



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
UNITED STATES ARMY AVIATION AND MISSILE COMMAND  
5300 MARTIN ROAD  
REDSTONE ARSENAL AL 35898-5000

JUN 29 2007

NMSS 2

Safety Office

Licensing Assistance Team  
Division of Nuclear Materials Safety  
U.S. Nuclear Regulatory Commission, Region I  
King of Prussia, Pennsylvania 19406-1415

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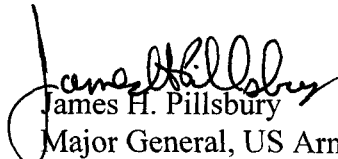
Dear Sir or Madam:

In accordance with instructions received from the Nuclear Regulatory Commission (NRC), the US Army Aviation and Missile Command's Safety Office requests renewal of its source material license, STB-1579, which expires July 31, 2007. All information in the present license concerning the radionuclide, chemical/physical form, quantities for possession and use are correct and accurately represent our current and anticipated program. Minor changes have been made to add specific NRC requirements from correspondence not yet listed in the license application. Two complete copies of the retyped application are enclosed along with a summary of minor changes (Enclosures 1 and 2). Updated radiation safety documents are included with the retyped application.

In the interest of national security, we request this license not be subject to the license term rule as indicated in 10 CFR 30.36, 10 CFR 40.42, and 10 CFR 70.38

We hope you find these records complete and in order. Questions concerning this action may be directed to Mr. Keith Rose, at 256-313-2114, FAX 256-313-2111, or email [keith.rose@redstone.army.mil](mailto:keith.rose@redstone.army.mil).

Sincerely,

  
James H. Pillsbury  
Major General, US Army  
Commanding

Enclosures

**NRC FORM 313**  
(10-2005)  
10 CFR 30, 32, 33,  
34, 35, 36, 39, and 40

**U.S. NUCLEAR REGULATORY COMMISSION**

**APPROVED BY OMB: NO. 3150-0120**

**EXPIRES: 10/31/2008**

Estimated burden per response to comply with this mandatory collection request: 4.4 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [infocollects@nrc.gov](mailto:infocollects@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

**APPLICATION FOR MATERIAL LICENSE**

**INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.**

**APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:**

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY  
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS  
U.S. NUCLEAR REGULATORY COMMISSION  
WASHINGTON, DC 20555-0001

**ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:**

**IF YOU ARE LOCATED IN:**

ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, MISSISSIPPI, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

LICENSING ASSISTANCE TEAM  
DIVISION OF NUCLEAR MATERIALS SAFETY  
U.S. NUCLEAR REGULATORY COMMISSION, REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PA 19406-1415

**IF YOU ARE LOCATED IN:**

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING BRANCH  
U.S. NUCLEAR REGULATORY COMMISSION, REGION III  
2443 WARRENVILLE ROAD, SUITE 210  
LISLE, IL 60532-4352

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING BRANCH  
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TX 76011-4005

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**PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.**

**1. THIS IS AN APPLICATION FOR (Check appropriate item)**

- ☐ A. NEW LICENSE  
☐ B. AMENDMENT TO LICENSE NUMBER  
☒ C. RENEWAL OF LICENSE NUMBER

STB-1579

**3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED**

Department of Defense (DOD) sites worldwide to include DOD contractors

**2. NAME AND MAILING ADDRESS OF APPLICANT (Include ZIP code)**

US Army Aviation and Missile Command  
ATTN: AMSAM-SF  
Redstone Arsenal, AL 35898-5000

**4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION**

Arthur Keith Rose

TELEPHONE NUMBER

(256) 313-2114

**SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.**

**5. RADIOACTIVE MATERIAL**

- a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time.

**6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.**

**7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.**

**8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.**

**9. FACILITIES AND EQUIPMENT.**

**10. RADIATION SAFETY PROGRAM.**

**11. WASTE MANAGEMENT.**

**12. LICENSE FEES (See 10 CFR 170 and Section 170.31)**

FEE CATEGORY AMOUNT ENCLOSURE \$

**13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.**

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39, AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

**CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE**

James H. Pillsbury, MG, USA Commanding

**SIGNATURE**

James H. Pillsbury

**DATE**

29 June 2007

**FOR NRC USE ONLY**

| TYPE OF FEE | FEE LOG | FEE CATEGORY | AMOUNT RECEIVED | CHECK NUMBER | COMMENTS |
|-------------|---------|--------------|-----------------|--------------|----------|
|             |         |              | \$              |              |          |

**APPROVED BY**

**DATE**

140747

**US ARMY AVIATION and MISSILE COMMAND**  
**U.S. NUCLEAR REGULATORY COMMISSION SOURCE MATERIAL LICENSE STB-1579**  
**SUMMARY of CHANGES TO LICENSE RENEWAL APPLICATION**

**1. General**

A. Organizational name changed from ATCOM to AMCOM throughout license application.

B. Typographical errors and other obvious errors (missing units, etc.) have been corrected throughout license application.

