Department of the Army ***Fort Sill Regulation 385-24**
Headquarters, U.S. Army Garrison
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Fort Sill, Oklahoma 73503
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Safety

RADIATION PROTECTION AND RADIOACTIVE MATERIAL CONTROL PROGRAM

Summary. This regulation provides guidance and direction to implement the safety requirements of AR 385–10 The Army Safety Program, DA PAM 385-24, The Army Radiation Safety Program and other Federal regulations and laws. It provides guidance and direction to implement DODI 6055.8 and DODI 6055.11. It includes Army guidance for the use, licensing, disposal, transportation, dosimetry, accident reporting, safety design, and accountability of and radiation exposure standards for ionizing and non-ionizing radiation sources.

Applicability. This regulation applies to all Fort Sill command elements and activities including directorates, tenant and satellite installations and units, civilian contractors, National Guard and U.S. Army Reserve components within the Fort Sill support area. It also includes individuals and units who do not currently maintain or possess a Nuclear Regulatory License or are currently supervised by MEDCOM.

Supplementation. Supplementation of this regulation is prohibited without prior approval from USAFCoE & Fort Sill Safety, 4700 Mow-Way Road, Suite 465, Fort Sill, OK 73503.

Suggested Improvements. The proponent of this regulation is the Fires Center of Excellence/Fort Sill Safety Office (FCoEFSSO). Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to the Fires Center/Fort Sill Safety Office.

Distribution. This regulation is distributed solely through the Director of Human Resources, Administrative Services Division Homepage at http-//sill-www.army.mil/dhr/Admin Svcs Div/Index.html.

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CHAPTER 1
Introduction

1-1. Purpose. This regulation establishes policy and mandatory guidance for the acquisition, possession, use, storage, handling, maintenance, transport, and disposal of radioactive material, equipment containing radioactive material, and ionizing and hazardous non-ionizing radiation producing devices. In addition, this regulation prescribes policy, procedure, and responsibility for the control of occupational exposure to ionizing radiation to ensure that radiation exposure of personnel is maintained as low as is reasonably achievable (ALARA).

1-2. References. Required and related publications are listed in appendix A.

1-3. Explanation of Abbreviations and Terms. Abbreviations and special terms used in this regulation are explained in the glossary.

1-4. Records Management. Records created as a result of processes prescribed by this regulation must be identified, maintained, and disposed of according to AR 25-400-2, The Army Records Information System (ARIMS) and DA Pam 25-403, the Army Records Information Management System website (https://www.arims.army.mil).

1-5. Policy. The Garrison Commander administers the Radiation Protection and Radioactive Material Control Program through the Fort Sill Radiation Safety Officer (FSRSO) and is committed to the operating philosophy of maintaining occupational radiation exposure ALARA.

1-6. Responsibilities

a. The Garrison Commander will designate in writing a trained FSRSO and alternate, establishes an RSC in accordance with DA PAM 385-24, Issues Army radiation permits, and other requirements of DA PAM 385-24 para 1-4 *l.*

b. FSRSO (Fort Sill RSO) (FSRSO) will --

(1) Perform the duties outlined in DA PAM 385-24 para 1-4 *p.* and *q.*

(2) Establish a dosimetry service for both occasionally and occupationally expose individuals within the Installation Safety Office.

(3) Operate the garrison Low Level Radiation Waste (LLRW) Holding Facility and ensure proper disposal of radioactive waste and contaminated radioactive items for Fort Sill garrison activities.

(4) Accept radioactive items from the Fort Sill Defense Reutilization and Marketing Office (DRMO) for disposal.

(5) Provide RSO support to Fort Sill museums.

(6) Other requirements of DA PAM 385-24 para 1-4 *p.*

c. Commander, MEDDAC will --

(1) Provide medical surveillance and evaluations for the installation according to DA Pam 40-11, para 5-1. Preventive Medicine.

(2) Perform bioassays as needed.

(3) Other requirements IAW MEDCOM Policy 40-42.

d. Commanders or Directors will–

(1) Designate in writing an RSO when the criteria in DA PAM 385-24 para 1-4 *k.* has been met.

(2) Ensure 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.

(3) Maintains an inventory of radiation sources and furnishes a copy to the FSRSO annually or as inventory changes.

(4) Reports radiation accidents/incidents when required by DA PAM 385-40 or 10 CFR to the chain of command, the appropriate NRC license holder, and the FSRSO.

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

(6) Oversees the integration of CRM into the unit Radiation Safety program.

(7) Other requirements of DA PAM 385-24 para 1-4 ***k***.

e. Unit RSO will –

(1) Perform the RSO requirements of their unit or directorate.

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

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

(4) Ensures the shipping guidance for the commodity is in accordance the applicable TM or TB.

(5) Executes other requirements as defined within DA PAM 385-24 para 1-4 *r.*

f. Director of Logistics will –

(1) Inform the FSRSO of receipt and shipment of containers that display radioactive labels and markings that are physically damaged when received.

(2) Ensure proper processing of shipping documents according to 49 CFR for all radioactive shipments from Fort Sill.

(3) Ensure trained certified Hazardous Material Class 7 shipping personnel are on staff. Retraining/certification required every two years.

(4) Ensure employees preparing packages for shipment must be properly trained in hazardous materials packaging and shipping procedures.

(5) Properly post the temporary shipping, receiving and secure storage areas containing radioactive materials with radiation caution and ensure personnel working in these areas are enrolled in a dosimetry program.

g. DOL Optics Repair and Unit Fire Control Shops will --

(1) Ensure only trained authorized personnel work in the fire control repair shop.

(2) Provide a written SOP of fire control shop operations that includes purging limitations and required actions to take in the event of an emergency.

(3) Comply with emergency actions upon suspected incident and notify the FSRSO immediately.

h. DPW will –

(1) Ensure that radiation sources to be procured for use by the DPW shall be coordinated with the FSRSO for approval, prior to purchase.

(2) Ensure that 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.

(3) Ensure that the FSRSO is notified when the contractor physically brings the ionizing radiation source on the installation.

i. DES will --

(1) Ensure that the FSRSO is notified when responding to incident locations that involve radiation sources.

(2) Provide an inventory of ionizing radiation sources in their possession and use.

j. DRMO will –

(1) Screen items relating to the Defense Automated Information System (DAISY) for radioactive components.

(2) Return components being submitted for disposal to the submitting unit for proper item processing or demilitarization and inform the FSRSO.

(3) Host a walk-through survey of the DRMO storage yard, upon request of the FSRSO.

k. Mission and Installation Contracting Office will –

(1) Review contracts that involve radioactive equipment ionizing or non-ionizing (i.e. weapons systems moisture density meter) for the inclusion of a qualified trained RSO to handle the commodity actions.

(2) Ensure Contractor's handle, use, or have radioactive commodities to implement an effective Radiation Safety Program that complies with the requirements of Federal standards and Army policies.

l. Establish an Installation Radiation Safety Committee (IRSC) as required by DA Pam 385-24 will –

(1) Recommend policy to the commander regarding the safe and proper use, handling, storage, transport, maintenance, and disposal of radioactive material/devices.

(2) Review radiation safety related aspects of proposals to procure or use sources of hazardous radiation and standing operating procedures for operations involving the use of equipment capable of producing hazardous radiation.

(3) Review Nuclear Regulatory Commission (NRC) license applications and requests for DA Radiation Authorizations/Permits.

(4) Review and approve radiation source user qualifications.

(5) Review reports of radiation incidents and adverse findings and make recommendations to the commander regarding corrective action/process improvement.

(6) Other requirements of DA PAM 385-24 para 1-8.

CHAPTER 2
CONTROL OF IONIZING RADIATION SOURCES AND RADIOACTIVE MATERIAL

2-1. Nuclear Regulatory Commission (NRC) License. Any unit or contractor within the Fort Sill area of operations will do the following IAW DAPAM 385-24 para 2-2.

a. Shall provide a copy of their NRC license and all amendments to the FSRSO.

b. Provide a copy of their DARA to the post RSO.

c. Other requirements of DA PAM 385-24 para 2-2.

2-2. AUTHORIZED STORAGE, USE, OR TRANSPORT. No operation involving the storage, use, or transport of radioactive material will be authorized at Fort Sill unless it has been reviewed and approved by the FSRSO, and--

a. Authorized by a specific license issued by the Nuclear Regulatory Commission (NRC) to the owning activity, or

b. Authorized by a Department of the Army Radiation Authorization (DARA) for Army owned quantities exempt from NRC specific licensing requirements, or

c. Authorized by a Department of the Army Radiation Permit (DARP) issued to a non-Army agency, or

d. Authorized by the Installation Commander for temporary use or storage (not to exceed 14 consecutive calendar days), or

e. Involves only sealed radioactive sources for which the Installation Commander has issued a DARP for temporary use or storage (not to exceed 180 days in any calendar year) to users possessing a proper NRC or Agreement State license.

f. All patient care or patient treatment within MEDCOM or DENTAC units are exempt from these requirements.

2-3. RADIOACTIVE MATERIAL INVENTORY. All activities will conduct an annual physical inventory of radioactive material/commodities and forward results to the FSRSO, and the Fort Sill Safety Office. Inventory format must include the following.

a. Nomenclature of items containing radioactive material.

b. National stock number (as applicable).

c. Serial number (as applicable).

d. On-hand quantity.

e. Storage location (i.e., building and room number).

f. Radioactivity (i.e., curies, millicuries, microcuries, Becquerrel).

g. Radionuclide (i.e. tritium, americium-241, nickel-63).

h. Date inventory was consolidated.

i. Name of individual consolidating the inventory.

j. Signature of Responsible/Accountable Officer.

2-4. MEDICAL RADIOACTIVE MATERIAL INVENTORY. Medical activities will conduct a physical inventory of radioactive material every 3 months and forward results to the FSRSO through the Reynolds Army Community Hospital Radiation Safety Committee. Medical activities will also provide an estimate of the maximum on-hand quantity of radioactive material which may be possessed at any one time during the year to the DPW Fire and Emergency Services Division.

