These individuals are provided training commensurate with the radiation hazards they manage. Types of RSOs discussed in this regulation include:

- a. *Garrison RSO*. The RSO on the staff of the garrison commander. The Garrison RSO normally belongs to the IMCOM.
- b. *Installation RSO*. The RSO on the staff of the installation commander for arsenals, depots, and similar areas not managed by the IMCOM.
- c. *Mission RSO*. The RSO in an "Army Headquarters" activity. The Army

Headquarters activity is typically a tenant organization on an installation (synonymous with tenant activity RSO).

d. Unit RSO. The RSO in an Army unit (typically a brigade, battalion, company, detachment or TDA organization).

Radiation Safety Program

A program to implement the objective of radiation safety. The Radiation Safety Program includes all aspects of—

- a. Measurement and evaluation of radiation and radioactive material pertaining to protection of personnel and the environment.
- b. Army compliance with Federal and DOD, and Army radiation safety regulations.
- c. The Army's radiation dosimetry, radiation bioassay, radioactive waste disposal, radiation safety training, and radiation instrument Test, Measurement, and Diagnostic Equipment (TMDE) and calibration programs.

Roentgen Equivalent Man

A unit of any of the quantities expressed as dose equivalent. The dose equivalent in rems is equal to the absorbed dose in rad multiplied by the quality factor (1rem = 0.01 Sievert).

Restricted Area

An area access to which is limited by the RSO for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials.

Sievert

A unit of any of the quantities expressed as dose equivalent. The dose equivalent in Sieverts is equal to the absorbed dose in Grays multiplied by the quality factor (1 Sievert = 100 rem).

GLOSSARY

Section II Acronyms

ALARA

As Low As is Reasonably Achievable

AMC

U.S. Army Materiel Command

AMDF

Army Master Data File

AR

Army Regulation

ARIMS

Army Records Information Management Systems

ARP

Army Radiation Permit

ARNG

Army National Guard

ATTN

Attention

Bq

Becquerel

C_A

Wavelength correction factor

Ci

Curie

CFR

Code of Federal Regulations

CW

Continuous Wave

DA

Department of the Army

DES

Director Emergency Services

DFMWR

Directorate of Family Morale Welfare and Recreation

DLA-DS

Defense Logistics Agency-Disposition Services

DOL

Directorate of Logistics

DOT

Department of Transportation

DPW

Directorate of Public Works

eV

Electron Volt

FORSCOM

U.S. Army Forces Command

Gy

Gray

HAZMAT

Hazardous Material

HQ

Head Quarters

IMCOM

Installation Management Command

IOC

Installation Operations Center

LASER

Light Amplification by the Stimulated Emission of Radiation

LLRW

Low Level Radioactive Waste

LRC

Logistic Readiness Center

LSO

Laser Safety Officer

M

Milli

MARS

Military Auxiliary Radio System

MED

Medical

MEDCEN

Medical Center

MICC

Mission and Installation Contracting Command

MREM/HR

Millirem per hour

MRI

Magnetic Resonance Imaging

MW

MilliWatts

NRC

Nuclear Regulatory Commission

NSN

National Stock Number

OSLD

Optically Stimulated Luminescence Dosimeter

PAM

Pamphlet

PPE

Personal Protective Equipment

RADWASTE

Radioactive Waste

REM

Roentgen Equivalent Man

RF

Radio Frequency

RFR

Radio Frequency Radiation

RFSO

Radio frequency safety officer

RSC

Radiation safety committee

RSO

Radiation safety officer

S

Seconds

SOP

Standing Operating Procedures

Sv

Sievert

TB

Technical Bulletin

TDA

Table of Distribution Allowance

TM

Technical Manual

TMDE

Test, Measurement, and Diagnostic Equipment

URSO

Unit Radiation Safety Officer

US

United States

USAR

U.S. Army National Guard

W

Watt