



DEPARTMENT OF THE ARMY  
UNITED STATES ARMY GARRISON BAVARIA  
UNIT 28130  
APO AE 09114-8130

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MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: USAG Bavaria Radiation Safety Program Standard Operating Procedure (SOP)

**1. Purpose, Applicability, and Objective:**

- a. To establish and maintain a Radiation Safety Program for the effective management of radioactive commodities, radiation emitting sources, and hazardous lasers possessed and/or used by all Department of Defense (DOD) organizations, US Government agencies, and US and Host Nation civilian workers and contractors in the USAG Bavaria footprint. It does not apply to medical use of ionizing or non-ionizing radiation or nuclear weapons.
- b. Commanders will ensure coordination with the local Works Council, or equivalent, for Local National employees working with radiation emitters or devices containing radioactive material.
- c. The objective is the protection of people and the environment from unnecessary exposure to radiation. Radiation safety is concerned with understanding, evaluating, and controlling the risks from radiation exposure relative to the benefits derived. **NOTE:** Army radioactive commodities do not cause contamination during normal use.

**2. References:**

- a. AR 385-10 The Army Safety Program, Chapter 7 and Appendix B, 27 November 2013.
- b. DA Pam 385-24 The Army Radiation Safety Program, 24 August 2007, RAR 30 November 2015.

**3. Supplementation:** Commanders will supplement this SOP with local Command-specific Radiation Safety Programs.

**4. Suggested Improvements:** The proponent of this SOP is the USAG Bavaria Safety Office. Users may send suggestions to improve this publication to the following email address: [usarmy.bavaria.id-europe.list.safety@mail.mil](mailto:usarmy.bavaria.id-europe.list.safety@mail.mil).

5. **Radiation Safety Program Key Components:** There are ***24 mandatory components*** of an effective Radiation Safety Program (RSP) which include inventories, training, surveys (including leak tests), and audits/inspections, among others. The mandatory program elements/components are as follows:

a. **General Army Radiation Safety Program Requirements & Responsibilities:**

1) **Program Requirements:**

- a) Commanders will ensure a standard operating procedure (SOP) is developed for all equipment covered by this SOP. The SOP will be reviewed by the Garrison Radiation Safety Officer and signed by the unit Commander. This may be a standalone document or an enclosure in the Commander's Safety Program Document.
- b) The SOPs and revisions will be based on the results of a complete risk assessment of all phases of the task or operation and resulting recommended controls. Risk assessments shall be documented on DD Form 2977.
- c) Army personnel using radioactive materials (RAM) (including industrial radiography sources and commercial off-the-shelf equipment) are to comply with all applicable Nuclear Regulatory Commission (NRC) regulations and licenses, Army radiation authorizations (ARA), and Army radiation permits (ARP) held by their Command or by another Command.
- d) Units will adopt no practice and conduct no operation involving planned exposure of personnel to ionizing radiation in excess of the applicable exposure standards (other than deployment operations governed by operational exposure guidance).
- e) All units will maintain a current roster of trained and qualified employees who are authorized to use equipment containing radioactive materials, radiation emitting sources, or hazardous lasers. Documentation of training will be maintained in unit training records.

2) **Responsibilities:**

- a) Radiation Safety Officers (**RSO**), Laser Safety Officers (**LSO**), and Radiofrequency Safety Officers (**RFSO**) and alternates must be appointed in writing at all levels. Designation of an alternate is an effective means to ensure program continuity and command and control of radiation sources in the absence of the primary RSO/LSO/RFSO.

- i. Each Commander or Director designates, in writing, an RSO when any of the following is true:
    - A) An NRC license, ARA, Army reactor permit, or applicable technical publication requires an RSO to be appointed.
    - B) An NRC license, ARA, Army reactor permit, or applicable technical publication requires personnel in the command to wear Army Dosimetry Center (ADC) issued dosimetry.
    - C) An NRC license, ARA, Army reactor permit, or applicable technical publication requires personnel in the command to participate in a bioassay program.
    - D) A deployable unit possesses radioactive commodities or radiation emitting equipment that requires the implementation of a Radiation Safety Program (for example, leak testing, radiation postings, and shipping requirements).
  - ii. Each Commander or Director designates, in writing, a **LSO** when the activity operates, maintains, or services Class 3B or Class 4 Laser Systems or military/Department of Defense-exempt laser systems.
  - iii. Each Commander or Director designates, in writing, a **RFSO** whenever there are RF or electromagnetic radiation (EMR) sources that exceed the exposure reference levels (ERLs).
  - iv. Copies of all RSO/LSO/RFSO appointment letters will be provided to the Garrison RSO promptly.
- b) Each **RSO, LSO, or RFSO**, including the Garrison RSO, provides the following functions, for radiation sources within their organization's responsibility:
- i. Performs or be responsible for the performance of all radiation safety functions that are applicable to Federal, DOD, and Army regulations and NRC licenses, Army reactor permits, and ARA condition requirements.
  - ii. Properly documents, stores, retains, and preserves RSP records including annual physical inventories and radiation and contamination survey reports to ensure availability during decontamination and decommissioning.

- iii. Establishes plans and procedures for handling credible emergencies involving radiation and RAMs. This includes coordination with civilian and military emergency response organizations as necessary.
  - iv. Coordinates with supporting medical personnel to ensure that personnel receive appropriate occupational health surveillance (see AR 40–5).
  - v. Radiation Safety Officers, with laser safety responsibilities, assume the responsibilities of an LSO as listed in ANSI Z136.1, except for occupational health responsibilities. The RSO or LSO assists the occupational health physician, as necessary, in meeting laser occupational health responsibilities.
  - vi. Radiofrequency Safety Officers assume the duties of an RFSO as listed in Institute of Electrical and Electronics Engineers (IEEE) C95. The RFSO assists the occupational health physician, as necessary, in meeting Radiofrequency (RF) occupational health responsibilities.
- c) Each unit RSO or LSO:
- i. Receives instruction on the types of radioactive commodities, ionizing radiation producing devices, lasers, and Electromagnetic radiation (EMR) sources from 0 Hertz (Hz) to 300 Gigahertz (GHz) within the unit.
  - ii. Provides user-level training in the radiation safety aspects of radioactive commodity use, laser safety, and EMR sources from 0 Hz to 300 GHz or ensures users receive required training.
  - iii. Develops and maintains a unit standing operating procedure (SOP) for storage, inventory, tracking, and leak testing of radioactive commodities, materials, or sources and response to broken and damaged radioactive sources. Develops and maintains a unit SOP for safe operation, storage, inventory, tracking, accident reporting, and disposal requirements for Class 3B and Class 4 lasers and EMR sources from 0 Hz to 300 GHz that could potentially exceed the ERL limits.
  - iv. Manages the inventory of radioactive commodities, ionizing radiation producing devices, Class 3B and Class 4 lasers, and EMF sources that could exceed ERL limits for the unit and establishes controlled areas as required.