2-5. RADIATION PRODUCING EQUIPMENT INVENTORY. An annual inventory of equipment capable of producing ionizing radiation and/or microwave/radiofrequency (3kHz to 300GHz), laser, or other hazardous non-ionizing radiation must be consolidated by owning activities and forwarded to the FSRSO, as required by paragraphs 2-3 of this regulation.

2-6. AREA POSTING AND SECURITY. Areas or rooms where radioactive materials, commodities, or devices are stored, used and/or maintained will be properly secured and conspicuously posted in accordance with the following.

a. "CAUTION RADIOACTIVE MATERIAL" signs will be posted in areas or rooms where the quantity of radioactive material exceeds 10 times the quantity specified in Appendix B to 10 CFR Part 20.1001-20.2401. Posting is not required in areas or rooms where only sealed radioactive materials are present and the radiation dose rate does not exceed 5 millirem per hour at 12 inches from the source.

b. "RADIATION AREA" signs will be posted in areas where the radiation dose rate exceeds 5 millirem per hour at 12 inches from the source but is less than or equal to 100 millirem per hour in any area which is accessible to personnel.

c. "HIGH RADIATION AREA" signs will be posted in areas where the radiation dose rate exceeds 100 millirem per hour at 12 inches from the radiation source but is less than or equal to 500 rad per hour at 1 meter in any area which is accessible to personnel.

d. "GRAVE DANGER, VERY HIGH RADIATION AREA" signs will be posted in areas where the radiation dose rate exceeds 500 rad per hour at 1 meter in any area which is accessible to personnel.

e. "CAUTION AIRBORNE RADIOACTIVITY AREA" signs will be posted in areas, rooms, or enclosures where airborne radioactive materials exist in concentrations--

(1) In excess of the derived air concentrations (DACs) specified in appendix B to 10 CFR 20.1001-20.2401.

(2) In which an individual could exceed in 1 week, 0.6 percent of the annual limit on intake (ALI) or 12 DAC hours without regard to respiratory protection.

f. Areas which require posting pursuant to paragraphs 2-6a through e also require posting of the following documents.

(1) Applicable NRC licenses and DA Radiation Authorizations.

(2) SOPs and emergency procedures.

(3) 10 CFR Parts 19, 20, and 21.

(4) Notices of noncompliance.

(5) NRC Form 3.

(6) Section 206 of the Energy Reorganization Act of 1974.

(7) Emergency points of contact.

g. “CAUTION X-RAY: signs will be posted in areas, rooms, or enclosures within MEDCOM or DENTAC areas where machine produced ionizing radiation is present.

NOTE: Where posting of documents identified in (1), (2), and (3) above is required but not practicable, a notice which describes the document and states where it may be examined may be posted in lieu of the document.

2-7. RADIATION SURVEYS. The FSRSO will conduct periodic radiation surveys of all areas where radioactive materials are used, stored, or maintained and determine specific requirements for area posting, controlling personnel access, and use of personal protective equipment; the FSRSO may delegate authority to perform radiation surveys to qualified unit level RSCs, RSOs, or RPOs, as appropriate. Surveys will include an evaluation of radiation exposure levels, radiation shielding, and procedural changes which may affect the use or quantity of radioactive material.

2-8. DAMAGED RADIOACTIVE DEVICES. Radioactive commodities (standard issue items) and radioactive devices, as defined by TB 43-0116, and all other items containing radioactive material will be immediately removed from service when damaged or determined to be unserviceable. Unauthorized personnel must not attempt to repair radioactive items or remove radioactive sources. Emergency procedures described in Appendix B will be followed when a commodity or device containing radioactive material is found to be damaged or broken.

2-9. MAINTENANCE PROCEDURES. Procedures described in Appendix C are mandatory and apply to all maintenance activities authorized to perform maintenance operations on commodities or devices containing tritium.

2-10. SERVICING M1A1 COLLIMATOR. Procedures described in Appendix D are mandatory and apply to all activities authorized to service the M1A1 Collimator.

CHAPTER 3
IONIZING RADIATION EXPOSURE LIMITS

3-1. GENERAL. Radioactive material will not be used, stored, or transferred nor will ionizing radiation producing devices be operated in such a manner as to allow an individual to receive a radiation exposure or dose in excess of the limits specified below except for medical procedures.

3-2. ALARA. Radiation exposure to all personnel will be maintained as low as is reasonably achievable (ALARA).

3-3. OCCUPATIONALLY EXPOSED INDIVIDUALS. The radiation dose received by occupationally exposed individuals will not exceed the more limiting of--

a. Total effective dose equivalent (TEDE) of 5 rems per year.

b. An eye-lens dose equivalent of 15 rems per year.

c. A shallow dose equivalent of 50 rems per year to the skin or to any extremity.

d. The limits specified in paragraphs 3-4 and 3-5 of this regulation, as applicable.

3-4. DECLARED PREGNANT FEMALES. All workers within the Fort Sill Area of operations occupationally exposed to radiation are required to contact the MEDDAC RSO at RACH for an interview/consult upon discovery of their pregnancy.

a. The employee has the option of declaring her pregnancy to the RSO/ARSO. Declaring a pregnancy is not required by the employer.

b. Upon declaring pregnancy, the employee will be counseled as to the risks associated with radiation to the unborn fetus, the need to keep her exposure as low as reasonably achievable, and the Command's policy concerning pregnant radiation workers. The RSO/ARSO will provide a copy of US NRC regulatory guide 8.13.

c. The Health Physics Office does not require that changes be made to a worker's duties because of pregnancy, unless they are trending to exceed the maximum allowable fetal dose. The pregnant occupationally exposed individual will not be allowed to exceed 0.5 R for the entire gestational period.

NOTE: A female occupationally exposed to ionizing radiation only falls under the lower annual permissible dose equivalent limits for a pregnant female when she formally declares her pregnancy in writing to the RSO.

3-5. OCCUPATIONALLY EXPOSED MINORS. Occupationally exposed individuals under 18 years of age will not be exposed to more than 10 percent of the annual dose limit for adult occupationally exposed individuals as specified in paragraphs 3-3a through d of this regulation.

3-6. EMERGENCY RESPONSE VOLUNTEERS (LIFE SAVING). Personnel exposed to ionizing radiation during the performance of life-saving emergency or rescue operations which may involve exposures in excess of 25 rem will be of volunteer status. Volunteers who are expected to receive an exposure in excess of 25 rem will be fully informed of the involved radiation risk and will not be permitted to receive a dose equivalent in excess of 100 rem.

3-7. EMERGENCY RESPONSE VOLUNTEERS (VALUABLE EQUIPMENT/PROPERTY). Personnel exposed to ionizing radiation during emergency operations and who are involved solely in the protection of valuable equipment or property and who may be exposed to radiation in excess of the dose limits for

occupationally exposed adults, as specified above, will be of volunteer status and will not receive a dose equivalent in excess of 10 rem.

3-8. GENERAL PUBLIC. Members of the general public and individuals who occasionally enter restricted areas but who are not classified as occupationally exposed individuals will not be exposed to a radiation dose rate in excess of 2 millirem per hour in any hour and will not exceed a TEDE in excess of 100 millirem in any 1 year.

CHAPTER 4
PERSONNEL DOSIMETRY AND RADIOBIOASSAY MONITORING

4-1. RADIOBIOASSAY MONITORING. The following occupationally exposed individuals will be enrolled in a radiobioassay monitoring program and will have their committed effective dose equivalent (CEDE) assessed.

a. Adults likely to receive, in any 1 year, an intake in excess of 10 percent of the applicable annual limit on intake (ALI) specified in table 1, columns 1 and 2 of appendix B to 10 CFR Parts 20.1001-20.2401.

b. Minors and declared pregnant women likely to receive, in any 1 year, a CEDE in excess of 0.05 rem.

c. Personnel who work in optical instrument repair facilities which maintain tritium fire control devices will receive baseline tritium bioassays, as a minimum.

4-2. PERSONNEL DOSIMETRY.

a. Dosimetry custodians and managers maintain exposure records and implement guidance on the dosimetry program policy according to this regulation, AR 40-5 and DA PAM 385-24. Monitor exposure of personnel assigned or attached to Fort Sill who are routinely or occasionally exposed to sources of ionizing radiation as a condition of their employment.

b. The dosimetry custodian will review quarterly dosimetry reports and annotate (initial and date) when the report was reviewed.

c. Report any exposure to the FSRSO for evaluation and investigation and recommendation of further action.

d. Adult occupationally exposed individuals having a reasonable probability of receiving a dose in excess of 10 percent of the applicable limit specified in paragraph 3-3 of this regulation contributed solely by external sources of ionizing radiation.

e. **Declared pregnant females** having a reasonable probability of receiving a dose in excess of 10 percent of the limit specified in paragraph 3-4 of this regulation contributed solely by external sources of ionizing radiation.

f. Occupationally exposed individuals under 18 years of age (minors) having a reasonable probability of receiving a dose in excess of 10 percent of the limit specified in paragraph 3-5 of this regulation contributed solely by external sources of ionizing radiation.

g. All dosimetry (occupational radiation worker monitoring) is issued through RACH Preventive Medicine Health Physics Service within the Fort Sill area of Operations. All Personnel working on Fort Sill and Fort Sill area of operations who meet monitoring criteria shall contact the RACH RSO at 580-442-5211 to receive radiation safety training and dosimetric device(s).

4-3. ARMY DOSIMETRY SERVICE. Individuals performing operations at Fort Sill requiring the use of personnel dosimetry will use Army dosimetry devices and service provided by the U.S. Army Dosimetry Center (ADC). This includes contractors and government owned contractor operated facilities (GOCO). Supplemental dosimeters may be used but will not obviate the requirement to use ADC provided dosimetry. Recommendation: If a person is required to wear dosimetry as terms of a contract the COR should included that requirement in the contract. The Army dosimetry program should only be used for specific Army functions. Contractors being given dosimetry is the exception to the rule not the rule of thumb

4-4. DOSIMETER STORAGE. Dosimeter storage locations must--

a. Be approved in writing by the RSO.

b. Be centrally located and outside of areas where ionizing radiation sources are used or stored.

c. Be adequately shielded from ionizing radiation.

d. Contain a control dosimeter.

