

DEPARTMENT OF THE ARMY  
U.S. ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL  
AND FORT SAM HOUSTON  
Fort Sam Houston, Texas 78234-5014

FSH Memorandum  
No. 385-11

18 May 1998

Safety  
**Radiation Protection Program**

**1. PURPOSE.** To prescribe policies, procedures, and responsibilities that ensure the safe handling, and minimize the exposure of personnel to sources of ionizing radiation, non-ionizing radiation, including coherent sources, Light Amplification by Stimulated Emissions of Radiation (LASER), and to ensure safe use and storage of these sources, and to prescribe minimum standards to ensure:

a. Protection of personnel from ionizing radiation mishaps.

b. Control over personnel, radiation sources and areas, to prevent internal deposition of radioactive material, and to minimize external exposure to ionizing and non-ionizing radiation as low as reasonably achievable (ALARA).

c. Containment of radioactive material and radiological contamination.

d. Compliance with Department of the Army (DA) regulations and directives, Nuclear Regulatory Commission (NRC) rules and regulations, and radiological emergency procedures listed in appendix B.

**2. APPLICABILITY.** This memorandum applies to any activity or person who possesses or desires to bring a source of ionizing radiation onto Fort Sam Houston (FSH) and Camp Bullis. This memorandum also applies to Brooke Army Medical Center (BAMC) and its subordinate organizations. Brooke Army Medical Center is also subject to additional controls and regulatory requirements, and must therefore develop its own procedures for control of radiological hazards in concert with their medical mission, and the requirements of the U.S. Army Medical Command (MEDCOM), the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO), and the NRC.

**3. REFERENCES.** Required publications and forms are listed in appendix A.

**4. DEFINITIONS.** The definitions contained in AR 385-11, Ionizing Radiation Protection; \*AR 700-64, Radioactive Commodities in the DOD Supply Systems; Title Code 10 of Federal Regulations (CFR); U.S. NRC regulations, and Title 49 CFR, U.S.

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Department of Transportation's Hazardous Materials Regulations, are applicable to this memorandum.

\*This regulation is obsolete; however, the U.S. Army Center for Health Promotion and Preventive Medicine, and the Office of the Surgeon General, indicated that until the new AR 11.xx is finalized, AR 700-64 must still be referenced.

**5. RESPONSIBILITIES.**

a. The Radiation Control Committee (RCC) and the Installation Radiological Protection Officer (IRPO) oversee the Radiation Safety Program. The RCC assists and advises the commander, and prescribes the radiation safety standards to be maintained on FSH and Camp Bullis, as required by CFR, Title 10, Part 19, 20, and 21.

b. The IRPO, assisted by unit level Radiation Protection Officers (RPOs), administers the Radiation Safety Program. If the RPO is absent, the alternate RPO acts for him/her in radiation safety matters.

c. Commanders advise non-Army agencies, using radioactive material on Army property of the requirements outlined in AR 385-11.

d. The RCC meets quarterly at the time and place designated by the chairperson. The chairperson may call special meetings as necessary. The committee is composed of the following personnel/representatives:

- (1) The Installation Occupational Safety and Health Manager, Chairman.
- (2) The IRPO.
- (3) The RPO, BAMC.
- (4) The RPO, 147th Medical Logistics Battalion.
- (5) The RPO, Directorate of Plans, Training, Mobilization and Security (DPTMSEC).
- (6) The RPO, Directorate of Public Works (DPW).
- (7) The RPO, Directorate of Logistics (DOL).
- (8) The Installation Medical Authority (IMA).
- (9) The RPO, U.S. Army Medical Department Center and School (AMEDDC&S).

e. The RCC:

- (1) Prescribes the radiation protection standards for FSH and Camp Bullis.
- (2) Establishes requirements, and initiates applications for NRC licenses and DA authorizations, including renewal and amendments.
- (3) Approves proposed use of radiation sources.
- (4) Provides standards and procedures for procuring radiation sources within the authorization of the specific radioactive commodities utilized at FSH and Camp Bullis.
- (5) Approves the use of equipment and material required for implementing the Radiation Safety Program.