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- v. Conducts annual, or as required by NRC license conditions, physical inventories of RAM and forwards the inventory to their Commander, applicable ARA manager, applicable NRC licensee, and the Garrison RSO.
- vi. Coordinates with the serialization officer to ensure that applicable transactions are entered into the DOD Radiation Testing and Tracking System database in accordance with AR 710–3 as required. While deployed, tracking per AR 710–3 is not required.
- vii. Stores and secures radioactive commodities, secured by two independent permanent physical locks, the location properly posted when not in use, and away from flammables/explosives. While deployed, the unit RSO stores and secures radioactive commodities consistent with mission, enemy, terrain, troops, time, and civil considerations.
- viii. Conducts surveys of storage areas as required by the appropriate NRC license.
- ix. Performs (or has performed by direct support units) periodic leak tests, as required.
- x. Establishes and maintains a Personnel Dosimetry Program as per DA Pam 385–25 (when required).
- xi. Conducts transportation surveys and ensures that radioactive commodity shipments are certified by a qualified hazardous material shipping official when required.
- xii. Provides shipping information, to include appropriate exposure rate and contamination levels, to the transportation officer or hazardous material officer prior to shipment.
- xiii. Investigates accidents or incidents involving lost, stolen, broken, damaged radioactive commodities, materials, and sources or malfunctioned safety devices of radioactive commodities.
- xiv. Coordinates with medical authorities to follow up on possible personnel exposure to RAM.
- xv. Secures and stores damaged radioactive commodities, materials, and sources properly.

- xvi. Reports accidents and incidents to the Garrison RSO, Command RSSO and the affected NRC license RSO.
- xvii. Reports lost or damaged radioactive commodities, materials, and sources in accordance with DA Pam 385–40 and AR 385–10 by completing a DA Form 285–AB (US Army Abbreviated Ground Accident Report) and a report of survey, as required.
- xviii. Initiates request for disposal of damaged devices through the Garrison RSO, Command RSSO, and NRC license RSO.
- xix. Maintains RSP records.
- xx. Maintains “ACTIVE” (health and safety calibrated) radiation detection, indication, and computation instruments required to perform mandated surveys.

d) Each **unit** RFSO:

- i. Identifies, evaluates, and specifies control measures for EMF sources that may produce fields exceeding the ERL limits. Regions that are normally accessible and exhibit intense EMFs will demand a higher priority when allocating resources for implementing the EMF RSP.
- ii. Conducts safety analyses, which may address potential exposure to personnel and potential interference with medical devices.
- iii. Provides an initial evaluation of the potential for exposure, and monitoring changes (that is, radiation characteristics of the EMF sources or access to controlled areas).
- iv. Maintains an inventory of controlled EMF sources; **check Technical Bulletin (TB) 43–0133 for guidance if a source needs an EMF safety program.**
- v. Evaluates and implements recommended safety procedures (for example, use of signs, barricades, and published safety procedures for identified user activities).
- vi. Documents the EMF safety program.
- vii. Monitors relevant regulations relating to EMF safety.

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- viii. Disseminates information on EMF safety policy within the organization.
- ix. Provides advice on the interpretation of policies and procedures related to EMF safety.
- x. Reviews and authorizes EMF surveys and hazard control measures.
- xi. Designates qualified EMF safety personnel.
- xii. Provides EMF safety awareness training and maintaining training records.
- xiii. Conducts or arranges regular site audits (at least once every three years) for compliance with EMF safety policies.
- xiv. Conducts an annual review of EMF hazard survey policies and procedures to ensure that they adequately reflect best practices and regulatory requirements.
- xv. Investigates breaches of EMF safety policies and procedures or accidental EMF over-exposure incidents.
- xvi. Archives all documentation associated with EMF safety in the organization in accordance with DODI 6055.11 and AR 25-400-2.

e) Garrison RSO:

- i. Establishes and directs the Garrison RSP (to include a written RSP document).
- ii. Assists units, tenants, civilian activities, and contractors on the installation to meet requirements of NRC licenses and ARAs for radioactive commodities. In particular, the Garrison RSO —
  - A) Assists units and tenants with radiation safety training support.
  - B) Reports accidents or incidents involving units within the USAG Bavaria footprint to the USAREUR and IMCOM RSSOs who in turn will notify the applicable NRC licensee.
  - C) Advises on appropriate radiation source inventory control and security of the material.

- iii. Notifies the affected mission commander and the AMC RSSO (Army Materiel Command Radiation Safety Staff Officer, 4400 Martin Road, Redstone Arsenal, AL 35898) when a building or area that currently or formerly contained radioactive commodities is scheduled for demolition or no longer contains radioactive commodities. This process provides stakeholders with appropriate notification for decommissioning actions as necessary.
- iv. Administers the Garrison ARP program (to include maintaining records of ARP applications and ARPs issued by the Garrison Commander).
- v. Administers the Garrison Radiation Safety Committee (RSC), if applicable.
- vi. Documents, stores, retains, and preserves Garrison RSP records properly, including radiation contamination survey reports in accordance with AR 25-400-2, to ensure availability during decontamination and decommissioning of facilities.
- vii. Coordinates as necessary with mission RSOs, medical officials, and emergency response personnel (both military and civilian, if appropriate) to establish plans and procedures for responding to credible radiation emergencies on the installation.
- viii. Coordinates with the medical authority on occupational monitoring requirements for Garrison radiation workers when applicable.
- ix. Provides training, guidance, and technical support to Garrison security forces and fire departments with fixed or portable radiation detection systems or mobile imaging systems used for force protection purposes when appropriate.

**b. Control measures:**

- 1) Commanders, with the guidance of the Radiation Safety Officer (RSO), must design, select, use, and maintain radiation exposure control measures to ensure that anticipated and actual occupational doses are maintained as low as reasonably achievable (ALARA) and do not exceed the limits specified in Army Pam 385-24, Table 5-1.
- 2) Risk management will be used to identify and mitigate hazards and manage the associated risk(s) with that activity. This requires that risk assessments, risk decision making, and implementation of effective risk controls be part of



the SOP. SOPs will also incorporate preoperational safety briefings and training requirements. Risk assessments shall be documented on DD Form 2977.

- 3) An annual radiation safety audit checklist is located in Appendix B to assist Commanders and RSOs in evaluating key radiation safety controls.

- c. **NRC Licenses:** Not applicable for USAG Bavaria. Nuclear Regulatory Commission (NRC) licenses are maintained by Communications-Electronics Command (CECOM) at the following website:

<https://cecom.aep.army.mil/cecom/home/Safety/RSO/default.aspx>

- d. **Army radiation authorizations:** Not applicable for USAG Bavaria. Army Radiation Authorizations are maintained by CECOM at the following website:

<https://cecom.aep.army.mil/cecom/home/Safety/RSO/default.aspx>

- e. **Army Radiation Permits:**

- 1) Permits are required for all non-Army or non-military agencies (including vendors and civilian contractors) prior to using, storing, or possessing **ionizing radiation** sources on an Army installation. Contact the USAG Bavaria RSO as soon as it is determined an ionizing radiation source will be brought onto an installation, so that the Garrison Commander can receive the permit application at least 30 days before the requested start date of the permit.
- 2) The applicant must have an appropriate Host Nation authorization, as necessary, that allows the applicant to use the source as specified in the ARP application and has in place a RSP that complies with Army regulations. Applicants will also comply with applicable Status of Forces Agreements (SOFAs) and other international agreements.