4-5. DOSE RECORDING PROCEDURES. Records of internal and external occupational radiation dose monitoring are required to be maintained as permanent health records for military and civilian occupationally exposed individuals. Procedures for preparing, maintaining, reviewing, transferring, and disposing of these records are as follows.

a. Automated Dosimetry Records (ADR) will be maintained for each military and civilian occupationally exposed individual required to wear personnel dosimetry pursuant to paragraph 4-2 or 4-4 of this regulation, as applicable.

b. Occupationally exposed individuals, visitors, and transient personnel who work in or frequent an area in which access is restricted for purposes of controlling hazards from ionizing radiation or radioactive materials (restricted area) must complete a DD Form 1952 (Dosimeter Application and Record of Occupational Radiation Exposure) in

accordance with appendix B of AR 40-14 regardless of whether personnel dosimetry is required or not.

c. The following procedures will be followed to assure the proper transfer of dosimetry records upon reassignment or termination of employment of an occupationally exposed individual.

(1) Record the address of the gaining organization to which the individual has been reassigned on the DD Form 1952.

(2) Forward DD Forms 1952, ADRs, and records of radiobioassay results to the health records custodian for military personnel or to the Occupational Health Service for civilian employees. The health records custodian will
remove the OF 23, Chargeout Record, from the individuals health record upon receiving the individuals radiation exposure records.

(3) Disposition of radiation exposure records for military and civilian personnel separating or retiring from active service will be accomplished by placing the records in the individuals health record as required by AR 40-66 and/or Directorate of Civilian Personnel guidance.

d. Unit/activity Radiation Safety Coordinators (RSC) will review, verify, certify, sign, date, and maintain ADRs and notify the FSRSO of radiation doses to personnel as specified in paragraph 1-6(d) of this regulation.

CHAPTER 5
MEDICAL SURVEILLANCE

5-1. MEDICAL EVALUATION OF INDIVIDUALS OCCUPATIONALLY EXPOSED TO IONIZING RADIATION. Medical examinations are not routinely required for individuals occupationally exposed to ionizing radiation. Individuals suspected of receiving a radiation dose or exposure in excess of the limits specified in chapter 3 of this regulation will be referred to a physician for medical evaluation. Medical evaluations will also be performed as deemed necessary by the medical authority or FSRSO.

5-2. MEDICAL EVALUATION OF INDIVIDUALS OCCUPATIONALLY EXPOSED TO Non-IONIZING RADIATION.
Pre-placement screening will be performed on all laser workers and incidental laser personnel working with class 3b or 4 lasers IAW MEDDAC Regulation MR 40-133. The purpose of this examination is to determine the baseline visual acuity and ocular health status of the employee. Laser workers and incidental laser personnel potentially exposed to only class 1, 2, 2a, and 3a laser radiation have no vision screening requirement beyond that which is required during routine pre-placement physicals.

5-3. OPTHALMIC EXAMINATION FOR SUSPECTED LASER OVEREXPOSURE. Individuals suspected of having received an overexposure to laser radiation will receive ophthalmic examinations as deemed necessary by the medical authority or when referred by the RSO. Individuals having abnormal findings will be referred for a diagnostic examination.

5-4. MEDICAL EXAMINATION OF RF/MICROWAVE WORKERS. Radiofrequency radiation (RFR/microwave) workers require no specific ocular examinations except in the event of a known exposure to RFR in excess of five times the permissible exposure limit (PEL) specified in DoDI 6055.11, in which case an examination will be performed within 24 hours of the suspected overexposure.

CHAPTER 6
TRANSPORTATION OF RADIOACTIVE MATERIALS

6-1. OFF-POST MOVEMENT. The off-post shipment/transport of radioactive material will be accomplished in accordance with the following.

a. The Installation Transportation Officer (ITO), in coordination with the FSRSO, will assure that each package of radioactive material offered for shipment is prepared in accordance with 49 CFR, Subpart I and 10 CFR, Part 71 to include acceptable package surface contamination and radiation levels, marking, labeling, placarding, and shipping papers.

b. The ITO will assure that all packages of radioactive material offered for transport comply with the applicable provisions of DoD Regulation 4500.9R, and that appropriate documentation accompanies each shipment.

c. All radioactive material shipments will be accompanied by a FS Form 150, Radioactive Material Record, or equivalent, completed and signed by the FSRSO.

d. The FSRO will notify the Radioactive Material Control Point (RMCP) and obtain approval prior to authorizing the movement or transfer of Individually Controlled Items of Supply (ICRIS) as defined in DA PAM 385-24.

e. Radioactive material will not be stored, transported, or shipped in the same compartment or area as explosives, flammable materials, photographic film, or unsealed food products.

f. Damaged radioactive commodities will meet depot repair criteria, as determined by the item manager, before being evacuated to depot.

g. All devices containing tritium must be shipped in double plastic bags and must be packaged in approved containers (if wood or fiberboard box is used all seams must be caulked or taped) regardless of the condition of the devices.

h. Packages bearing Radioactive White I, Yellow II, or Yellow III labels which are temporarily stored incident to shipment or transport must be moved to a controlled area separated from areas frequently occupied by personnel. Activities which temporarily store labeled packages of radioactive material will inform the FSRSO of the materials location as soon as practicable after being placed in storage.

6-2. ON-POST MOVEMENT. Persons transporting radioactive material, other than material contained in radioactive commodities as defined in TB 43-0116, within the boundaries of Fort Sill will do so only with approval and under specific guidance of the FSRSO.

6-3. RECEIPT, MONITORING, AND INSPECTION. The receipt, monitoring, and inspection of packages and vehicles containing radioactive material will be accomplished as specified below, as soon as practicable after receipt but not to exceed 3 hours after receipt if received during normal duty hours or not later than 3 hours from the beginning of the next working day if received after normal duty hours.

a. All packages containing radioactive material will be reported to the FSRSO upon receipt for inspection, monitoring, and certification regardless of isotope, activity (quantity), or DOT labeling requirements. Records of radioactive material movement will be maintained by the FSRSO.

b. Activities expecting to receive a package containing a quantity of radioactive material in excess of Type A quantity, as defined in 10CFR 71.4 and appendix A to part 71, will make arrangements to receive--

(1) The package when the carrier offers it for delivery; or

(2) Notification of the arrival of the package at the carriers terminal and to take possession of the package expeditiously.

c. Activities responsible for receiving or unloading motor vehicles (military or commercial) carrying labeled packages (DOT Radioactive White I, Yellow II, or Yellow III labels) of radioactive material will notify the FSRSO prior to unloading. Transport vehicles will be inspected prior to unloading and will be monitored for radioactive contamination immediately after unloading unless transporting only radioactive material in the form of a gas or in special form as defined in 10 CFR 71.4.

d. Upon receipt of a package (labeled or unlabeled) containing radioactive material, the receiving activity will notify the FSRSO. The FSRSO will monitor the external surfaces of the package for radiation levels unless the package contains quantities of radioactive material that are less than or equal to the Type A quantity, as defined in 10 CFR 71.4 and appendix A to part 71. All packages which exhibit evidence of package degradation, such as packages that are crushed, wet, or damaged will be monitored for radioactive contamination and radiation levels, without exception.

e. Before unloading any closed compartment in which labeled radioactive packages have been transported, the compartment will be adequately ventilated to remove gases that may have accumulated during transport.

f. Removable radioactive contamination present on the external surface of radioactive material packages must be less than 22 dpm per square centimeter for beta and/or gamma emitting radionuclides; all radionuclides with half-lives less than 10 days; natural uranium; natural thorium; uranium-235; uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical concentrates and less than 2.2 disintegrations per minute (dpm) per square centimeter for all other alpha emitting radionuclides.

g. Transport vehicles found to be contaminated in excess of the limits specified in DA PAM 385-24 will be decontaminated before release and a certificate of vehicle decontamination will be issued by the ITO to the common carrier or to the vehicle operator. The detection of excessive levels of contamination indicates that an incident/accident has occurred which must be reported in accordance with chapter 10 of this regulation. Contaminated shipments must be investigated by the FSRSO due to potential exposure to down-stream personnel and/or contamination of equipment.

CHAPTER 7
RADIOACTIVE WASTE DISPOSAL

7-1. TURN-IN OF UNSERVICABLE RADIOACTIVE ITEMS. Unserviceable radioactive items will be sealed in double plastic bags and be turned-in through the DOL radioactive commodity disposal point with a properly prepared turn-in document (DA Form 2765-1) annotated with the word "RADIOACTIVE". Unserviceable or unwanted radioactive items will not be transferred to the Defense Reutilization and Marketing Office (DRMO) for disposal.

7-2. DEMILITARIZATION OF RADIOACTIVE ITEMS. Prior to being transferred to DRMO, end items containing radioactive material must be demilitarized by authorized personnel in accordance with item manager instruction. Wipe tests must be performed by the FSRSO of all demilitarized radioactive items to assure that removable radioactive contamination levels are acceptable for release to the general public.

7-3. STORAGE OF RADIOACTIVE WASTE. Unserviceable radioactive items and radioactive waste will be stored in the designated radioactive material/waste storage area pending disposition by the FSRSO. Radioactive waste will be disposed only in accordance with procedures approved by the FSRSO and authorized by this regulation. Land burial of radioactive material is authorized only at NRC licensed disposal facilities.

CHAPTER 8
RDTE OPERATIONS INVOLVING RADIATION SOURCES

8-1. SAFETY REVIEW. Activities proposing to conduct research, development, testing or evaluation operations involving the use of radioactive material (including material used in equipment or devices) or equipment capable of producing ionizing or hazardous non-ionizing radiation (i.e. RF/microwave, ultraviolet, laser) must submit a copy of safety procedures which will be followed to assure safe and proper use of material/equipment to the FSRSO for review and approval prior to commencement of the operation.

8-2. DESTRUCTIVE TESTING. Destructive testing of equipment or devices containing radioactive material is prohibited.

CHAPTER 9
RESPONSE TO RADIOLOGICAL EMERGENCIES AND CONTAMINATION CONTROL.

Required response actions to emergencies involving radioactive material and procedures for controlling radiological contamination are specified in Appendix E.