- (6) Approves the storage and training areas for radiation sources.

(7) Establishes rules for using agencies to dispose of radioactive material, and directs RPOs to initiate required procedures.

(8) Receives reports from the unit RPOs and reviews inspection records of the Radiation Safety Program by outside agencies.

(9) Determines when willful violation of the Radiation Safety Program occurs, and refers the case to the appropriate agency for disciplinary action.

f. The IRPO:

(1) Acts as consultant and advisor to the commander on radiation safety matters.

(2) Administers the Radiation Protection Program.

(3) Reviews proposed uses of radiation sources to ensure that adequate safety procedures are specified and followed.

(4) Maintains an inventory of radioactive items and devices that emit ionizing and non-ionizing radiation.

(5) Maintains liaison with civilian communities on civilian radiation emergency plans and procedures or emergency conditions that may impact the installation.

(6) Coordinates activities on segregation of personnel, and decontamination with other emergency personnel in conjunction with the Installation Disaster Control Plan.

(7) Provides technical assistance concerning the requisition, receipt, storage, transfer, and disposal of radioactive material.

(8) Provides technical assistance during the investigation and reporting of radiological mishaps, to include reports required by AR 385-40, Accident Reporting and Records.

(9) Is assigned to the Installation Safety Office.

g. The DOL:

(1) Submits all requests for ionizing radiation resources to the IRPO for approval or submission to the RCC, according to guidelines established by the RCC.

(2) Maintains a listing of all radioactive commodities on FSH and Camp Bullis.

(3) Provides the IRPO with an updated listing of all radioactive commodities on FSH and Camp Bullis on a quarterly basis.

h. The IMA:

(1) Provides technical advice and medical surveillance testing in support of personnel involved in operations using radioactive nuclides, x-rays, LASER, ultraviolet radiation sources, and microwave energy sources.

(2) Performs leakage tests and inspects microwave ovens upon request.

(3) Removes all radioactive commodities from equipment before transferring equipment to the Defense Reutilization Marketing Office, unless the commodity has been determined to be safe for military and public use in accordance with (IAW) AR 700-64.

(4) Ensures radioactive commodities to be sold or transferred are marked IAW Mil-STD-129, Marking for Shipping and Storage, and are free of contamination in excess of limits specified in AR 385-11.

(5) Administers the dosimetry program for installation personnel IAW AR 40-14, Occupational Ionizing Radiation Personnel Dosimetry.

(6) Provides the IRPO with a quarterly summary report on individual's exposure to ionizing radiation.

(7) Provides an annual inventory of items turned-in by organizations on FSH to the BAMC Health Physics Office for disposal.

i. Major subordinate commanders, directors, chiefs of staff offices, commanders, and tenant activities using any radiation sources or equipment (ionizing or non-ionizing) will publish a Standing Operating Procedure (SOP) to be followed when working with a potentially hazardous radiation source. A copy of each SOP will be forwarded to the installation RPO, ATTN: MCGA-DPS-S.

j. The DPTMSEC will develop, test, and be prepared to implement the FSH and Camp Bullis Radiological Accident/Incident Response and Assistance Plan. This plan will be tested annually.

k. Each individual, who uses radioactive material or is exposed to ionizing radiation will comply with the procedures and precautions of this memorandum. The individual will also report any safety equipment or procedural violation regarding radiological protection to the installation RPO.

## **6. PROCEDURES FOR CONTROL OF RADIATION SOURCES.**

### **a. Procurement.**

(1) The RCC approves the quantities and types of radiation sources that may be used on FSH and Camp Bullis. Users will send requests for authority to use a new radiation source through their respective RPO to the RCC for approval.

(2) Send requests for purchase of radiation sources through the IRPO, ATTN: MCGA-DPS-S, for approval. The IRPO supervises the requisitioning of radiation sources, to ensure that only allowable quantities of approved sources are on hand.

b. Shipping and transportation of radioactive materials/commodities is to be accomplished IAW 49 CFR.