- f. **Army Radiation Safety Recordkeeping — to include Decommissioning Records:**

- 1) Each Commander or Director maintains an inventory of licensed or authorized ionizing radiation sources, Class 3B, Class 4, military exempt lasers, and electromagnetic radiation (EMR) sources from 0 Hz to 300 GHz that can exceed the exposure reference levels (ERL) and technical publications.
- 2) All USAG Bavaria units (to include tenant/partner units) will provide information about the location, use, and storage of all Radioactive Materials

- (RAM) to the Garrison RSO as part of the annual inventory for the installation RAM history records. Inventories might require more frequent updates if required by the US Nuclear Regulatory Commission (NRC) license. A copy of the inventory will be furnished to the USAREUR Radiation Safety Staff Office (RSSO) when requested.
- 3) In addition, the inventory must record, at a minimum, the name of the radioactive material, the type, quantity of the material, and the nomenclature of the device. See TB 43-0116 Identification of Radioactive Items in the Army for assistance with identifying equipment containing radioactive material, the quantity of material, and which material it contains.
  - 4) Inventories will also include captured foreign items as well as artifact memorials and 'trophies' containing radioactive material.
  - 5) Each unit, local, and installation RSO or tenant RSO notifies the USAREUR RSSO when a building or area that currently or formerly contained radioactive commodities is scheduled for demolition or will no longer contain radioactive commodities. The USAREUR RSSO will determine if contamination surveys will be required as appropriate.

**Note:** Army radioactive commodities do not cause contamination during normal use. Therefore, unless contamination is known to exist or is found during surveys, consider facilities that contained only radioactive commodities (and no other radioactive material) to be non-hazardous.

**g. Training Requirements for RSOs, LSOs and RFSOs:**

- 1) **Specific training requirements for all three duties are outlined in Army Pamphlet 385-24, Chapter 7 and AE Regulation 385-24, Appendix D and must be reviewed for currency.**
- 2) It is desirable that the RSO be fully qualified prior to appointment. However, if operational circumstances interfere with the training, RSOs, LSOs, and RFSOs are to be fully qualified within 90 days.
- 3) The RSO, LSO, or RFSO designee is trained (and periodically retrained, as necessary) to a level commensurate with the RSP scope and responsibilities.
- 4) RSOs shall also receive specific training for Army radioactive commodities or radiation generating devices (RGD) for which they are responsible.

- 5) RSOs ensure all personnel occupationally exposed to radiation receive appropriate radiation safety training commensurate with potential workplace hazards.
  - 6) Army personnel holding the Military Occupational Specialty (MOS) 72D (Environmental Science Officer), MOS 74D (Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) Specialist), or any within the 25 series (Signal/Communications) should be considered to be the unit RFSO and receive training on RF radiation to support the EMF RSP.
- h. Personnel Monitoring — to include External Dosimetry and Bioassay:** The USAG Bavaria Safety Office is not aware of any personnel in the USAG Bavaria footprint who are occupationally exposed to ionizing radiation or radioactive material above applicable levels. Should units become aware of this condition, notify the Garrison RSO immediately. Occupational personnel radiation safety monitoring is covered in DA Pam 385–25.
- i. Radiation Safety Lifecycle Management:**
- 1) The overarching goal of the Lifecycle Management Program is to provide the US Army the radioactive material and radiation producing devices to support the US Army mission. To do this effectively, the RSP has to have accountability of the radioactive material at all times. Proper training and procedures must be in place to use radioactive materials efficiently, effectively, and safely. Training will include:
    - a) Proper handling of radioactive materials,
    - b) Inventorying,
    - c) Surveying,
    - d) Leak testing with calibrated equipment for accurate results, and
    - e) Audits of the program.
  - 2) In addition, training must be conducted to ensure proper movement of materials, proper disposal procedures, and processes to ensure radioactively contaminated areas are properly decontaminated and decommissioned for future use.
- j. Inventory and Accountability:** Inventories of licensed or authorized ionizing radiation sources (radioactive materials and RGD) will be made in accordance with this SOP, the NRC license conditions, or ARA conditions. The unit RSO or

activity RSO is responsible for the inventory. Inventories are provided to the Garrison RSO annually and to the USAREUR RSSO upon request. Sample inventory sheets are available from the USAG Bavaria Safety Office.

**k. Use and Storage:**

- 1) Use and storage of radioactive materials will be in accordance with the NRC license, ARA, ARP, TB, and Technical Manual (TM) guidance.
  - a) **Posting.** NRC license applications describe when and what posting is required for storage and work areas based on the amount of material and the dose rates emitted by the device. Radioactive material signs are prohibited for RGD use. Hazard warning signs for RGD operations are prohibited for use in identifying radioactive material storage locations.
  - b) **Security.** All radioactive sources are to be secured against unauthorized use or removal. Radioactive sources exceeding International Atomic Energy Agency Category II require additional security procedures as identified in Army Pamphlet 385-24 Chapter 8.

**l. Internal and External Program Reviews:** Reviews of unit Radiation Safety Programs (RSPs) must be conducted periodically in compliance with NRC licenses, ARAs and this SOP. At a minimum, an internal unit review is to be performed annually using, at a minimum, the checklist provided in Annex B. An external review of unit RSPs will be conducted as part of the USAG Bavaria RSP every two years and by higher headquarters, as applicable.

**m. Equipment Calibration:**

- 1) Units having radioactive material, in commodities or otherwise, must maintain calibrated Radiation Detection, Indication and Computation (RADIAC) equipment and an equipment calibration program as required by: DA PAM 385-24 paragraph 1-4(u); AR 750-43 Army Test, Measurement, and Diagnostic Equipment; and TB 43-180 Calibration and Repair Requirements for Maintenance of Army Equipment.
- 2) Calibrate radiation survey instruments used for health or safety purposes at least annually or as specified in TB 43-180 or other governing tech data. Documentation of equipment calibration certifications will be readily available in each workplace.

**n. Survey Instruments:**

- 1) An adequate number and type of radiation survey meters and monitoring devices will be available to support the RSP. The RSO must maintain at least two survey instruments of each type used to accommodate maintenance and calibration downtime. (Applies to Ionizing radiation (RADIAC) meters calibrated Active. Does not apply to tactically calibrated meters.)
- 2) Radiation survey instruments should be response-checked with an appropriate check source before and after use.

**o. Radiation Surveys:**

- 1) Radiation surveys are performed to ensure dose rates and contamination levels are within regulatory limits and meet As Low As Reasonably Achievable (ALARA) goals. Radiation surveys ensure NRC license compliance and are performed in accordance with procedures published by the license. The US Nuclear Regulatory Commission Regulation (NUREG) 1556 series of publications also provide information on radiation surveys.
- 2) Radiation surveys performed to ensure facilities and work surfaces are in compliance with AR 385–10 and NRC regulations are semi-permanent records and maintained as directed by AR 25–400–2. A copy is maintained at the facility and by the Garrison RSO to assist in future closeouts. These records have a disposition of the life of the facility plus 75 years. Forward copies of these surveys to the USAG Bavaria RSO annually.