CHAPTER 10
REPORTING OF RADIATION INCIDENTS/ACCIDENTS AND SAFETY HAZARDS

10-1. INDIVIDUAL NOTIFICATION REQUIREMENTS. Individuals having knowledge of the following events must provide immediate notification to the FSRSO. Failure to comply may result in civil penalties assessed in the amount provided by Section 234 of the Atomic Energy Act of 1954, as amended. DA personnel are not exempt from this notification requirement.

a. Manufacturing defects involving any radioactive device licensed by the NRC.

b. Release of radioactive material to an unrestricted area or to the environment.

c. Willful or inadvertent incineration, crushing, discarding, etc., of radioactive material.

d. Unauthorized disassembly or maintenance of an item containing radioactive material.

e. Discovery of a leaking "sealed" radioactive source.

f. Over exposure or suspected over exposure of personnel to ionizing radiation.

g. Loss of control of any radioactive material.

h. Failure to use or store radioactive items strictly in accordance with the provisions of applicable technical publications, manufacturer instructions, NRC licenses, DA Radiation Authorizations/permits, or this regulation.

i. Radiation dose rate exceeding 2 millirem per hour in an unrestricted area.

j. Levels of radiation or concentrations of radioactive material in a restricted area exceeding applicable NRC regulatory or license limitations.

k. Incidents or accidents involving the transport, loading, unloading, or temporary storage of radioactive material in which fire, breakage, spillage, damage to shipping container, or radioactive contamination occurs or is suspected.

10-2. REPORTING INCIDENTS/ACCIDENTS INVOLVING DAMAGE TO RADIOACTIVE DEVICES. Any individual having knowledge of an incident or accident involving damage to any radioactive device must report the event in accordance with Appendix B and chapter 10 of this regulation.

10-3. REPORTING RADIOLOGICAL EMERGENCIES. Any individual having knowledge of a radiological emergency must report the emergency in accordance with Appendix E and chapter 10 of this regulation.

10-4. INVESTIGATION OF RADIOLOGICAL INCIDENTS/ACCIDENTS. The FSRSO will investigate all events reported pursuant to paragraphs 10-1, 10-2, and 10-3 and will provide telephonic notification in accordance with 10-5 upon confirmation of the following.

a. Lost, stolen, or missing licensed radioactive material in a quantity greater than 10 times the quantity specified in Appendix B to 10 CFR 20 or any radioactive material which may present a substantial hazard to persons in unrestricted areas.

b. Radiation incidents described in 10 CFR 20.2202 that may have caused or threaten to cause conditions that could result in an individual receiving--

(1) A total effective dose equivalent of 5 rems, or

(2) An eye dose equivalent exceeding 15 rems, or

(3) A shallow dose equivalent to the skin or extremities exceeding 50 rems, or in the release of radioactive material, inside or outside a restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake in excess of one occupational annual limit on intake.

c. dose in excess of the specified dose limits for occupationally exposed adults, occupationally exposed minors, the embryo/fetus of a declared pregnant woman, an individual member of the public, or any dose limit specified in the applicable license.

d. Levels of radiation or concentrations of radioactive material in--

(1) A restricted area in excess of any applicable limit specified in the license, or

(2) An unrestricted area in excess of 10 times any applicable limit set forth in 10 CFR 20 or in the license (whether or not involving exposure of any individual in excess of the limits in 10 CFR 20.1301).

(3) Any area in excess of the limits specified in DA PAM 385-24 for controlled and uncontrolled work areas, equipment, containers, personal clothing, or skin of the body or hands.

e. Receipt of a package which has removable external surface radioactive contamination in excess of the following.

(1) .00001 microcurie (22 dpm) per square centimeter of package surface for beta-gamma emitting radionuclides, all radionuclides with half-lives less than ten days, natural uranium or thorium, uranium 235, uranium 238, thorium 232, thorium 228, or thorium 230 when contained in ore or physical concentrates.

(2) .000001 microcurie (2.2 dpm) per square centimeter for all other alpha emitting radionuclides.

NOTE: The method for determining package surface contamination will be the wiping of 300 square centimeters of package surface area with an absorbent material using moderate pressure and measuring the radioactivity on the wiping material.

(3) Radiation levels in excess of 200 millirem per hour at the external surface or in excess of 10 millirem per hour at 3 feet from the external surface.

f. Defects or failure to comply as defined in 10 CFR 21 which could create a substantial safety hazard.

g. Leak test results of any sealed source which indicate a total removable activity which exceeds 0.005 microcurie (11,100 dpm).

h. Accidents involving the transportation, loading, unloading, or temporary storage in which fire, breakage, spillage, or radioactive contamination occurs or is suspected.

10-5. REPORTING REQUIREMENTS.

a. The FSRSO will provide immediate telephonic notification upon confirmation that any event specified in paragraph 10-4 has occurred and will submit a written report within 10 working days of the occurrence through the following organizations to the appropriate licensee for material specifically licensed to the Army or to the NRC for all other radioactive material (except accelerator produced material).

(1) Fort Sill Force Protection Office, ATTN: IMSI-SO, Fort Sill, Oklahoma 73503, DSN 639-2108/4466, commercial (580) 442-2108/4466.

(2) Commander, USACRC (CSSC–Z), Fort Rucker, AL, at DSN 558–2660/3410, commercial (334) 255–2660/3410 (24–hour phone line), FAX DSN 558–3749, commercial (334) 255–3749 or e–mail helpdesk@crc.army.mil.

(3) Army Safety Office, ATTN: (DACS –SF) at DSN 329 –2412, commercial (703) 601–2412 and (SGPS–PSP) DSN 289–0132/703–756–0132 or e–mail ASO@hqda.army.mil (during nonduty hours, contact the Army Operations Center, DSN 227–0218, Commercial (703) 697–0218, and indicate the offices to be notified).

NOTE: Army licensees and notification phone numbers are identified for each army managed commodity in TB 43-0116, Identification of Radioactive Items in the Army.

b. Upon notification that an incident (as described in 10 CFR, Part 20, Subpart M) has occurred, the licensee will provide telephonic and/or written reports as required below.

(1) Immediately notify the FSRSO during duty hours, commercial (580) 442-2108/1905) or Fort Sill Field Officer of the Day (FOD) after duty hours, commercial (580) 442-4912.

(2) Report theft or loss of licensed material in accordance with 10 CFR 20.2201.

(3) Provide notification and reporting of incidents as identified in paragraph 10-4b of this regulation in accordance with 10 CFR 20.2202.

(4) Report exposures, radiation levels, or concentrations of radioactive material exceeding limits specified in paragraphs 10-4c and d of this regulation in accordance with 10 CFR 20.2203.

(5) Notify other federal agencies, as appropriate.

CHAPTER 11
NON-IONIZING RADIATION PROTECTION

11-1. GENERAL. Hazardous non-ionizing radiation includes radiofrequency (RF), microwave, ultrasound, ultraviolet, laser, and high intensity optical radiation. The FSRSO is responsible for developing and implementing the Fort Sill non-ionizing radiation safety program in accordance with AR 40-5 and this regulation.

11-2. STANDING OPERATING PROCEDURES. Prior to the commencement of operations involving equipment or devices capable of producing hazardous levels of microwave, RF, or laser radiation, an SOP will be developed and forwarded to the FSRSO for review and approval.

11-3. USER TRAINING. Personnel required to use hazardous non-ionizing radiation producing equipment will be familiarized with appropriate operational safety procedures, exposure hazards, operational restrictions, and required use of associated safety devices and equipment.

11-4. ANNUAL EQUIPMENT INVENTORY. An annual inventory of hazardous non-ionizing radiation producing devices must be provided to the FSRSO by all activities who possess these devices as required by paragraph 2-3 of this regulation.

11-5. HEALTH HAZARD ASSESSMENT. Health hazard assessment surveys will be conducted by the FSRSO as required, and upon request, for operations involving microwave, RF, laser, or high intensity optical radiation.

11-6. MEDICAL EXAMINATIONS. Personnel whose occupation or duty assignment may provide a reasonable potential for over exposure to microwave, RF, or laser radiation will have a preplacement and termination of employment ophthalmologic examination as established by the Reynolds Army Community Hospital Occupational Health Clinic.

11-7. LASER OPERATIONAL SAFETY. Organizations and activities (including civilian contractors) will operate laser devices in accordance with safety guidance specified in AR 385-63, MIL-HNDBK 828, TB MED 524, Fort Sill Regulation 385-1, Appendix G of this regulation, and local safety SOPs.

11-8. RF/MICROWAVE OPERATIONAL SAFETY. Organizations and activities (including civilian contractors) will operate microwave/RF radiation producing equipment in accordance with safety guidance specified in TB MED 523 and local safety SOPs.

11-9. RF/MICROWAVE AREA POSTING. Areas in which microwave/RF radiation sources are used will be posted in accordance with DoD Instruction (DoDI) 6055.11 and ANSI standard C95.1.

11-10. LASER AREA POSTING. Areas in which laser devices are used will be posted in accordance with TB MED 524 and MILHNDBK 828.

11-11. INVESTIGATION OF LASER INCIDENTS. Laser incidents and accidents will be investigated and reported in accordance with AR 40-5, AR 385-10, Fort Sill Reg 385-1, and this regulation.

11-12. INVESTIGATION OF RF/MICROWAVE INCIDENTS. Microwave/RF incidents and accidents will be investigated and reported in accordance with DA Pam 385-40, AR 40-5, and DoDI 6055.11.

CHAPTER 12
TRAINING

12-1. TRITIUM DEVICE USER PERSONNEL. Personnel who use tritium devices will receive 1 hour of radiation safety training regarding specific hazards of tritium, safe handling/storage procedures, and procedures to be followed in the event of an incident or accident involving tritium.

12-2. TRITIUM DEVICE MAINTENANCE PERSONNEL. Personnel who perform maintenance procedures on tritium devices will receive 4 hours of radiation safety training regarding biological effects of ionizing radiation, specific hazards of tritium, safe handling/storage procedures, procedures to be followed in the event of an incident or accident, and proper purging/charging procedures.