### **c. Storage.**

(1) Each radioactive source will have a tag or label affixed containing the radiation caution symbol, isotope identification, activity, and date measured (except commercial calibration sources that are in exempt quantities, and are labeled by the manufacturer as to isotope, activity, and date).

(2) Each radioactive source/commodity will be stored IAW 10 CFR, U.S. NRC regulations, with appropriate placards and symbols, where required.

d. Inventory.

(1) Users of ionizing radioactive material/equipment will conduct a physical inventory quarterly. Users will keep records of quarterly inventory results IAW AR 25-400-2, The Modern Army Recordkeeping System (MARKS). Any discrepancies noted during an inventory will be reported immediately through the unit RPO to the IRPO. A copy of the inventory will be forwarded to the IRPO, ATTN: MCGA-DPS-S.

(2) Users of non-ionizing radiation and coherent light equipment will conduct an annual physical inventory. Any discrepancies noted during an inventory will be reported immediately through the unit RPO to the IRPO. A copy of the inventory will be forwarded to the IRPO, ATTN: MCGA-DPS-S.

(3) The unit RPO will take a physical inventory annually, as a minimum, of all radioactive material/equipment covered by NRC licenses and DA authorizations IAW AR 385-11. Annual inventories of all radioactive materials will be submitted no later than (NLT) 15 December to the IRPO, ATTN: MCGA-DPS-S.

e. Surveillance. The unit RPO will conduct necessary surveillance tests of radioactive materials, and radiation work areas, as required by NRC licenses.

f. Disposal and turn-in of radioactive waste, materials, and equipment.

(1) Radioactive items, i.e., watches, compasses, light antitank weapon (LAW) front sights, and test sample MX-7338, must be accompanied by DA Form 3161, Request for Issue or Turn-In.

(a) Units will process the items through the IRPO at the Installation Safety Office, building 2250, for accountability.

(b) After sign-off by the IRPO, deliver these items to building 1001, BAMC, Radiation Safety, for turn-in.

(2) Units will forward DD Form 1348, DOD Single Line Item Requisition System Document, and DA Form 2765-1, Request for Issue or Turn-In, to DOL, Storage Material Handling Section, building 4189.

g. Markings for radioactive material.

(1) Radioactive storage areas must be marked IAW AR 385-11. Areas that require "CAUTION RADIOACTIVE MATERIAL" signs are: RADIAC AN/UDM-2, AN/UDM-6, AN/UDM-7, Moisture Density Gauge; the M43A1/M8A1 and the Radioactive Test Sample MX-7338/PDR-27. "CAUTION RADIATION AREA" signs are required on the entrances of rooms containing RADIAC calibrators.

The signs will be at least 8 by 10 inches, overall, with a minimum letter size of 3/4 inches, and the radiation symbol will be at least 3 3/4 inches. The

sign(s) will be posted at entrances to rooms or storage areas. Wherever the signs are posted, a NRC 3 Form, U.S. Nuclear Regulatory Commission, Notice to Employees, must also be posted.

(2) Radioactive storage container for equipment listed above must be labeled "CAUTION RADIOACTIVE MATERIAL." This label is approximately 1 3/4 inches, and must be completed by listing the isotope, and radiation level in millicuries.

(3) The MX-7338/PDR-27 radioactive test sample must have the factory-made radioactive warning identification tag attached with the serial number listed. This test sample is considered unserviceable if the identification tag is damaged, illegible or missing or if the aluminum wand is crushed or corroded. If this item is lost, report it to the installation RPO immediately.

## **7. RADIATION SAFETY PROCEDURES.**

a. Procedures will be implemented to:

(1) Reduce the amount of external radiation exposure as far below the "maximum permissible" level as is reasonably achievable.

(2) Reduce the possibility of internal radiation exposure by preventing ingestion, inhalation or other modes of entry of radioactive materials into the body.

(3) Prevent the spread of radioactive contamination.

b. Basic philosophy.

(1) The control of ionizing radiation hazards begins at the source by containment.

(2) Keep exposure to ionizing radiation ALARA.

(3) Adequate monitoring and alertness are a vital part of safe, smooth, and efficient operations.