**p. Shipping, Receiving, Transferring, and Transport:**

- 1) Detailed procedures for the transportation of radioactive materials is outlined in AE REG 50-4 Safe Movement of Hazardous Goods by Surface Modes (hazard class 7 radioactive materials).
- 2) Transfer radioactive material to authorized persons only. The shipper is responsible for ensuring material is shipped only to authorized organizations and personnel.
- 3) **Transportation of radioactive material in privately owned vehicles (POV) or through the US Postal System is prohibited. Government vehicles and commercial freight vehicles will be utilized to transport radioactive commodities throughout Europe.**
- 4) Units will consult with their Dangerous Goods Advisor (DGA), who is appointed on AE Form 55-50E in accordance with AE Regulation 55-4 and AE Regulation 55-50, prior to shipping all radioactive material(s).

- 5) Commanders will appoint in writing and train personnel to transport unit equipment containing radioactive material in accordance with AE Regulations 55-4 and 55-50. Radioactive material is a Class 7 hazardous material by transportation law. Units possessing/using radioactive material must establish a Radioactive Material Transportation Program. Defense Transportation Regulation (DTR) 4500.9-R Part II applies.
  - 6) For Europe, individuals will attend the Combined Arms Training Center (CATC) HAZ-12 and HAZ-15 Hazardous Material Transportation classes to be considered as "qualified" to transport radioactive materials. **NOTE:** This applies only to small "Excepted" shipments. **ALL OTHER SHIPMENTS REQUIRE ASSISTANCE TO SHIP** (see paragraph 7).
  - 7) Unit personnel may not transport larger quantities of radioactive material (Type-A or Type-B quantities) without assistance. To transport large sources, unit personnel must have attended and passed the Radioactive Commodity Identification and Transportation (RCIT) class provided by the Communications-Electronics Command (CECOM) or equivalent commercial course in addition to the requirements listed in paragraph six above.
  - 8) Refresher training to transport radioactive material is required every two years.
  - 9) Lasers, RF equipment, and x-rays are only hazardous when energized. When not energized, there are no special transportation requirements.
- q. **Cargo and Personnel Security Screening Systems (PSSS):** General-use systems produce an effective dose per screening of 0.025 mrem or less. Due to the low effective dose per screening, these systems can be used without regard to the number of individuals scanned or the number of scans per year. No special precautions are required for pregnant women or children. Check manufacturer's specifications for determining the type of PSSS installed. If further assistance is needed, consult with the USAREUR RSSO.
- r. **Emergency Response:**
- 1) Although it is impossible to establish fixed reaction procedures, radiation accident reaction plans will be developed and included in unit SOPs. The following are types of possible radiological emergencies for units within the USAG Bavaria footprint:
    - a) Explosion.

- b) Fire.
  - c) Vehicular accident.
  - d) Tank/DU ammunition fire.
  - e) Loss of or loss of control of a radioactive source.
  - f) Personal injury.
  - g) Laser eye or skin injury.
  - h) RF/EMF overexposure.
- 2) Written emergency procedures will include emergency response and reporting procedures for radiation incidents and over-exposures.
- 3) Emergency response and reporting procedures will be part of the unit's initial safety briefing and will be posted in all storage and maintenance locations and provided to all drivers of vehicles transporting radioactive commodities. Personnel suspected of being overexposed to x-rays will be referred to the medical treatment facility and make a written statement to the RSO.
- 4) **The USAG Bavaria "Quick Reaction Checklist" for Possible Tritium Exposure can be found in Annex C.**
- 5) The RSO supports all radiation safety matters for the on-scene-commander, typically the Fire Chief, who coordinates the emergency response effort.
- 6) The RSO provides radiation safety training to the fire department and emergency response personnel. Emergency response training should be conducted annually or when there is a significant change to the radiation safety emergency response plan.
- 7) **Tank fires:** Personnel will remain upwind of any tank fire. Once a tank fire has been extinguished, personnel will remain clear of the area until a radiation survey has been conducted to determine if any radiation hazards exist.
- s. **Garrison Support of Mission Partners and Contractors:**
- 1) Mission partners can request a Radiation Safety Program inspection through USAG Bavaria Radiation Safety Officer.

- 2) Inspections will be scheduled based on the workload and manning of the Safety Office. If the workload or manning cannot support providing an inspection in the timeframe the tenant unit is requesting, the tenant unit should ask for assistance through their respective organization.
- t. **Military Operations Support:** USAG Bavaria does not anticipate supporting military operations other than routine training activities, but will strive to support all units in the USAG Bavaria footprint to the greatest extent possible should the need arise.
- u. **Foreign and Captured Material:** USAG Bavaria does not anticipate receiving any foreign or captured material. Contact the Garrison RSO immediately should units discover RAM of unknown origin.
- v. **Range Maintenance and Disposal:**
- 1) All USAG Bavaria range maintenance and disposal actions will follow the guidance in DODD 4715.12 Environmental and Explosives Safety Management on Operational Ranges Outside the United States, in conjunction with Host Nation authorizations, Status of Forces Agreements (SOFA), Army regulations, international agreements, NRC licenses, and ARAs, as applicable. USAG Bavaria does not anticipate any radioactive materials (RAM) during this process.
  - 2) When applicable, appropriate fire, chemical, and radiological hazard symbols shall be displayed in such a manner as to be easily visible from all roads of approach. Radiation symbols should conform to the American National Standard on Radiation.
  - 3) An Industrial Hygienist must evaluate the hazards during environmental safety operations where dusts, vapors, or gases are present to determine whether respirators are needed.
  - 4) No hazardous materials or hazardous waste of any kind will be placed in trash receptacles destined for the sanitary landfill without prior approval. All waste must be inspected prior to disposition. Ensure compliance with regulatory documents such as Environmental Assessments, Environmental Impact Statements, or Environmental Radiological Monitoring Plans. Ensure the monitoring methods are sufficient to detect to levels required by NRC license conditions.
- w. **Decontamination Survey Guidance:** Decontamination survey guidance will be provided by the USAREUR RSSO as warranted by each accident or event. Contact the Garrison RSO for assistance.



**x. Handling and Disposal of Unwanted Radioactive Material:**

- 1) Reference USATA, Region Europe External Sop 700-48, which details how to interact with the Radioactive Material Processing Facility (RMPF)
- 2) Do not store radioactive materials with personal, explosive, flammable, or food products or other incompatible commodities. Items with radioactive gas or radium will be stored in ventilated structures. Storage areas and containers will be marked in accordance with 10 CFR.
- 3)
- 4) Burial of radioactive waste on Army or DOD-owned or DOD-leased property is prohibited.
- 5) All USAG Bavaria units with items or equipment containing RAM that are found to be unserviceable or no longer needed will initiate procedures to immediately relinquish control through normal supply channels in accordance with technical data disposition instructions, special instructions, or SOPs . Under no circumstances should these commodities be disposed of in regular waste disposal streams.
- 6) Equipment containing radioactive material or contaminated with radioactive material **may not** be sent to Defense Logistics Agency Disposition Services (formerly known as DLA or Defense Reutilization and Marketing Office - DRMO). Commanders will state this prohibition in their Commander's Radiation Safety Program document.
- 7) Return serviceable equipment to the supply system for reutilization.
- 8) The USAREUR RSSO will provide guidance for the disposition of questionable radioactive materials.
- 9) The Radioactive Material Processing Facility (RMPF) in Pirmasens, Germany and the Low Level Radioactive Waste Agency (LLRWA) in the United States are not dumping grounds to avoid the proper turn-in via the normal supply system and subsequent reuse of serviceable Army equipment. They will, however, assist with information regarding the disposition of equipment. Contact the Garrison RSO for assistance.