12-3. CAM MAINTENANCE PERSONNEL. Personnel who perform maintenance and/or wipe testing procedures on the Chemical Agent Monitor (CAM) will receive 8 hours of radiation safety training regarding the interaction of ionizing radiation with matter, biological effects of ionizing radiation, hazards associated with Ni-63, procedures to be followed in the event of an incident or accident, radiation testing and tracking system (DODRATTS) reporting, and wipe testing procedures.

12-4. CAD USER PERSONNEL. Personnel required to use the M43A1 Chemical Agent Detector will receive 2 hours of radiation safety training regarding the hazards associated with Am-241, safe handling and storage procedures, procedures to be followed in the event of an incident or accident, and radiation testing and tracking system (DODRATTS) reporting.

12-5. CAD MAINTENANCE PERSONNEL. Personnel who perform maintenance and/or wipe testing procedures on the M43A1 Chemical Agent Detector will receive 8 hours of radiation safety training regarding the hazards associated with Am-241, units of radiation measurement, biological effects of ionizing radiation, radiation detection instrumentation, wipe testing procedures, radiation testing and tracking (DODRATTS) reporting, and procedures to be followed in the event of an incident or accident.

12-6. PERSONS FREQUENTING CONTROLLED AREAS. All persons (including visitors) working in or frequenting any portion of a controlled area where radioactive materials are used or stored, or where equipment capable of producing radiation is energized, must be informed of the radiation hazard involved and be instructed regarding the rules and procedures to be observed. Instructional topics must include those specified in AR 40-5, paragraph 1-5.

12-7. OCCUPATIONALLY EXPOSED PERSONS FREQUENTING CONTROLLED AREAS. Persons working in or frequenting any portion of an area controlled or restricted for the purpose of controlling radiation exposure (whose occupation involves the use of radioactive material or equipment capable of producing ionizing radiation) who may receive an occupational dose of ionizing radiation will receive initial training regarding the topics specified in DA PAM 40-18, paragraph 2-7b(1) through (4), as a minimum. Personnel requiring this training will also receive refresher training each

calendar year to include a review of topics presented in the initial training as well as the topics specified in paragraph 2-7c(1) through (3).

12-8. INDIVIDUALS LIKELY TO EXCEED 100 MREM. All individuals who in the course of employment are likely to receive in a year an occupational dose in excess of 100 mrem will be kept informed of the storage, transfer, or use of radiation and/or radioactive material and will be instructed as specified in 10 CFR Part 19.12.

12-9. OCCUPATIONALLY EXPOSED FEMALES. Females occupationally exposed to ionizing radiation will receive instruction regarding the prenatal exposure risks and concerns to the developing embryo/fetus as identified in NRC Regulatory Guide 8.13.

12-10. UNIT/ACTIVITY RSCs. Unit/activity level Radiation Safety Coordinators will attend the "Fundamentals of Radiation Safety" class provided by the FSRSO. This class provides the RSC with basic "need-to-know" information regarding the Fort Sill radiation safety program.

12-11. LRSOs. Laser Range Safety Officers (LRSO) will receive training and certification as specified in Appendix G of this regulation.

12-12. LASER OPERATING PERSONNEL. Personnel required to operate laser devices will receive safety instruction as specified in Appendix G of this regulation.

12-13. RF/MICROWAVE DEVICE OPERATING PERSONNEL. Personnel required to operate hazardous RF/microwave radiation producing equipment or devices will receive instruction regarding operational safety procedures, associated radiation exposure hazards, operational restrictions, and proper use of safety devices/equipment.

12-14. FIRST RESPONDER PERSONNEL. Military police, security guards, fire-fighters, and other first responder personnel will be informed of the hazards associated with responding to an emergency involving radioactive material. First responder personnel will also receive instruction regarding appropriate actions to be taken in the event of a radiological emergency and refresher training will be provided each calendar year.

12-15. TRAINING RECORDS. Records which identify persons attending training and which provides a brief outline of the topics covered during the training must be maintained for all training required by chapter 12.

APPENDIX A

REFERENCES

Section I
Required Publications

AR 40-5
Preventive Medicine

AR 40-13
Medical Support-Nuclear/Chemical Accidents and Incidents

AR 385-63
Range Safety

PAM 385-24
The Army Radiation Safety Program

PAM 385-40
Army Accident Investigations and Reporting

AR 710-3
Asset and Transaction Reporting System

Dodi 6055.11
PROTECTING PERSONNEL FROM ELECTROMAGNETIC FIELDS

Dodi 6055.15
DOD LASER PROTECTION PROGRAM

Dodi 6055.08
OCCUPATIONAL IONIZING RADIATION PROTECTION PROGRAM

Fort Sill Regulation 385-1
Post Range Regulation

TB 43-0116
Identification of Radioactive Items in the Army

TB MED 523
Control of Hazards to Health from Microwave and Radio Frequency Radiation and Ultrasound

TB MED 524
Control of Hazards to Health from Laser Radiation

TM 55-315
Transportability Guidance for Safe Transport of Radioactive Materials

Military Handbook 828
Laser Range Safety

Title 10, Code of Federal Regulations
Nuclear Regulatory Commission

Title 49, Code of Federal Regulations
Department of Transportation

Section II
RELATED PUBLICATIONS

MEDDAC Regulation 40-132
Radiation Protection Program

TM 3-261
Handling and Disposal of Unwanted Radioactive Material

TB 43-0122
Identification of U.S. Army Communications-Electronics Command Managed Radioactive Items

TB 43-0197
Instructions for Safe Handling, Maintenance, Storage, and Disposal of Radioactive Items Managed by U.S. Army Armament Material Readiness Command

TB 43-0216
Safety and Hazard Warnings for Operation and Maintenance of TACOM Equipment

TB 43-0133
Hazard Criteria for CECOM Radio Frequency and Optical Radiation Producing Equipment

NRC Regulatory Guide 8.10
Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As is Reasonably Achievable

NRC Regulatory Guide 8.13
Instruction Concerning Prenatal Radiation Exposure

Section III
PRESCRIBED FORMS

FS Form 150
Radioactive Material Movement Form

APPENDIX B

DAMAGED RADIOACTIVE DEVICE REPORTING AND HANDLING PROCEDURES

B-1. When a radioactive commodity/device source breaks or is suspected of having been broken, immediately notify the following radiation protection personnel.

B-1a Fort Sill Radiation Safety Officer, 442-2108

B-1b DOL Radiation Safety Officer, 442-1905

B-1c Installation Safety Manager, 442-4466

B-1d Field Officer of the Day , 442-4912 (After normal duty hours).

B-2. In the event of a fire involving radioactive commodities/devices or any other radioactive material, call 911 and inform the DPW Fire and Emergency Services Dispatcher of the existing radiation hazard.

B-3. The following procedures are to be followed in order to contain the spread of radioactive contamination and to protect personnel from potential hazards resulting from the release of radioactive material from damaged radioactive commodities/devices.

B-3a Seal the damaged device in double plastic bags and place in a cardboard box (if available), identify the bag/box as containing a broken radioactive device, and place in a secured area restricted from personnel access. Personnel handling the device will wear rubber or latex gloves which will be turned-in to the Fort Sill Radiation Safety Officer (FSRSO) for disposal as radioactive waste.

B-3b Personnel known or suspected of having been exposed to airborne radioactive material and/or anyone who may have come in contact with contaminated surfaces as a result of the release of radioactive material from damaged radioactive commodity/device sources will wash their hands and all other exposed areas of the body as soon as possible with nonabrasive detergent and water and report to the Occupational Health Clinic, Reynolds Army Community Hospital, Building 4300 for radiobioassay collection.

B-3c Restrict personnel from entering room or area of breakage. Rope or tape off area and post signs designating the area as "HAZARDOUS-DO NOT ENTER."

B-3d The FSRSO will perform area monitoring and wipe tests of the incident area as appropriate to determine the presence and extent of radioactive contamination. The incident area will remain restricted pending determination of contamination levels by the FSRSO.

B-3e Areas found to be contaminated in excess of allowable limits as specified in PAM 385-24 will be decontaminated as instructed by the FSRSO.

B-3f No maintenance or purging/servicing procedures will be performed on tritium fire control devices that are not illuminated or any other radioactive commodity/device suspected or known to be damaged, contaminated, or leaking radioactive material.

B-3g No eating, drinking or smoking is permitted in areas where radioactive materials are used, stored, or maintained.

B-3h The FSRSO will provide instructions for the proper disposal of damaged radioactive devices.

B-4. In the event of fire involving radioactive material, notify the Fort Sill Fire and Emergency Services Division (dial 911) and radiation protection personnel as identified above. Perform the following immediate actions.

B-4a Notify all personnel to vacate the area immediately.

B-4b Hold breath and turn off air circulating devices (fans, air conditioners and blowers) if this can be safely accomplished.

B-4c Vacate the area.

B-4d Keep persons not engaged in fire-fighting or rescue operations at least 100 yards upwind from the scene. Those entering a radiation incident/accident area during a fire must wear self contained breathing apparatus.

B-4e When personnel are seriously injured all other considerations (except fire, explosion, and contaminated atmosphere) are secondary until urgent first aid, rescue, and evacuation are provided. Medical personnel will supervise evacuation of injured personnel.

B-4f The FSRSO will direct all activities pertaining to segregation of personnel, decontamination, monitoring, and coordination with other emergency assistance personnel.

B-4g Permit no one to resume work in an incident area without approval of the FSRSO.

APPENDIX C

SAFETY PROCEDURES FOR TRITIUM DEVICE MAINTENANCE OPERATIONS

1. Tritium fire control devices stored indoors must be stored in areas with ventilation of at least 12 air changes per day. An outside, unoccupied storage shed-type building is recommended. Arms rooms used for the storage of the lightweight company mortars and M16 rifles using tritium devices must meet the ventilation requirements for tritium storage areas. In addition to the emergency procedures outlined for handling damaged radioactive devices, general support and direct support repair facilities will implement the following tritium safety procedures.

a. Maintenance facilities will store spare tritium parts in separate, nonoccupied and well ventilated storage areas.

b. Maintenance personnel authorized to perform tritium fire control maintenance/servicing will be limited to those personnel who have received a minimum of 4 hours radiation safety training in the handling of radioluminous devices and emergency procedures.

c. Maintenance personnel who work in these areas will receive a baseline bioassay.

d. Work benches on which tritium devices are repaired will be covered with kraft paper to prevent the build up and spread of tritium contamination.

e. Kraft paper, when removed will be treated as radioactive waste, double bagged in plastic bags, and marked "Radioactive Waste - H3" and turned in to the Radiation Safety Officer as accumulated.

f. No maintenance will be performed on tritium devices that are not illuminated except at authorized depots.

g. All operational procedures involving maintenance of tritium fire control devices will be reviewed and approved (in writing) by the Radiation Safety Officer prior to use.