(4) Never put safety in jeopardy because a job "must be done."

(5) For information concerning the evaluation of potential safety problems, call the IRPO, 221-0830/0630.

c. Basic radiation safety rules.

(1) Ionizing radiation areas must be immaculate where unsealed activity is present.

(2) Before entering an ionizing radiation area where spreadable activity is present, check the body for any exposed breaks in the skin (that is, open cuts or abrasions). If an individual has breaks in the skin, he/she will not be permitted to come into direct contact with the spreadable contamination.

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(3) Do not eat, chew, smoke, drink or prepare food or drink in radiation areas where the spreadable radioactive material is handled or stored.

(4) Tools and other equipment used in radiation areas where spreadable radioactive material is present are regarded as contaminated. They cannot be taken outside the area until a survey indicates the items are within the appropriate maximum permissible levels.

(5) Rehearse new procedures during a "dry-run" before working with radiation sources, especially if special handling tools or equipment are used. Any faulty procedure or any defective or improperly designed handling equipment noted during such rehearsal will be modified, repaired or replaced, and tested before being used in the actual operation with a radiation source.

(6) Observe the maximum practical distance, and shielding, and minimum personnel exposure time when handling or working in the vicinity of radiation sources. Avoid unnecessary exposure to radiation.

(7) Do not use a radioactive source in a non-radiation area in such a manner as to create radiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of 2 millirem (2 mrem) in 1 hour or 100 mrem in 7 consecutive days.

(8) Entry into any area where a possibility of receiving a dose rate of 2 mrem per hour or a total dose in excess of 100 mrem in 7 consecutive days (that is, a restricted, radiation or high-radiation area), will be limited to necessary work done or supervised by radiation workers. Do not allow anyone below the age of 18 or who is pregnant to enter a restricted area (dose rate in excess of 2 mrem/per hour). Personnel entering into such areas will wear a thermoluminescent dosimeter (TLD). Also, entry into a high-radiation area requires the wearing of self-reading dosimeters.

d. Instructions to personnel working with radiation material.

(1) Inform individuals working in or frequenting any portion of a restricted radiation or high-radiation area of the presence of radioactive materials or radiation. Also instruct them of the exposure hazards to such materials or radiation, in the precautions or procedures to minimize exposure, and on pertinent regulations which apply to that area.

(2) Wear prescribed monitoring equipment (TLD and pocket dosimeters) at all times, in any radiation area.

(a) Activities requiring TLDs will have an adequate supply available for immediate use. Staff members who escort visitors to radiation areas are responsible for signing TLDs in and out for their visitors.

(b) Use an appropriate personnel-monitoring device, and self-reading pocket dosimeter, to monitor the whole-body exposure of each individual who enters a high-radiation area.

(c) Each person assigned a TLD will wear only the dosimeter assigned to that person. Do not exchange dosimeters with another person under any circumstances, and do not tamper with the device in any way.

(d) Personnel working in radiation areas must wear dosimeters at all times. These devices may be worn comfortably on the belt line or chest, but

never cover them with any other clothing or carry them in pockets. If wearing a lead apron or similar clothing, wear the dosimeter beneath the apron.

(e) Do not take the dosimeters out of the building unless the outside duty or travel will be associated with an exposure to radiation. Personnel should not wear dosimeters when receiving diagnostic or therapeutic x-rays.

(3) Wear protective clothing while in radiation areas where spreadable radioactive material is present; do not wear the clothing outside a radiation area until it is determined to be free of detectable contamination.

(4) Frequently monitor hands, hair, face, and protective clothing, and equipment with appropriate instrumentation during the work periods where spreadable contamination is present.

(5) Before leaving the radiation area, monitor exposed areas of the body and personal clothing with appropriate instrumentation.

(6) Even if contamination is not found, monitor, wash, and re-monitor hands before leaving any facility where spreadable radioactive materials are used.

(7) If an accidental overexposure has occurred or is suspected, contact the installation RPO. If necessary, the RPO will refer the case to Occupational Health Services, who will determine disposition, including the need for medical examination.

e. Radiation protection standards.