**6. Laser Safety Program:**

- a. Units at all levels of the Army that own or employ personnel that operate DOD (military)-exempt, Class 3B, and/or Class 4 lasers are required to establish and maintain a safety program for the control of laser hazards.

- b. The laser safety program includes the following requirements:
  - 1) Designation in writing of an individual as the LSO responsible for laser safety
  - 2) Adequate policies and procedures that comply with Federal and local regulations for the control of laser hazards. The LSO approves SOPs and other procedures for Class 3B and Class 4 laser systems that may be part of the requirements for administrative or procedural controls.
  - 3) The Laser Safety SOPs will include:
    - a) Laser classifications.
    - b) Hazard evaluations.
    - c) Procedure and equipment approvals.
    - d) Inventory, signs and labels.
    - e) Safety features.
    - f) Audits.
    - g) Training of personnel.
    - h) Medical surveillance.
    - i) Accident reporting.
    - j) Administrative and engineering control measures\Safety instructions.
    - k) Documentation.
    - l) Appropriate PPE, such as laser eye protective devices.
  - 4) Implementation and maintenance of recommended control measures (Personal Protective Equipment (PPE), barriers, screens, etc.). The LSO can approve alternate control measures when the primary controls are not practical. The LSO has the authority to suspend, limit, or terminate the operation of a laser system that is lacking adequate laser hazard controls. The LSO periodically audits PPE to ensure that it is in proper working order.
  - 5) Reviews of Class 3B and Class 4 laser installations, facilities, ranges, and laser equipment prior to use. This includes modifications to existing facilities.

- 6) Reviews of the wording on area warning signs and equipment warning labels.
  - 7) Maintaining and annually updating an inventory of all Class 3B and Class 4 lasers (military and non-military), and all military exempt lasers. Laser users should report inventory changes to the LSO as they occur and report changes annually (or more frequently if required by local procedure). The LSO forwards the laser inventory to Garrison RSO at least annually or more frequent if required.
  - 8) Providing the appropriate training and refresher training of authorized laser personnel (for example, LSOs, laser operators, service personnel, and range personnel) in the safe use of lasers and laser systems and control of their hazards.
  - 9) Reporting known or suspected overexposures to laser radiation to the Garrison RSO.
  - 10) Implementing medical surveillance for all required personnel within the program according to current US Army policy.
- c. The use of any military-specific laser or any commercial off-the-shelf laser on an Army range is permitted only if a Joint DOD or US Army Public Health Command (USAPHC) laser safety hazard evaluation has been performed, documented, and signed for that specific model of laser. A partial list of lasers that have a laser safety hazard evaluation is in TB MED 524.
  - d. The use of an unlisted Class 3B and Class 4 laser on an Army range for research, development, testing, and evaluation purposes is permitted only when authorized by the LSO and USAPHC.
  - e. Only Class 1, Class 2, and Class 3R lasers may be used indoors on Army installations as hand-held laser pointing devices. Class 3B or Class 4 lasers are prohibited for such purposes.

## **7. Electromagnetic Field Radiation Safety Program:**

- a. Users will adopt no practice and conduct no operation involving planned exposure of personnel to EMF in excess of the applicable exposure reference levels (ERL). Based upon IEEE C95.1 and DODI 6055.11 there are two tiers to RF safety exposure limits: controlled environments and action levels for the general public. The ERLs for both tiers are provided in IEEE C95.1–2345.

- b. An Electromagnetic Field Radiation Safety Program (EMF RSP) is *needed only when electromagnetic field (EMF) levels can exceed the action level*; hence the term action level. If required, the Electromagnetic RSP shall include:
- 1) An inventory and description of all potentially hazardous EMR radiation producing equipment. The inventory will be provided to the Garrison RSO annually.
  - 2) A SOP describing the unit EMF Radiation Protection Program for each area or activity using potentially hazardous EMF sources. Post the SOP conspicuously in the vicinity of the RF operations.
  - 3) Periodic surveys of potentially hazardous EMF sources conducted to ensure compliance with applicable regulations and Technical Manuals.
  - 4) Annual EMF refresher briefings for all EMF radiation workers. These briefings shall discuss the nature of EMF radiation, the hazards associated with EMF sources, and the means by which personnel can avoid potentially hazardous exposures.
  - 5) Posted EMF warning signs at all access points where levels exceed the controlled environment ERLs listed in IEEE C95.1–2345. The EMF warning sign formats specified in the IEEE C95.2 or adequate variation are permitted to identify EMF hazards and properly instruct individuals of the dangers. Variations to include subdued signs for camouflage or tactical reasons or to provide improved visibility under certain lighting conditions are authorized provided the general layout of the signs remains the same.

**8. Special Reporting Requirements:**

- a. Reporting requirements of NRC licenses, 10 CFR, AR 385–10, DA Pam 385–40, and DA Pam 385–25 apply to radiation **accidents, incidents, and overexposures** involving—
- 1) Radioactive material. Reported immediately to the NRC license holder, ARA holder, or ARP issuer and the ACOM.
  - 2) Manufacturer’s electronics products. Examples include x-ray machines for industrial, medical, and research; accelerators; electron microscopes; and neutron generators. Where reasonable grounds exist that an incident has occurred, personnel are encouraged to remain calm, shut off the device, and call the following numbers at USAPHC to report all medical and industrial incidents involving electronic products:

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- a) DSN 584–8396 or commercial (410) 436–8396 or after duty hours at (410) 436–4375, DSN 584–4375
  - b) DSN Dialing from OCONUS (312) 584–4375, or (800) 222–9698 (24 hour phone lines).
  - c) Refer to the USAPHC Occupational Health Services, Health Physics Program, Resources website for additional information:  
<http://USAPHC.amedd.army.mil/organization/institute/dohs/Pages/hp.asp>  
[X](#)
- b. Non-ionizing radiation. Report all non-ionizing incidents or accidents to:
- 1) Commander, US Army Public Health Command, 5158 Blackhawk Road, Aberdeen Proving Ground, MD 21010–5403, (800) 222–9698 (24-hour phone line).
  - 2) USAPHC Non-ionizing Radiation Program (DSN 584–3353/3932 or commercial (410) 436–3932/2331 or (800) 222–9698 after duty hours) (e-mail to: [usarmy.apg.medcom-phc.mbx.nonionizing@mail.mil](mailto:usarmy.apg.medcom-phc.mbx.nonionizing@mail.mil))
- c. Suspected laser eye injuries. Immediately evacuate personnel suspected of experiencing potentially damaging eye exposure from laser radiation to the nearest medical facility for an eye examination. Laser eye injuries require immediate specialized ophthalmologic care to minimize long-term visual acuity loss.
- 1) Medical personnel should obtain medical guidance for laser injuries from the DOD Laser Injury Hotline, (800) 473–3549, DSN 798–3764, commercial (937) 938–3764, or email [esoh.service.center@wpafb.af.mil](mailto:esoh.service.center@wpafb.af.mil). Additionally, medical personnel should complete the Laser Injury Electronic Reporting Form at <https://hpws.afrl.af.mil/dhp/OE/ESOHSC/laserinjury/> and submit the completed report on the incident to the Laser Injury Database <https://hpws.afrl.af.mil/dhp/OE/laserinjury/>.
  - 2) The Tri-Service Vision Conservation and Readiness Program (TVCRP) should be notified in the event of a laser eye injury. USAPHC TVCRP, (DSN 584–2714 or commercial (410) 436–2714) (email [laserincident@amedd.army.mil](mailto:laserincident@amedd.army.mil)). The NRC license holder reports applicable accidents/incidents to the NRC's 24-hour Headquarters Operations Center (301) 816–5100. The ARA holders and ARP issuers report to higher commands accidents and incidents as required.