APPENDIX D

PROCEDURES FOR SERVICING THE M1A1 COLLIMATOR

D-1. Purge and charge servicing of the M1A1 Collimator is authorized at the organizational maintenance level. The correct procedures and equipment are found in TM 750-116, general procedures for purging and charging of fire control instruments and specify that fire control purging kit,
NSN 4931-00-065-1110, SC 4931-95-Cu-J54, is the only equipment to be used. These procedures and equipment will limit the internal pressure to 3 pounds per square inch (3 psi). Organizational maintenance personnel not having the proper equipment will notify their next higher level of maintenance for support. In no case will a high pressure nitrogen purging kit be used.

D-2. Maintenance personnel will purge and charge fire control devices, when condensation is present, using the above specified fire control purging kit.

D-3. The following M1A1 collimator visual and luminosity checks must be performed prior to purging, charging, or removal of the optical cell, NSN 1240-01-079-5453.

D-3a Ensure that the collimator has not been exposed to light during the 4 hours preceding the luminosity and visual check.

D-3b Place collimator in darkened room and remove cover assembly.

D-3c Look through the collimator's objective end and check for a broken/cracked retical and/or loss of illumination. If the reticle is intact (no cracks are observed) and the device is illuminated, proceed with maintenance actions.

D-3d If cracks are observed but illumination is still present seal in a double plastic bag and notify the Radiation Safety Officer at 442-2108/4466.

D-3e If no illumination is detected, seal the collimator scope assembly in a double plastic bag and immediately notify the Radiation Safety Officer as directed in Appendix B.

APPENDIX E

RESPONSE TO RADIOLOGICAL EMERGENCIES AND CONTAMINATION CONTROL

E-1. GENERAL. In view of the complicating factors which may arise during a radiological emergency, the primary concern must always be the protection of personnel and minimizing the spread of external and internal contamination from radioactive hazards.

E-2. PURPOSE. To prescribe the minimum actions to be taken in the event of a radiological accident/incident and to minimize the radiation exposure of affected personnel and individuals rendering emergency assistance.

E-3. APPLICABILITY. This appendix is applicable to all activities and agencies who perform operations involving the transport, use, maintenance, or storage of radioactive materials within the boundaries of Fort Sill and/or its support areas.

E-4. RESPONSIBILITIES.

E-4a Personnel involved in an incident or accident involving radioactive material will immediately notify the FSRSO, Field Artillery Branch Safety Office, and if fire is involved, the Directorate of Public Works (DPW) Fire and Emergency Services Division (911) and provide the following information.

(1) Location of the incident/accident.

(2) Type and quantity of radioactive material involved (if known).

(3) Other information which may facilitate initial hazard assessment.

E-4b The Fort Sill Radiation Safety Officer (FSRSO) is responsible for monitoring the radiological accident/incident area, radiologically contaminated victims, emergency response personnel, and emergency vehicles exiting the accident/incident area as well as supervising decontamination of personnel and equipment.

E-4c The 61st Explosive Ordnance Detachment (EOD) is responsible for assuring safe entry of the accident/incident site when an explosive munitions hazard exists or when special weapons are involved.

E-4d Reynolds Army Community Hospital (RACH) will implement the Emergency Preparedness Plan upon notification that radiologically contaminated victims are en route to the emergency room.

E-4e The MEDDAC is responsible for assigning a medical officer to determine the necessary medical treatment and follow-up care of radiological accident victims to include bioassays for determining the extent of ingestion or inhalation of radioactive material.

The MEDDAC RPO is responsible for monitoring radiological accident victims transported to the Reynolds Army Community Hospital for emergency care.

E-4f The Fire and Emergency Services Division, DPW, is responsible for responding to a fire or explosion emergency with appropriate personnel protective and rescue equipment and assumes direct command of the accident site until the fire or explosion is controlled.

E-4g The Directorate of Environmental Quality (DEQ) Material and Waste Management Branch, Emergency Response Team is responsible for responding to hazardous material accidents and spills and will coordinate radiological decontamination and clean-up procedures as determined by the FSRSO.

E-4h The Law Enforcement Command is responsible for providing Military Police security of the accident/ incident site including restraint of news media and spectators from entering radiologically contaminated areas.

E-5. EMERGENCY PROCEDURES.

E-5a In the event of a radiological emergency, notify the following, as appropriate.

(1) If a fire exists, dial 911 and advise that a radiological hazard exists and that radioactive contamination may be present.

(2) If an explosion hazard from ammunition or special weapons exists, contact the 761st EOD , DSN 639-2313, Commercial (580) 442-2313.

(3) Notify the Fort Sill Radiation Safety Officer, DSN 639-2108/4466, Commercial (580) 442-2108/4466.

(4) Notify the Directorate of Logistics Radiation Safety Officer, DSN 639-1905, Commercial (580) 442-1905.

(5) If victims requiring medical assistance are known or suspected of being contaminated with radioactive material notify the Reynolds Army Community Hospital Emergency Room (Telephone 458-2770) and the MEDDAC RPO (Telephone 442-5211) of the potential radiological hazard.

(6) Notify the DEQ HAZMAT Response Team (Telephone 442-3266) that a radiological accident has occurred.

(7) After normal duty hours, contact the Field Officer of the Day (FOD), Commercial (580) 442-4912.

E-5b In the event of a radiological emergency, the following procedures should be implemented to protect personnel from existing radiation hazards.

(1) If only radioactive commodities or standard issue items are involved and there are no apparent explosion hazards or personnel requiring medical assistance refer to Fort Sill Reg 385-24, Appendix B, Damaged Radioactive Device Reporting and Handling Procedures.

(2) For radiological emergencies involving situations not covered by paragraph F-5b(1) above, the following procedures should be implemented.

(a) Clear the accident area of all personnel not actually needed or engaged in fire fighting or emergency operations.

(b) It is essential that medical care of critical injuries take precedence over attempts to decontaminate accident victim(s). When a choice must be made, the medical care of life-threatening conditions should take priority.

(c) Radiation safety personnel, upon arrival, will establish an exclusion zone (hot), contamination reduction zone (warm) and an operation support zone (cold) surrounding the accident/incident area. Only authorized personnel will enter these zones and proper personal protective equipment (PPE) will be worn as determined by the FSRSO. Personnel and equipment including vehicles, will be monitored for contamination by the FSRSO before exiting the contamination reduction zone. Every effort will be made to contain the spread of contamination to within the contamination reduction zone.

(d) If fire or explosion exists, evacuate all personnel from the immediate hazard vicinity and personnel downwind or uphill from the rising smoke plume. Use self-contained breathing apparatus (SCBA) operated in positive pressure mode for protection from airborne radioactive contaminants.

(e) The FSRSO will monitor the accident/incident area, equipment, and personnel for contamination and determine the necessary measures for safe decontamination. The FSRSO will also record the names, addresses, and telephone numbers of personnel who enter the contamination reduction zone and/or the exclusion zone, whether contaminated or not, along with the results of personnel monitoring.

(f) No attempt should be made to remove contaminated clothing from critically injured accident victims. These victims should be wrapped in a clean sheet or blanket to contain the spread of contamination in preparation for transport to the ER.

(g) Personnel with minor wounds will be monitored by the FSRSO and decontaminated if necessary before exiting the contamination reduction zone.

(h) All contaminated clothing and articles collected for disposal will be placed in a metal disposal drum lined with a 4 mil plastic bag and properly disposed of as radioactive waste by the FSRSO.

(i) No equipment or materials involved in the accident/ incident will be removed from the site until the items have been monitored by radiation protection personnel and decontaminated as required.

(j) All personnel, equipment, and articles (except radioactive waste) found to be contaminated will be decontaminated in accordance with contamination release limits specified in PAM 385-24, table 4-3.

(k) Bioassays will be performed by medical personnel on any person(s) known or suspected of ingesting or inhaling radioactive material.

E-6. RELEASE OF INFORMATION TO PULBIC. Any radiation accident/incident will arouse much public interest and any misleading or sensational reports can cause panic. Consequently, any release of information concerning a radiation accident/incident will be in accordance with AR 360-5 and the Fort Sill Public Affairs Office.

E-7. REPORTING OF RADIOACTIVE MATERIAL. Accidents and incidents involving radioactive material will be reported in accordance with this regulation, paragraph 11-2.

E-8. REFERENCES.

E-8a PAM 385-24, Ionizing Radiation Protection (Licensing, Control, Transportation, Disposal, and Radiation Safety)

E-8b AR 40-14, Occupational Ionizing Radiation Personnel Dosimetry

E-8c 10 CFR, Nuclear Regulatory Commission (Parts 0-199)

E-8d TM 3-261, Handling and Disposal of Unwanted Radioactive Material

E-8e FM 3-15, Nuclear Accident and Contamination Control

APPENDIX F

STANDING OPERATING PROCEDURE (SOP)
UNIQUE ITEM TRACKING (UIT)

RADIATION TESTING AND TRACKING SYSTEM (RATTS)

F-1. REFERENCE. AR 710-3, Asset and Transaction Reporting System, Chapter 4, Section II Radiation Testing and Tracking System (RATTS)

F-2. PURPOSE. The purpose of this SOP (Standard Operating Procedure) is to establish and define the methods of operations for reporting and tracking serial numbered radioactive “sources” and detectors containing a radioactive “source”.

F-3. OBJECTIVE. DODRATTS is a DOD-wide program established to maintain “source” serial number visibility and wipe test results of all “sources” within the active Army, USAR, ARNG and other DOD components. It is designed to provide strict control and identification of all “sources” for the purpose of life cycle visibility and control. DODRATTS meets the requirements imposed by the Nuclear Regulatory Commission (NRC) as outlined in NRC Licenses 21-32838-01.