(1) The maximum occupational permissible exposure to ionizing radiation is IAW the permissible limits specified in Title 10, CFR, Part 20, Standards of Protection Against Radiation, and AR 40-14. When the limits of the Federal regulations and DA directives are in conflict, use the least value of maximum permissible exposure quoted.

(2) The intentional exposure of personnel to radiation for medical or dental diagnosis or medical therapy by members of the medical profession is not considered in the maximum permissible exposure.

(3) Areas surveyed using appropriate RADIAC instruments are considered contaminated with fixed contamination if smears are within limits for removable contamination, but RADIAC instruments indicate twice the background levels or more.

f. Lasers and microwaves.

(1) Lasers and microwave sources (diathermy) used for medical purposes are covered by specific guidance within BAMC directives.

(2) Microwave ovens are not routinely monitored by the Preventive Medicine Service, unless a potential problem exists. However, they should be kept clean, doors should be in proper functioning condition, and no tampering with the safety locks.

(3) The control of other microwave sources is prescribed in TB MED 522, Control of Hazards from Protective Material Used in Self-Luminous Devices.

(4) The use of visible laser diodes (pen-like laser pointers, survey instruments, etc.) are becoming widespread.

(a) The potential hazard is limited to unprotected eyes of individuals who look at the laser within the direct beam.

(b) No skin hazard exists.

(c) Pointer lasers should never be pointed into the audience.

(d) Laser pointers with a "caution" label have few safety devices as opposed to those that are labeled "danger."

(e) Other equipment containing lasers should be used in accordance with the manufacturer's instructions.

(f) Additional guidance is available in TB MED 524, Control of Hazards to Health from Laser Radiation.

g. Caution signs, labels and signals.

(1) Conspicuously post signs, signals or labels bearing the standard radiation caution symbol in radiation areas, and secure these areas to prevent entry by unauthorized personnel.

(2) Mark the boundaries of a temporary radiation area with portable signs on a rope or chain.

(3) Post laser and microwave operations with the appropriate standard warning signs.

(4) The specifics concerning signage is outlined in AR 385-11.

h. Radiation emergencies.

(1) During duty hours, any individual who recognizes what he/she may consider to be a radiation emergency, (an incident showing evidence of loss or unauthorized use of a radiation source, accidental release of radioactive material or excessive radiation exposure or injury to personnel), will immediately notify one of the personnel listed below, in order of priority. The individual notified will then notify other personnel listed.

(a) Area supervisor.

(b) IRPO or alternate RPO (IRPO, FSH: 221-0830/0630, alternate RPO; Camp Bullis: 295-7195).

(c) Fire Department (FSH: 221-2727; Camp Bullis: 295-7600).

(d) Military Police (FSH: 221-2222; Camp Bullis: 295-7557).

(2) Emergency procedures are outlined in appendix B.

(3) During non-duty hours, report such an emergency to the Staff Duty Officer (SDO), 221-2810, who notifies personnel in priority listed.

(4) The IRPO:

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(a) Assesses the severity of the incident and takes action as prescribed by Title 10, CFR, Part 20.

(b) Notifies the USAG Emergency Operations Center (EOC).

(c) The IRPO ensures that a copy of appendix B is furnished to the Garrison SDO instruction books, Radiation Safety (BAMC); Fire Department, IMA, DPTMSEC, EOC, and the unit RPOs.

i. Radiation equipment and control procedures are identified below for radioactive items that may be used on FSH and Camp Bullis.

(1) The standard Army wristwatch (NSN 6645-00-952-3767), the lensatic compass (NSN 6605-00-151-5337), and the front sight of the LAW and LAW trainer contain sealed radioactive material. The wristwatch and the lensatic compass contain Hydrogen. The LAW contains Promethium 147. These isotopes are beta only emitters, and present no radiation hazard in the in-tact piece of equipment. If the radioactive part of the item becomes broken, these isotopes present little external body hazard, but do present an internal body hazard. If the Army wristwatch, the lensatic compass or the front sight of the LAW becomes physically damaged, place these items inside a plastic bag, wash your hands, and notify the installation RPO. The RPO determines if the work area or individuals have to be surveyed for radioactive contamination.