C. "Assure" has been changed to "ensure" throughout license application to conform to exact meaning and intention of use.

D. "RPO" has been changed to "RSO" to comply with the change in AR 11-9, The Army Radiation Safety Program.

**2. Detailed Change Summary**

| ITEM | SUMMARY of CHANGE  | IMPACT ON PERSONNEL, FACILITIES, EQUIPMENT AND RADIATION SAFETY PROCEDURES  |
|------|--|---|
| 7    | AMCOM Alternate RSO removed from license as Alternate RSO for license.   | No impact. If license RSO leaves position, licensee will enlist a new RSO and apply for license amendment within 30 days. |
| 8    | Training for Individuals Working In or Frequenting Restricted Areas – Updated training package to include training CD produced specifically for AMCOM NRC License STB-1579. Updated forms for posting at work sites to current editions. Updated information in Emergency Notification.                  | No impact. Updated training package already in use. Updated forms and Emergency Notification already in use.              |
| 9    | Facilities and Equipment –<br>2. Storage Facilities. Added statement that waste generated from use of this license will be stored as radioactive material until disposal as radioactive waste in accordance with AR 11-9 and Nuclear Regulatory Commission and Department of Transportation regulations. | No impact. Waste generated by authorized maintenance already being stored and disposed of as radioactive waste.           |
| 9    | 3. General Safety Equipment. Removed DA PAM 385-3 (obsolete) as reference for protective clothing and equipment (PCE). Added statement from AR 385-10, 2-2, j (1) – (5) to describe Army PCE policy. Removed statement on Army audit policy as unnecessary.  | No impact.  |

| ITEM | SUMMARY of CHANGE  | IMPACT ON PERSONNEL, FACILITIES, EQUIPMENT AND RADIATION SAFETY PROCEDURES   |
|------|--|--|
| 9    | <p>6. Radiation Detection and Analysis Equipment. Added statement from NUREG-1556, Vol. 7, 8.10.2</p> <p>Added radiation detection instruments available from AMCOM Safety Office.</p> <p>Deleted instruments listed as generally available at depots.</p>   | <p>No impact. Updated information to be compliant with NUREG-1556, Vol. 7 and NRC Regulatory Guide 10.4, GUIDE FOR THE PREPARATION OF APPLICATIONS FOR LICENSES TO PROCESS SOURCE MATERIAL (Task FC 409-4)</p> |
| 9    | <p>6c. Calibration</p> <p>Added statement from NUREG-1556, Vol. 7, 8.10.2 and included calibration interval not to exceed 12 months and IAW TB 43-180, 15 January 2005.</p> <p>Added name and accreditations of U.S. Army calibration facility.</p>  | <p>No impact. Updated information to be compliant with NUREG-1556, Vol. 7 and NRC Regulatory Guide 10.4, GUIDE FOR THE PREPARATION OF APPLICATIONS FOR LICENSES TO PROCESS SOURCE MATERIAL (Task FC 409-4)</p> |
| 10   | <p>Radiation Safety Program</p> <p>III. Specific Maintenance to be Performed</p> <p>A. Helicoil Insert – Changed “rose ann” to “Rosan©”</p>  | <p>No impact.</p>  |
| 10   | <p>IV. Hazard Analysis</p> <p>B. Inhalation. Added statement that air sample analysis equipment and air sampling technique used by the licensee have resulted in a lower limit of detection (LLD) that is below the 10 CFR 20, App. B, Table 2 Inhalation DAC of 5E-13 <math>\mu\text{Ci/ml}</math>.</p> | <p>No impact</p>   |
| 10   | <p>C. Ingestion. Changed Ingestion ALI from 0.81 microcuries to value in Table 1, App. B, 10 CFR 20, “0.7 microcuries bone surface and 2.0 microcuries other”</p> <p>Changed “only 62 percent” to “less than 72 percent”.</p>  | <p>No impact.</p>  |
| 10   | <p>V. Radiation Safety Program</p> <p>A. AR 385-11 updated to Army Regulation 11-9, 28 May 1999. ATCOM Regulation updated to AMCOM Regulation 11-1, 25 February 2002.</p>  | <p>No impact. Already using updated documents.</p>   |
| 10   | <p>D. Training. Added statement that all female radiation workers will be specifically trained on NRC Reg. Guide 8.13.</p>   | <p>No impact. Already requiring this.</p>  |
| 10   | <p>F. Added date to TB 43-0116, 1 April 1998</p>   | <p>No impact. Technical Bulletin 43-0116 not revised since last application submitted.</p>   |
| 11   | <p>Waste Management</p> <p>Moved statement added by NRC requiring all waste generated by this license be disposed of</p>   | <p>No impact.</p>  |