F-4. SCOPE. The transaction reporting procedures for standard Army-wide asset and transaction reporting systems will be used in either a manual or an automated logistical environment. The specific asset management area affected by this SOP is the transaction reporting of radioactive sources contained in the M43A1 Chemical Agent Detector (CAD) and Chemical Agent Monitor (CAM).

F-5. RESPONSIBILITIES AND PROCEDURES.

F-5a General.

(1) Location. The Reporting Activity for the DOD RATTS Program is the Directorate of Logistics (DOL) Supply Branch located in the system room of Building 1655, Randolph Road, Fort Sill, Oklahoma.

(2) Hours of Operation. Operating hours of the Reporting Activity are 0730 to 1600 hours Monday thru Friday with the exception of Federal holidays.

(3) Telephone Numbers. The telephone numbers for the Reporting Activity, DOL Supply are--

(a) DDN (Defense Data Network) 639-3919.

(b)Commercial (580) 442-3919/4588.

F-5b Reporting Activity.

(1) The reporting activity will maintain an automated or manual file of “source” serial numbers presently in inventory for all supported units or activities.

(2) The reporting activity will (within 10 days) report to the DOD Central Registry any source transactions described in AR 710-3.

F-5c Owning Unit.

(1) Assure that CAD and CAM serial numbers are accurately recorded on accountable property records in accordance with equipment TM instruction. Physically verify serial numbers to assure accuracy.

(2) Prepare receipt transactions to be reported to reporting activity (DOL Supply Branch).

(3) Submit IS364E disk (SPBS-R System) UIT transactions to the reporting activity or copy of receipt document for manual input.

F-6. WIPE TEST MAINTENANCE REPORTING PROCEDURES. The Nuclear Regulatory Commission (NRC) requires that a wipe test be performed on all M43A1 (CAD) and CAM radioactive sources annually and within 6 months of UIC transfer.

F-6a The U.S. Army Armament, Chemical and Logistics Activity (ACALA) will notify the reporting activity of wipe test due dates.

F-6b TMDE will notify Owning Activity Coordinators/Managers of wipe test due date using the Monthly Master Record File (IMRF).

F-6c TMDE will notify the reporting activity of wipe test results.

F-6d The reporting activity will transmit preliminary wipe test results (i.e. 555 for go; 999 for no-go) to the UIT Central Registry with a TRAC code of “W”. If the wipe test results are no go (999) ACALA will provide specific instructions to the owning unit for securing the equipment pending laboratory analysis of the wipe test samples and, if applicable, appropriate disposition instructions.

NOTE: It is the responsibility of the owning unit to notify the reporting activity of the disposition instructions to assure the removal of the equipment/source serial numbers from the owning activities UIT serialization record.

F-7. INVENTORY GAIN/LOSS.

F-7a Report gains of a radioactive sources for inventory adjustment using transaction code “C”. Submit IS364E disk or supporting supply documentation to reporting activity for transmission to UIT Central Registry.

F-7b Report suspected losses of the CAD and/or CAM to the reporting activity using transaction code “Q.” Additionally, submit IS364E disk and any supporting documentation (i.e., Report of Survey) to reporting activity for transmission to the UIT Central Registry.

APPENDIX G

LASER SAFETY

G-1. PURPOSE. To establish mandatory guidance regarding the use of military and nonmilitary laser devices at Fort Sill.

G-2. SCOPE. This appendix is applicable to all personnel involved with the use of tactical, nontactical, and commercial laser devices at Fort Sill except laser devices used for medical applications.

G-3. RESPONSIBILITIES.

G-3a Commander, USAFACFS will--

(1) Appoint an Installation Radiation Safety Officer (FSRSO) responsible for managing the ionizing and non-ionizing radiation protection program at Fort Sill.

(2) Designate an Installation Radiation Control Committee (IRCC) responsible for providing recommendations to the commander regarding ionizing and non-ionizing radiation safety policy.

G-3b Field Artillery Branch Safety Manager will--

(1) Serve as Installation Laser Safety Officer (LSO) responsible for providing laser safety guidance and reviewing laser Standing Operating Procedures (SOPs) for all range operations, and acting as range evaluator as specified in MIL-HNDBK-828.

(2) Oversee installation laser safety program and range operations and serve as command liaison between FSRSO, Laser Range Safety Officers, and major command safety personnel regarding laser safety issues.

G-3c Installation Radiation Safety Officer (FSRSO) will develop and implement the non-ionizing radiation protection program, develop and/or review standing operating procedures related to laser operations, and advise the Field Artillery Branch Safety Manager of the non-ionizing radiation safety program regulatory compliance status.

G-3d Range Safety Officer--

(1) Manage operations involving the use of tactical lasers, including testing, on the range and act as range operator as stipulated in MIL-HNDBK-828.

(2) Be familiar with and incorporate current J-laser doctrine and TTPs into range operations.

(3) Coordinate range scheduling to ensure the safe operation of tactical lasers.

(4) Assist the Field Artillery Branch Safety Manager in determining the requirements for safe employment of tactical lasers.

(5) Ensure range inspectors are laser certified and adequately trained to identify laser range safety violations.

G-3e Commanders/Directors will—-

(1) Ensure compliance with this appendix.

(2) Develop SOPs for laser operations in accordance with AR 385-63, Fort Sill Reg 385-1, and Fort Sill Reg 385-24.

(3) Conduct an annual physical inventory of laser devices IAW Fort Sill Reg 385-24.

(4) Report incidents of actual or suspected personnel overexposure to laser radiation to the Field Artillery Branch Safety Manager and the Installation Radiological Protection Officer within 2 hours of occurrence.

(5) Ensure LRSOs obtain required training and certification and provide a roster of certified LRSOs to Range Control.

(6) Appoint individual(s) to represent the Command on the IRCC.

G-3f Laser Range Safety Officer (LRSO).

(1) Responsible for the safe conduct of laser operations.

(2) Implement the provisions of this appendix.

(3) Ensure proper control of hazardous laser energy in accordance with the specific guidelines prescribed in MIL-HNDBK-828, paragraph 4-10.

(4) Be familiar with and understand the provisions of AR 385-63 related to laser operations.

(5) Enforce established azimuth and elevation restrictions which are inscribed on the Laser Point Safety Data Card available from Range Control Scheduling Section.

(6) Ensure personnel who enter the laser safety danger zone (LSDZ) wear laser protective eyewear with appropriate optical density (OD) for the specific laser wavelength of the laser system to be used (see table 1).

(7) Check in and out with Range Control prior to commencement of and upon completion of laser range operations in accordance with Fort Sill Reg 385-1, chapter 3.

(8) Ensure that all personnel suspected or known to have received an overexposure to laser radiation report to Reynolds Army Community Hospital for qualified ophthalmic attention.

(9) Notify the Field Artillery Branch Safety Officer and the Installation Radiation Safety Officer within 2 hours of occurrence of all cases of suspected personnel eye overexposure.

(10) Provide a laser safety orientation/briefing (associated hazards and safety procedures) to all unit personnel required to work with or in close proximity to laser devices.

G-3g Civilian contractors will--

(1) Develop and forward an operating procedure to the Installation Radiation Safety Officer (FSRSO) for review and approval, prior to operating hazard class 3 and 4 laser devices. The operating procedures will include laser device hazard classification and the number of laser devices to be used.

(2) Ensure personnel who are required to operate laser devices receive instruction regarding the safe operation of the devices and the hazards associated with overexposure to laser radiation. Instructions will include, as a minimum, any restrictions in operating techniques and the use of safety devices to assure safe operation of the devices.

G-3h MEDDAC Radiation Protection Officer will develop and implement the MEDDAC radiation safety program to include the medical use of laser devices.

G-3i Installation Radiation Control Committee (IRCC) will--

(1) Recommend installation policy and procedure to the commander regarding laser related operational and safety issues.

(2) Review reports of laser related incidents and adverse findings and make recommendations for improvements and appropriate action to the commander.

G-4. PROCEDURES FOR RANGE USE- Refer to Fort Sill Regulation 385-1, Chap. 8

GLOSSARY

Section I
ABBREVIATIONS.

ACALA
U.S. Army Armament and Chemical Acquisition and Logistics Activity

ADR
automated dosimetry report

ADC
Army Dosimetry Center

ALARA
as low as reasonably achievable

ALI
annual limit on intake

AMC
U.S. Army Materiel Command

AR
Army Regulation

ARSO
Alternate Radiation Safety Officer

CECOM
U.S. Army Communications-Electronics Command

CEDE
committed effective dose equivalent

CFR
Code of Federal Regulations

CHPPM
U.S. Army Center for Health Promotion and Preventive Medicine

cm
centimeter

DA
Department of the Army

DAC
derived air concentration

DARA
Department of Army Radiation Authorization

DARP
Department of Army Radiation Permit

DEQ
Directorate of Environmental Quality

DOD
Department of Defense

DODI
Department of Defense Instruction

DOL
Directorate of Logistics

dpm
disintegrations per minute

DOT
Department of Transportation

DPW
Directorate of Public Works

EDE
effective dose equivalent

FSRSO
Fort Sill Radiation Safety Officer

Ghz
gigahertz

GOCO
government-owned contractor-operated

h
hour

HHA
health hazard assessment

IOC
Industrial Operations Command

IRCC
Installation Radiation Control Committee

kHz
kilohertz

LRSO
Laser Range Safety Officer

LSO
Laser Safety Officer

MEDDAC
Medical Department Activity

mCi
microcurie

MIL-HDBK
Military Handbook

mrem
millirem

NRC
U.S. Nuclear Regulatory Commission

NSN
National Stock Number

RAM
Radioactive material

RDTE
Research, development, testing, and evaluation

RF
Radio frequency

RPO
Radiation Protection Officer

RSC
Unit/Activity Level Radiation Safety Coordinator

RSCC
Radiation Safety Coordinator Committee

SOP
Standing operating procedure

TB
Technical Bulletin

TB MED
Technical Bulletin (Medical)

TEDE
Total effective dose equivalent

TODE
Total organ dose equivalent

TM
Technical Manual

TMDE
Test, measurement, and diagnostic equipment

USACHPPM
U.S. Army Center for Health Promotion and Preventive Medicine

B-2. TERMS.