(2) Radium is used as a luminous material in various gauge, meter, and compass dials. These items include the IM-174 series radiacmeter (except factory-built B models), old lensatic compasses without radiation warning markings, and old gauges on vehicles, power generators, and some radioactive knobs, gauges, and toggle switches on radio, public address (PA) systems, electronic test sets, and voltmeters. These items contain radioactive radium which is an alpha and gamma emitter, making it an external and internal radiation hazard.

(3) If the glass face of the IM-174 radiacmeter breaks, place it in a plastic bag and have personnel wash their hands. Survey the work area and personnel with the AN/PDR-27 radiacmeter, to determine if the personnel or area is contaminated. If contamination is not detected, place the IM-174 radiacmeter in a plastic bag, and turn-in to the area Test, Measurement, Diagnostic, Equipment (TMDE) personnel. If contamination is detected or if an AN/PDR-27 radiacmeter is not available, notify the installation RPO immediately. If the paint on the dials of the IM-174 series radiacmeter starts to flake in the in-tact radiacmeter, turn-in to the area TMDE personnel. The turn-in documents should indicate the flaking.

(4) Many older vehicles contain gauges with radium paint dials. Some older radios and PA systems, electronic test sets, and voltmeters contain radioactive meters, knobs, and toggle switches. If any of these radioactive parts have radium paint flaking off, inform the installation RPO immediately. Although not required by regulation, radioactive vehicle and generator gauges can be replaced with non-radioactive gauges. These radioactive gauges can be identified by using the AN/PDR-27 radiacmeter if it becomes damaged or at the time of disposal. If radiation is detected, notify the installation RPO. To eliminate continuous monitoring on this equipment when damaged, and upon disposal, a one-time survey of this equipment can be done with the AN/PDR-27 radiacmeter. Label and list each radioactive part on an inventory sheet. Update this inventory sheet on a quarterly basis.

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(5) Krypton 85 is used in the MX-7338 test source of the AN/PDR-27 radiacmeter, and the ignition exciter units of Army aircraft. Krypton 85 is a beta and gamma emitter in a gas form, and is encased in metal housings. The test source of the MX-7338 presents an external radiation hazard in the in-tact item, and exposure to the test source is kept to a minimum when

performing the functions check of the AN/PDR-27 radiacmeter. There is less Krypton 85 in the ignition exciter unit that presents little external radiation hazard.

(6) If the metal of the MX-7338 or the ignition exciter unit should crack, ventilate the area to allow the gas to dissipate. Check the MX-7338 for leakage by performing the function check as specified in TM 11-6665-361-10, Operator's Manual for Radioactive Test Sample, Krypton 85, Gamma, MX-7338/PDR-27. On the 50 millirad (mrad)/per hour range for the AN/PDR-27 radiacmeter, a reading of at least 10 mrad should be indicated when the MX-7338 check source is used.

(7) The Toxler 3400B Moisture Density Gauge delivers significant external neutron and gamma radiation, and contains radioactive sources that present an internal hazard if the item becomes physically damaged. Exposure to this radiation source must be kept ALARA. The moisture density gauge must be operated only IAW its instruction manual. Personnel must be formally trained in the operation of this equipment, and must wear TLDs when doing so.

(8) The new M8A1 alarm consists of the M43A1 detector, and M42 alarm unit. The M43A 1 chemical detector component of the M8A1 chemical agent alarm system contains 250 microcuries of AM 241 in the detector cell module.

(a) Preparation of work area, wipe test, and accountability are listed in paragraphs 2-1 through 2-3 of TB-3-6665-312-50, Calibration Procedure for Tester, Airflow Resistance.

(b) Post radiation warning signs on room entrances if more than on M43A1 is stored in the same room. No more than 222 detectors or 44-cell modules or equivalent mix (1 cell module per 5 detectors) may be stored in a single room. Units must store detectors in a fire resistant container (metal cabinet or foot locker); in rooms or areas which are free from the damage of flooding; appropriate distances from flammables or explosives, and secure them against unauthorized removal.