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- d. Suspected overexposure to EMF Source. Immediately remove personnel suspected of experiencing the overexposure to the nearest medical facility for care. The medical personnel should obtain medical guidance for the injury from the DOD EMF Injury Hotline, (800) 473-3549, DSN 798-3764, commercial (937) 938-3764, or e-mail [esoh.service.center@wpafb.af.mi](mailto:esoh.service.center@wpafb.af.mi). Medical personnel should complete the EMF Injury Reporting Form at <https://hpws.afrl.af.mil/dhp/OE/ESOHSC/emfinjury/> and submit the completed report to the EMF Injury Database <https://hpws.afrl.af.mil/dhp/OE/emflnjury/>.
- e. Notify the Garrison or activity Public Affairs Officer (PAO) at the onset of the accident or incident to activate public affairs contingency measures (see AR 360-1). Radiation accidents or incidents attract the attention of local and national media quickly. Early disclosure of accurate information is vital to maintaining the confidence of both the internal and external public.

  
LANCE C. VARNEY  
COL, IN  
Commanding

**ANNEX A:**

**DEFINITIONS:**

**Accident/Incident**

Defined as any occurrence in which: A radioactive commodity is damaged to the extent that radioactive material has been or may have been released to the environment; the control or the accountability for a radioactive commodity is lost; and/or a suspected over-exposure to EMF or x-rays has occurred.

**Action level**

The level of electromagnetic radiation exposure as specified in IEEE C95.1–2345 that requires commanders and users to implement control measures to reduce or mitigate the exposure hazards. Use process and engineering controls before PPE to protect workers.

**As Low As Reasonably Achievable (ALARA)**

Making every reasonable effort to maintain exposures to radiation as far below applicable dose limits as is practically consistent with the purpose for which the activity is undertaken, taking into account the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations and in relation to utilization of nuclear energy, RAMs, and ionizing radiation in the public interest.

**Control**

Action taken to eliminate hazards or reduce risk.

**Decommission**

The intentional removal of equipment or facilities safely from service. The objective is to reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of the NRC license, Army reactor permit, or Army radiation authorization.

**Electromagnetic Radiation**

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

**Exposure**

The frequency and length of time subjected to a hazard.

**Extremely Low Frequency Electromagnetic Radiation**

Electromagnetic radiation with a frequency less than 3 kHz.

### **Gigahertz (GHz)**

An SI unit prefix indicating a factor of one billion ( $1 \times 10^9$ ).

### **High Radiation Area**

An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 100 mrem (1 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

### **Infrared Electromagnetic Radiation**

Electromagnetic radiation with a wavelength between 760–780 nm and 1 mm.

### **Ionizing Radiation**

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

### **Light Amplification by Stimulated Emission of Radiation (LASER)**

A laser is a device that produces an intense, coherent, directional beam of light by stimulating electronic or molecular transitions to higher energy levels. Lasers are classified by the degree of potential hazard (see 21 CFR 1040.10 and ANSI Z136.1 for comprehensive definitions of laser hazard classes).

- a. Class 1 lasers emit at levels that are not hazardous under any viewing or maintenance conditions. They are exempt from control measures. However, as a matter of good safety practices avoid intrabeam viewing in case the laser is mislabeled.
- b. Class 2 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 3 (medium-power) lasers emit in the IR, visible or ultraviolet portions of the electromagnetic spectrum. They are hazardous to personnel who are in the beam path and when viewing the source directly or by specular reflection. They usually do not present a diffuse (non-mirror like) reflection or skin hazard.
  - Class 3a lasers, even though they emit at Class 3 power levels, have special beam characteristics that make them eye-safe except when viewed through magnifying optics.



- Class 3b lasers are all other Class 3 lasers. Class 3b laser devices are potentially hazardous if the unprotected eye views the direct or specularly reflected beam, but they normally do not cause hazardous diffuse reflections.

d. Class 4 (high-power) lasers emit in the IR, visible, or ultraviolet portions of the electromagnetic spectrum. These systems are very powerful and the most dangerous. They can be hazardous for extremely long distances downrange from the laser system. They can also present potential diffuse reflection viewing, skin, and fire hazard.

### **DOD/Military-Exempt Lasers**

Those lasers and laser systems that the FDA has exempted from the provisions of 21 CFR 1040.10 and 21 CFR 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. They have not been classified as a Class 1 thru Class 4 laser. Treat these lasers as if they are Class 4 lasers and pose a significant risk to personnel because their lasing hazards are intentionally undefined.

### **Non-Ionizing Radiation**

Electromagnetic radiation with photon energies less than 12.4 eV.

### **Occupational Dose**

The dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation or to RAM from regulated and unregulated sources of radiation, whether in the possession of the employer or another person. Occupational dose does not include dose received from background radiation; from any medical administration the individual has received; from exposure to patients administered RAM and released in accordance with applicable regulations; from voluntary participation in medical research programs; or as a member of the public. Workplace exposure to naturally occurring RAM, such as radon, considered background radiation by NRC may be considered an occupational exposure by OSHA and regulated under 29 CFR 1910.1096.

### **Qualified Expert**

A person who, by virtue of training and experience, can provide competent, authoritative guidance on specific aspects of radiation safety. Being a qualified expert in one aspect of radiation safety does not necessarily mean that a person is a qualified expert in a different aspect.

### **Rad**

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

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### **Radiation**

For the purposes of this SOP, 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 0.005 rem (0.05 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

### **Radiation Safety**

For the purposes of this SOP, a discipline whose objective is the protection of people and the environment from unnecessary exposure to radiation. Radiation safety is concerned with understanding, evaluating, and controlling the risks from radiation exposure relative to the benefits derived. Same as “radiation protection.” Health physics has the same objective, but is a scientific discipline.

### **Radiation Safety Committee**

An advisory committee for the commander/director to assess the adequacy of the Command’s RSP. Same as “Radiation Control Committee” and “Radiation Protection Committee.”