Absorbed dose. The energy imparted by ionizing radiation per unit mass of irradiated material. The units of absorbed dose are the rad and the gray (Gy).

Administrative dose. The total effective dose equivalent that a radiation protection officer assigns when dosimetry is inaccurate or has been misused or lost.

Agreement state. Any state with which the Atomic Energy Commission or the Nuclear Regulatory Commission has entered into an effective agreement in which the state assumes many of the Nuclear Regulatory Commission's functions.

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 and licensed materials in the public interest.

Annual limit of intake (ALI). The derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year that would result in a committed effective dose equivalent of 5 rems (0.05 Sv) or a committed dose equivalent of 50 rems (0.5 Sv) to any organ or tissue.

Army regulation. A directive that sets forth missions, responsibilities, and policies and establishes procedures to ensure uniform compliance with those policies.

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

Byproduct material. Any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing
special nuclear material.

Committed dose equivalent. The dose equivalent to organs or tissue of reference that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

Committed effective dose equivalent. The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues.

Commodity, radioactive. See Radioactive commodity

Curie. A unit of radioactivity equal to 37 billion disintegration per second.

Declared pregnant woman. A woman who has voluntarily informed her employer, in writing, of her pregnancy and the estimated date of conception.

Deep-dose equivalent. Applies to external whole-body exposure and is the dose equivalent at a tissue depth of 1 centimeter (1000 mg/cm^2).

Derived air concentration (DAC). The concentration of a given radionuclide in air that, if breathed for a working year of 2,000 hours under conditions of light work (inhalation rate 1.2 cubic meters of air per hour), results in an inhalation of one ALI.

Dose equivalent. The product of absorbed dose in tissue, quality factor and all other necessary modifying factors at the location of interest in tissue. The units of dose equivalent are the rem and sievert (Sv).

Effective dose equivalent. The sum of the products of the dose equivalent to the organ or tissue and the weighting factors applicable to each of the body organs or tissues that are irradiated.

Electromagnetic radiation. Electric and magnetic fields that oscillate at right angles to each other and to their direction of propagation and that can 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, radio frequency radiation, and extremely low frequency electromagnetic radiation.

Eye dose equivalent. Applies to the external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm^2).

Giga (G). An SI unit prefix indicating a factor of one billion (10^9).

Hertz (Hz). The SI unit for frequency equivalent to one vibration (cycle) per second.

High radiation area. An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

Installation Radiation Control Committee. An advisory committee for the commander to assess the adequacy of the command's radiation protection program.

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 because they produce negligible ionization).

Kilo- (k). An SI unit prefix indicating a factor of 1000.

Laser. A device that produces an intense, coherent, directional beam of light by stimulating electronic or molecular transitions to lower energy levels. An acronym for light amplification by stimulated emission of radiation. Lasers are classified by degree of potential hazard (see 21 CFR 1040.10 and ANSI Z136.1 for comprehensive definitions of laser hazard classes).

a. Class I lasers emit at levels that are not hazardous under any viewing or maintenance conditions. They are exempt from control measures.

b. Class II lasers (low-power) emit in the visible light portion of the electromagnetic spectrum. They are a potential eye hazard only for prolonged intrabeam viewing. Eye protection is normally afforded by the aversion response including the blink reflex.

c. Class III (medium-power) lasers emit in the infrared, visible, or ultraviolet portions of the electromagnetic spectrum. They are a hazard for direct intrabeam and specular reflection viewing. Diffuse reflection is not normally a hazard.

(1) Class IIIa lasers, even though they emit at class III power levels, have special beam characteristics that make them “eye-safe” except when viewed through magnifying optics.

(2) Class IIIb lasers are all other class III lasers.

d. Class IV (high-power) lasers emit in the infrared, visible, or ultraviolet portions of the electromagnetic spectrum. They are hazardous for direct intrabeam exposure and sometimes diffuse reflection exposure to the eyes or skin. They may also produce fire, material damage, laser-generated air contaminants, and hazardous plasma radiation.

Low-level radioactive waste. See Radioactive waste, low-level

Micro- (m). An SI unit prefix indicating a factor of one one-millionth (10^{-6}).

Military-exempt lasers. Those lasers and laser systems that the U.S. Food and Drug Administration has exempted from the provisions of 21 CFR 1040.10 and 1040.11 and of 21 CFR 1002 (except 21 CFR 1002.20) (exemption no. 76-EL-01 DOD). These laser products are used exclusively by DOD components and are designed for actual combat or combat training operations or are classified in the interest of national security.

Milli- (m). An SI unit prefix indicating a factor of one one-thousandth (0.001).

Naturally occurring or accelerator produced radioactive material (NARM). Radioactive material not classified as byproduct, special, or source material; NARM includes NORM (naturally occurring RAM).

Non-ionizing radiation. Electromagnetic radiation with photon energies less than 12.4 eV

Occupational dose. The radiation dose received by an individual in the course of employment in which the individual’s assigned duties involve exposure to radiation or radioactive material. Occupational dose does not include doses received from

background radiation, from any medical administration the individual has received, from voluntary participation in medical research programs, or as a member of the public.

Optical radiation. See Visible light

Quality factor. The modifying factor [listed in tables 1004(b).1 and 1004(b).2 of 10 CFR 20.1004] that is used to derive dose equivalent from absorbed dose.

Rad. A unit of absorbed dose. One rad is equal to an absorbed dose of 0.01 joule/kilogram.

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

Radiation area. An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5 mrem (0.05 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

Radiation protection. For the purposes of this regulation, a scientific discipline whose objective is the protection of people and the environment from unnecessary exposure to radiation. Radiation protection is concerned with understanding, evaluating, and controlling the risks from radiation exposure relative the benefits derived. Also called “health physics” and “radiation safety.”

Radiation Safety Officer. The person that the commander designates, in writing, as the executive agent for the command’s radiation protection program. Also called “radiation protection officer” or “health physics officer.”

Radiation protection program. A program to implement the objective of radiation protection.

a. The Army’s radiation protection program includes all aspects of measurement and evaluation of radiation and radioactive material as they pertain to protection of personnel and the environment, and of the Army’s radiation dosimetry, radiation bioassay, radioactive waste disposal, radiation protection training, and radiation instrument TMDE and calibration programs.

b. A command’s radiation protection program includes all aspects of measurement and evaluation of radiation and radioactive material within the command as they pertain to protection of personnel and the environment.

Radioactive commodity. An item of Government property made up in whole or in part of radioactive material. A national stock number (NSN) or part number is assigned to commodities containing radioactive material greater than 0.01 microcurie.

Radioactive waste. Solid, liquid, or gaseous material that contains radionuclides regulated under the Atomic Energy Act, as amended, or is of sufficient quantity to require an Army radiation authorization, and is of negligible economic value considering the cost of recovery.

Radioactive waste, low-level. Material the NRC classifies as low-level radioactive waste (see 10 CFR 62.2); 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 regulated land disposal facility (10 CFR 61) authorized to accept radioactive material.

Radiobioassay. See bioassay

Radio frequency (RF) electromagnetic radiation. Electromagnetic radiation with frequencies between 3 kHz and 300 GHz.

Radio frequency (RF) controlled environment. Locations where RF exposure may be incurred by persons who are aware of the potential for occupational exposure, by other cognizant persons, or as the incidental result of transient passage through areas where analysis shows the exposure levels may be above those shown in table 2, IEEE C95.1, but do not exceed those shown in table 1, IEEE C95.1, and where induced currents may exceed the values in table 2, part B, IEEE C95.1, but do exceed the values in table 1, part B, IEEE C95.1.

Radio frequency (RF) uncontrolled environments. Locations where RF exposures do not exceed applicable exposure levels. Such locations generally represent living quarters, workplaces, or public access areas where personnel would not expect to encounter higher levels of RF energy.

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

Risk assessment. The first two steps of the risk management process.

Risk decision. The decision to accept or not accept the risk(s) associated with an action made by the individual responsible for performing that action.

Risk management. The process of weighing, identifying and controlling hazards to protect the force.

Risk management process. The process of identifying and controlling hazards to protect the force. It includes five steps that represent a logical thought process from which users develop tools, techniques and procedures for applying risk management in their areas of responsibility. It is a closed-loop process applicable to any situation and environment. Its five steps are--

a. Identify hazards. Identify hazards to the force. Consider all aspects of the current and future situations, environment and known historical problem areas.

b. Assess hazards. Assess hazards to determine risks. Assess the impact of each hazard in terms of potential loss and cost.

c. Develop controls and make risk decisions. Develop control measures that eliminate the hazard or reduce its risk. As control measures are developed, reevaluate risks until all risks are reduced to a level where benefits outweigh potential costs.

d. Implement controls. Put controls in place that reduce the risk.

e. Supervise and evaluate. Enforce standards and controls. Evaluate the effectiveness of the controls and adjust/update as necessary.

Risk management integration. The method of firmly fixing the risk management process as a principle for individuals and organizations.

Shallow dose equivalent. Applies to the external exposure of the skin or an extremity and is taken as the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm^2) averaged over an area 1 square centimeter.

Sievert (Sv). The SI 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 Sv = 100 rems).

Source material. Uranium or thorium, or any combination thereof, in any physical or chemical form or ores that contain by weight one-twentieth of one percent (0.05%) or more of uranium, thorium, or any combination thereof. Source material does not include special nuclear material.

Special nuclear material. Plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, or any material artificially enriched by any of the foregoing.

Total effective dose equivalent. The sum of the deep-dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

Ultraviolet (UV) electromagnetic radiation. Electromagnetic radiation with wavelengths between 100 nm and 380-400 nm.

Very high radiation area. An area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rad (5 gray) in 1 hour at 1 meter from a radiation source or from any surface that the radiation penetrates.

Visible light. Electromagnetic radiation with wavelengths between 380-400 nm and 760-780 nm.

Weighting factor. For an organ or tissue, the proportion of the risk of stochastic effects resulting from irradiation of that organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly.

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