(c) Attach the filter (NSN 6665-01-198-3882) to the exit port of the M43A1 detector when operator preventive maintenance checks and services (PMCS) are being performed. Other maintenance or training is performed inside a closed structure. Using this detector inside a moving vehicle is prohibited, with or without the exit port filter.

(9) The chemical agent monitor (CAM) radiation source is Nickel 63 placed on a metal cylinder. The light source is a sealed Pyrex glass capsule internally coated with phosphorous containing 500 millicuries of gaseous Tritium. The Nickel 63 source is encased inside the cell assembly with the drift tube. The Tritium light source is embedded in a semi-shock material beneath the display dial.

NOTE: The CAM does not present a radiation hazard as long as the radiation source remains in tact. Potential hazards exist if the sources are broken, damaged or exposed through breakage of the CAM casing, and component walls. Exposure to the Nickel 63 presents the potential for skin

contamination, and ingestion. A broken light source (Tritium) presents primarily an internal hazard due to inhalation of the Tritium. If the CAM case breaks, do not operate the CAM. Evacuate the area immediately and notify the IRPO.

APPENDIX A

**Required Publications and Forms.**

1. Required Publications:

AR 40-14, Occupational Ionizing Radiation Personnel Dosimetry.

AR 25-400-2, The Modern Army Recordkeeping System (MARKS).

AR 385-11, Ionizing Radiation Protection.

AR 385-40, Accident Reporting and Records.

AR 700-64, Radioactive Commodities in the DOD Supply System.

TB MED 524, Occupational and Environmental Health: Control of Health Hazards from Protective Material used in Self-Luminous Devices.

TB MED 522, Occupational and Environmental Health: Control of Hazards to Health from Laser Radiation.

TB 3-6665-312-50, Calibration Procedure for Tester, Airflow Resistance.

TM 11-6665-361-10, Operator's Manual for Radioactive Test Sample, Krypton 85, Gamma, MX-7338/PDR-27.

MIL-STD-129, Marking for Shipping and Storage.

2. Required Forms:

DD Form 1348, DOD Single Line Item Requisition System Document.

DA Form 2765-1, Request for Issue of Turn-In.

DA Form 3161, Request for Issue or Turn-In.

**Radiological Emergency Procedures**

**1. Purpose.** To prescribe instructions for dealing with a radiological emergency. This includes, but is not limited to contaminated injured

personnel, fire, flood or other emergencies in a radiation area or the uncontrolled release of radioactive material.

## **2. Responsibilities.**

a. The RPO is responsible for publishing and revising this appendix, and to ensure that copies are posted, where required, including the Garrison Staff Duty Office.

b. Individuals using, handling or responsible for radioactive materials will familiarize themselves with the Radiation Protection Program procedures and requirements.

c. The individual discovering a radiological emergency is responsible for accomplishing immediate actions required.

d. Emergency plans are tested annually, and are incorporated as part of the applicable disaster control plan.

## **3. Radiological Hazards.**

a. Exposure to ionizing radiation within limits specified by federal regulations does not have significant long- or short-term effect. Radiation areas used by FSH and Camp Bullis are maintained within federal guidelines by shielding or reducing the amount of sources.

b. Radioactive material, which is taken into the human body through inhalation, ingestion or open wounds, produces more physiological damage than much greater amounts of materials outside of the body. Therefore, it is important for persons involved in or near the accident to avoid eating, drinking, smoking or inhaling smoke. Wash and cover wounds.

c. Notify the Occupational Medicine Service of any exposed individual for follow-up, as appropriate.

**4. Immediate Actions.** The first few minutes after discovery of a radiological accident are the most critical if there are injured persons involved. During this period, the individuals present must take immediate action to render first aid (if required),

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control personnel exposure, and the spread of contamination. The following guidance is provided for accomplishing these tasks; however, good judgment must be exercised in its application.

a. Administer lifesaving first aid.

b. Remove injured personnel from radiation areas.