### **Radiation Safety Officer (RSO)**

The person that the commander designates, in writing, as the executive agent for the command’s RSP (same as “Radiation Protection Officer”). These individuals are provided training commensurate with the radiation hazards they manage. Types of RSOs discussed in this SOP include:

**Garrison RSO**: The RSO on the staff of the Garrison Commander. The garrison RSO is normally assigned to IMCOM.

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

**RSSO**: The Radiation Safety Staff Officer at the higher headquarters unit.

### **Radiation Safety Program (RSP)**

A program to implement the objective of radiation safety. The Army RSP includes all aspects of—

- a. Measurement and evaluation of radiation and RAM pertaining to the protection of personnel and the environment.
- b. Army compliance with Federal and DOD, and Army radiation safety regulations.
- c. The Army’s radiation dosimetry; radiation bioassay; radioactive waste disposal; radiation safety training; and radiation instrument TMDE and calibration programs.

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### **Radioactive Commodity**

An item of Government property made up in whole or in part of RAM to which a national stock number or part number is assigned. Examples of Army radioactive commodities include tritium fire control devices, chemical agent detectors/monitors, lensatic compasses, radioluminescent sights and gauges on vehicles, and moisture density gauges.

### **Radiofrequency Electromagnetic Radiation**

Electromagnetic radiation with frequencies between 3 kHz and 300 GHz.

### **Radiofrequency 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 DODI 6055.1, but do not exceed those shown in DODI 6055.1. Existing physical arrangements or areas, such as fences, perimeters, or weather deck(s) of a ship maybe used in establishing a controlled environment.

### **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).

### **Sievert**

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 rem).

### **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 rads (5 Gy) in 1 hour at 1 meter from a radiation source or from any surface that the radiation penetrates.

### **Excepted Shipments**

Very small radiation sources found in chemical detectors and fire control devices.

### **Milli**

SI units prefix indicating a factor of one one-thousandth (0.001).

### **ACRONYMS:**

**ADC** – Army Dosimetry Center

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**ALARA** - As Low As is Reasonably Achievable

**AMC** – Army Materiel Command

**ANSI** – American National Standards Institute

**ARA** – Army Radiation Authorization

**ARIMS** – Army Records Information Management System

**ARP** – Army Radiation Permit

**CATC** – Combined Arms Training Center

**CBRNE** - Chemical, Biological, Radiological, Nuclear, and Explosive

**CECOM** – Communications-Electronics Command

**CFR** – Code of Federal Regulations

**DGA** – Dangerous Goods Advisor

**DLA** – Defense Logistics Agency

**DRMO** - Defense Reutilization and Marketing Office

**EMF** – Electromagnetic Field

**EMR** - Electromagnetic Radiation

**ERL** - Exposure Reference Levels

**GHz** – Gigahertz

**Hz** – Hertz

**IEEE** - Institute of Electrical and Electronics Engineers

**IMCOM** – Installation Management Command

**LLRWA** - Low Level Radioactive Waste Agency

**LSO** – Laser Safety Officer

**NRC** – Nuclear Regulatory Commission

**PSSS** - Personnel Security Screening Systems

**RADIAC** – Radiation Detection, Indication and Computation

**RAM** – Radioactive Materials

**RCIT** - Radioactive Commodity Identification and Transportation

**RF** - Radiofrequency

**RFSO** - Radiofrequency Safety Officer

**RGD** – Radiation Generating Devices

**RMPF** - Radioactive Material Processing Facility

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**RSC** – Radiation Safety Committee

**RSO** – Radiation Safety Officer

**RSP** – Radiation Safety Program

**RSSO** – Radiation Safety Staff Office

**SOFA** – Status of Forces Agreement

**TB** – Technical Bulletin

**TM** – Technical Manual

**USAG** – US Army Garrison

**USAPHC** – US Army Public Health Command

**USAREUR** – US Army Europe

**REFERENCES:**

21 CFR 1040.10, **Laser Products**, 01 APR 00.

21 CFR 1040.11, **Specific purpose laser products**, 01 APR 16.

21 CFR 1002, **Applicability**, 01 APR 16.

AE Form 55-50E, **Dangerous Goods Advisor (DGA), Appointment Orders (VERS. 01.00)**, 01 OCT 15.

AE Regulation 55-4, **Safe Movement of Hazardous Goods by Surface Modes**, 11 OCT 16.

AE Regulation 55-50, **Command Dangerous Goods Program**, 02 FEB 10.

ANSI Z136.1, **Safe Use of Lasers**, 2014.

AR 25-400-2, **The Army Records Information Management System (ARIMS)**, 02 OCT 07.

AR 40-5, **Preventive Medicine**, 25 May 07.

AR 360-1, **The Army Public Affairs Program**, 25 May 11.

AR 385-10, **The Army Safety Program**, 27 NOV 13.

AR 710-3, **Inventory Management Asset and Transaction Reporting System**, 28 NOV 16.

AR 750-43, **Army Test, Measurement, and Diagnostic Equipment**, 24 JAN 14.

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DA Form 285-AB, **US Army Abbreviated Ground Accident Report (AGAR)**, 01 FEB 09.

DA Pamphlet 385-10, **Army Safety Program**, RAR 19 JAN 10.

DA Pamphlet 385-24, **The Radiation Safety Program**, 30 NOV 15.

DA Pamphlet 385-25, **Occupational Dosimetry and Dose Recording for Exposure to Ionizing Radiation**, 02 OCT 12.

DA Pamphlet 385-40, **Army Accident Investigations and Reporting**, 18 MAR 15.

DD Form 2977, **Deliberate Risk Assessment Worksheet**, SEP 14.

IEEE C95.1, **IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Field, 3kHz to 300 GHz**, 2005.

IEEE C95.2, **IEEE Standard for Radio-Frequency Energy and Current-Flow Symbols**, 1999.

DODD 4715.12, **Environmental Explosives Safety Management on Operational Ranges Outside the United States**, 24 APR 07.

DODI 6055.11, **Protecting Personnel from Electromagnetic Fields**, 19 AUG 09.

DTR 4500.9-R, **Defense Transportation Regulation (DTR)**, RAR 28 OCT 16.

NUREG 1556, **Consolidated Guidance about Materials Licenses**, 27 Jan 17,

OTSG Policy, **Surveillance of Laser and Radio frequency Radiation Personnel**, 11 APR 94.

TB 43-0116, **Identification of Radioactive Items in the Army**, 01 APR 98.

TB 43-0133, **Hazard Controls for CECOM Radiofrequency and Optical Radiation Producing Equipment**, 15 NOV 00.

TB 43-180, **Calibration and Repair Requirements for the Maintenance of Army Materiel**, 15 JAN 05.

TB MED 524, **Occupational and Environmental Health: Control of Hazards to Health from Laser Radiation**, 31 JAN 06.

USATA External SOP 700-48, **The U.S. Army Test, Measurement, and Diagnostic Equipment Activity (USATA), Region Europe**, 25 OCT 05

**ANNEX B: USAG Bavaria Unit Radiation Safety Program Checklist  
(Documented Annual Audit Required)**

**B-1. Function**

The function covered by this checklist is radiation safety.

**B-2. Purpose**

The purpose of this checklist is to assist commanders/directors and RSOs in evaluating the key program elements listed below. It is not intended to cover all aspects of the program.