- c. Keep all unnecessary personnel out of the area.
- d. Administer first aid for lesser injuries.
- e. Clear the downwind areas of personnel as far as feasible (at least until there is no ground smoke in the case of fire).
- f. Decontaminate injured personnel as soon as possible.
- g. Do not let any person or item thought to be contaminated out of the area.
- h. Identify and record names of affected personnel.
- i. Any action which increases the chance of radioactive material entering the body must be prohibited. Open wounds must be cleaned (decontaminated) thoroughly. Smoking, eating, and drinking will not be permitted in any area believed to be contaminated.
- j. The following paragraphs provide some guidance for accomplishment of the tasks above.

(1) First aid. Normal first aid procedures may be used with the following exceptions, modifications, and considerations:

(a) Treat only those persons with severe (that is, life endangering) injuries before removing them from the immediate site of the accident. Give primary consideration to life-saving procedures. Once life-saving procedures are accomplished, weigh the dangers of removing the individual from the site against the danger of radiation exposure if he/she remains at the site. The least injurious approach is the most desirable. In either event, decontaminate injured personnel, as soon as possible, with emphasis on removing gross amounts of radioactive contaminants, especially from the vicinity of wounds.

(b) Remove personnel with minor injuries from the immediate site, and decontaminate before treating.

(2) Control of personnel radiation exposure. The priority of radiation exposure control is second only to the safety of human life and limb. Therefore, after emergency first aid is rendered, direct efforts towards reducing personnel radiation exposure; any unnecessary radiation exposure is considered excessive. The following guidelines are provided:

(a) Control exposure by minimizing exposure time, increasing the distance between sources and personnel, and placing some dense material between sources and personnel.

(b) Remove all but the most severely injured from the accident site at the earliest possible time. Delay first aid for minor injuries until

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decontamination is completed, consistent with the urgency of need for treatment.

(c) Personnel who must be evacuated from the site should be decontaminated to the greatest extent possible before evacuation. Inform hospital and medical personnel of radioactive contamination, if decontamination is not complete.

(d) Obtain the name, address, unit and telephone number from each person involved, and retain until follow-up action is complete.

(e) Collect all TLDs and other dosimetry devices once the danger of exposure has passed, and arrange for immediate processing of the TLDs. Read and record the data taken from direct reading dosimeters.

(3) Radioactive contamination control. Proper control of contamination contributes not only to the task of personnel exposure control, but to the eventual task of area decontamination.

(a) Immediately upon discovery of an accident, close off the area, to include sealing windows and doorways, shut off the ventilation system, and limit access to the area.

(b) If fire is involved, extinguish as quickly as possible and take precautions to prevent runoffs from leaving the area by way of the storm or sanitary sewer.

(c) Contain and isolate all contaminated or possibly contaminated personnel and equipment until decontamination and monitoring are complete.

(d) Establish a contamination-free area, and do not allow contaminated personnel or articles within this area.

(e) If any individual or equipment is removed from the scene before decontamination is complete, take precautions to prevent the cross-contamination of personnel, areas, equipment and vehicles.

(f) Suspect that everyone and everything in the area of the accident is contaminated, until proven otherwise.

**5. Decontamination.** Once personnel have been removed from the immediate vicinity of the accident, direct efforts toward decontamination of personnel, giving priority to the injured. Attempt area decontamination only under the direction of the RPO.

a. Establish a clearly defined line, at which personnel and equipment are monitored, out of the area, and beyond where contaminated articles or personnel are not allowed.

b. Personnel decontamination is accomplished by washing, normally with available soap and water. The amount of water used should be kept to a minimum and must be contained (not allowed to flow into the sanitary sewer system).

c. Flush minor wounds with water to remove traces of radioactive materials. Once wounds are decontaminated and bandaged, protect them against recontamination.

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d. Continue decontamination until the IRPO or other competent authority determines, through instrument readings, that the remaining levels of radioactivity are within established guidelines.



The proponent of this memorandum is the Directorate of Public Safety. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to the Commander, U.S. Army Medical Department Center and School and Fort Sam Houston, ATTN: MCGA-DPS, Fort Sam Houston, TX 78234-5014.

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/S/

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