**B-3. Instructions**

Answers must be based on the actual testing of key program elements (for example, document analysis, direct observation, sampling, and simulation). Answers that indicate deficiencies must be explained and corrective action indicated in supporting documentation. These questions are the minimum used to adequately assess a radiation safety program for the annual audit. However, some questions may not apply to a specific program and may be rated as not applicable or N/A.

	<b>Question</b>	<b>Inspectors Answers/ Comments</b>	<b>Inspectors Recommended Corrective Action (Mandatory for all Findings)</b>
<b>1</b>	Has the commander notified the local Works Council that LN employees are working with radiation emitters or devices containing radioactive material?		
<b>2</b>	If required, has the commander designated a primary and alternate RSO, LSO, and RFSO?		
<b>3</b>	Has the RSO been properly trained IAW Army Pamphlet 385-24, Chapter 7?		
<b>4</b>	Are RSOs fully qualified prior to appointment, or trained to be fully qualified within 90 days?		
<b>5</b>	If required, has a written radiation safety SOP been established?		
<b>6</b>	Has the unit SOP documented an annual review of the SOP?		
<b>7</b>	Does the unit SOP include unit-specific emergency response procedures? Are procedures posted in the area?		
<b>8</b>	Does the unit commander conduct and maintain an inventory of licensed or authorized ionizing radiation sources, Class 3B, Class 4, military exempt lasers,		

	and electromagnetic radiation (EMR) sources at least annually?		
<b>9</b>	Are annual inventories of radioactive materials being provided to the Garrison RSO promptly?		
<b>10</b>	Do unit inventories also include captured foreign items as well as artifact memorials and ‘trophies’ containing radioactive material?		
<b>11</b>	Are all personnel occupationally exposed to LASER, RF, or ionizing radiation receiving radiation safety training?		
<b>12</b>	Are all controllable quantities of radioactive material and radiation-producing sources held by the unit under appropriate authority (for example, an NRC license, an Army radiation authorization, or as part of a radioactive commodity)? (Indicated in technical manuals)		
<b>13</b>	Does the unit comply with the requirements outlined in the NRC license if applicable? (Requirements are in technical manuals)		
<b>14</b>	Are the NRC posting requirements being met and are emergency contact numbers posted conspicuously? (USAEUR poster 385-24-1)		
<b>15</b>	Are all radiation sources secured against unauthorized use and removal? “Authorized personnel only” sign posted?		
<b>16</b>	Is all radioactive waste disposed of properly? (Procedures included in local SOP?)		
<b>17</b>	Are all radiation survey instruments calibrated?		
<b>18</b>	Are radiation surveys and leak tests performed at the prescribed intervals IAW Tech manuals?		
<b>19</b>	For Army laser ranges, have all type-classified or commercial Class 3B or Class 4 lasers received appropriate evaluation before their use?		



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<b>20</b>	Are all accidents and incidents involving personnel radiation exposure or radioactive contamination of facilities, equipment, or the environment, or loss of radioactive materials promptly reported through appropriate channels? (Procedures included in local SOP?)		
<b>21</b>	Do all personnel occupationally exposed to ionizing radiation or radioactive material above applicable levels participate in an appropriate dosimetry or bioassay program?		

**ANNEX C: USAG Bavaria “Quick Reaction Checklist” for Possible Tritium Exposure (Page 1)**

**USAG Bavaria Quick Reaction Checklist (QRC)  
for Possible Tritium Exposure**

Tank Automotive Command (TACOM) guidance provided to USAG Bavaria RSO by Mr. Frank Dunfrund, USAREUR Radiation Safety Staff Officer, on 2 Aug 2016:

1. Notify everyone in the area that a radioactive commodity has been damaged or involved in an incident and have them evacuate the area.
2. All personnel who may have come in contact w/ the material should be directed to wash their hand thoroughly w/ a mild soap and tepid water (not hot water). No harsh or abrasive brushes should be used on the skin. Potentially contaminated personnel should not eat, drink or smoke until their hands are washed.
3. Using latex rubber gloves, the equipment should be "double bagged and tagged" using two plastic bags and tape. For accountability purposes, label the tag with the NSN, Serial Number, and Nomenclature so the damage item can tracked by the property book officer.
4. First, place item in the first plastic bag and tape shut. Carefully remove the rubber gloves and place them in the second plastic bag and seal them up with the equipment. Label the bags/container as: **“CAUTION-DAMAGED TRITIUM SOURCE - DO NOT OPEN”**
5. Place the equipment in an outdoor metal storage cabinet/locker or in a 55 gal drum in a secure Hazardous Waste area away from the general population in a well ventilated storage area if possible. (Access to the equipment needs to be controlled until test results have been received).
6. Air out any inside rooms where the material may have been stored.
7. **Contact TLSC-E Production Control @ DSN 476-3256 to initiate a work order to have the material tested.** Once they look at it, they will be able to provide disposition instructions. (Results may take 8-10 days).
8. Contact the USAG Bavaria Radiation Safety Officer (RSO) or any USAG Bavaria Safety Office immediately. The RSO will need specifics on the incident to include the who, what, when, where, why etc. Please include the make, model, and serial # of the unit, and any available pictures. Be prepared to report all the details of the incident to include, date and time of incident, physical location, how the source was damaged, the specific commodity, total activity of the source it contained, number of personnel involved.
9. ***MEDICAL RESPONSE:***
  - a. The unit will notify the Occupational Health Nurse (OHN) when they realize a possible Tritium exposure has occurred. Time is of the essence given the half-life of radiation.
  - b. The OHN, in discussion with the Occupational Medicine (OM) Physician, will make the determination whether an immediate visit with OM is necessary. This

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**ANNEX C: USAG Bavaria “Quick Reaction Checklist” for Possible Tritium Exposure (Continued-Page 2)**

does not preclude the exposed worker from requesting a visit with Occupational Medicine.

Current USAG Bavaria RSO:

Don Cox, DAC

Safety and Occupational Health Specialist

USAG Bavaria-Hohenfels, Bldg. 388

Email: donald.j.cox8.civ@mail.mil

Comm: (49) 09472-83-1670

DSN: 466-1670

Mr. Rainer Doerner

Fire Control Supervisor (This is the gentleman who will normally conduct the wipe test, but he can't do anything until Production Control has a work order request and directs him to go).

TLSC-E, Maintenance Activity Vilseck

DSN 476-2756

CIV. (09662) 83-2756

E-mail: rainer.doerner.ln@mail.mil

Alternates for Mr. Rainer Doerner:

- Mr. Michael R. Schwabe
- Mr. Krapf Aldo

TLSC-E, Maintenance Activity Vilseck

DSN: 476-2495

CIV. (09662) 83-2495

In order to initiate a testing request, the unit will need to provide one of the following **and a DA Form 1687 (Signature Card)** to the Production Control Office:

1. Maintenance Request (work order) DA Form 2407, if the unit does not have a SAMS-E Box or GCSS Army
2. Maintenance Request (work order) DA Form 2407-E, if the unit has a SAMS-E Box
3. Maintenance Request (work order) DA Form 5990-E, if the unit has GCSS Army

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**ANNEX C: USAG Bavaria “Quick Reaction Checklist” for Possible Tritium Exposure (Continued-Page 3)**



Sample  
DA1687\_MAV.pdf