| ITEM          | SUMMARY of CHANGE  | IMPACT ON PERSONNEL,<br>FACILITIES, EQUIPMENT AND<br>RADIATION SAFETY PROCEDURES   |
|---------------|--|--|
| 11<br>(cont.) | <p>as radioactive waste to the top.<br/>Added statement about requiring copies of all disposal records be sent to the license RSO, AMCOM Safety Office.</p> <p>Section requesting relief from disposal requirements as radioactive waste removed.<br/>Army Regulation 385-11 updated to Army Regulation 11-9, 28 May 1999.</p> | <p>Incorporated NRC requirement (already in effect) for all waste material to be disposed of as radioactive waste and copies of all radioactive waste disposal records to be forwarded to the license RSO.</p> |

## ITEM 5. RADIOACTIVE MATERIAL

- a. Element and Mass Number: Natural Thorium (Thorium 232)
- b. Chemical and/or Physical Form: Magnesium-thorium alloys containing less than four percent thoria by weight.
- c. Maximum amount which will be possessed at any one time:  
Possession of magnesium-thorium alloys containing less than four percent thorium is exempt from licensing in accordance with 10 CFR 40.13(c)(4). Accordingly, this license and the maximum amount to be possessed at any one time, 15000 kilograms, applies to licensed maintenance of the alloys.

## ITEM 6. PURPOSE FOR WHICH LICENSED MATERIAL WILL BE USED.

The U.S. Army possesses aircraft engine parts of ZH62A and HZ32A magnesium-thorium alloys. These alloys contain 1.75 and 3.3 percent thoria (by weight), respectively. Thorium oxide is a refractory oxide and was added to the alloy at the time of smelting to increase the strength of the alloy. As magnesium is a comparatively soft metal, threads are often damaged when bolts are removed from magnesium alloys, especially if corrosion is present. To enable continued use of parts with damaged threads, it is necessary that the threads be drilled and/or re-tapped. In addition, it is necessary that corrosion be treated to minimize damage of the components involved. Accordingly, this license authorizes selected aircraft maintenance units to perform that limited maintenance which is necessary to repair damaged threads and eliminate corrosion on magnesium-thorium alloys. Maintenance is specifically limited to hand tapping, hand brushing, hand sanding, hand filing, chemical paint stripping, chemical corrosion treatment, reapplication of protective coatings, and drilling. Drilling is the only operation authorized which involves use of machine tools.

## ITEM 7. INDIVIDUAL RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE.

Mr. Arthur Keith Rose, CHP, is AMCOM Health Physicist/Radiation Safety Officer. (Resume at Enclosure 1).

## ITEM 8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

When established in 1983, aircraft engine maintenance was purposely limited to operations which do not present a radiological hazard (and special emphasis was placed on ensuring compliance with ALIs defined in ICRP 30). Although significant potential hazards exist only if workers perform unlicensed maintenance, workers must, nonetheless, be advised of license constraints and the nature of potential hazards in the workplace. Training materials at Enclosure

2, together with required documents for posting, will, therefore, be provided to each unit authorized to perform licensed aircraft engine maintenance. Each unit will be directed to ensure that all personnel performing licensed maintenance are trained and to provide a list of the names of individuals trained to the AMCOM Safety Office. AMCOM will direct retraining on an annual basis and advise maintenance activities to ensure that new personnel are properly trained/briefed prior to being authorized to perform licensed maintenance.

#### ITEM 9. FACILITIES AND EQUIPMENT.

1. Site. The maintenance authorized by this license is performed at Aviation Intermediate Maintenance (AVIM) activities worldwide, by depot maintenance teams, and at selected, usually isolated, Aviation Unit Maintenance (AVUM) organizations. AVIM units are usually located adjacent to the aviation units which they support and perform the licensed maintenance required by AVUM aircraft. If there is no AVIM located within a reasonable distance, combat readiness considerations necessitate that the AVUM be authorized to perform the maintenance. (Overhaul and major repairs of magnesium-thorium alloy aircraft engine parts are accomplished at Corpus Christi Army Depot pursuant to their NRC license or at contractor facilities and are specifically excluded from this license.)

2. Storage facilities. Magnesium-thorium alloy aircraft parts are stored as radioactive material at storage depots until needed. Parts transferred to an aviation unit, complete engines, and aircraft are stored without regard to the thorium content (in accordance with the license exempt status of the alloys for possession). Waste material generated by authorized use of this license will be stored as radioactive material until disposal as radioactive waste in accordance with AR 11-9 and Nuclear Regulatory Commission and Department of Transportation regulations.

3. General safety equipment. Extensive safety equipment, to include protective clothing, fire fighting, and fire prevention equipment and safety showers, is available to Army military and civilian personnel. AR 385-10, 2-2, j (1) – (5) describes the Army protective clothing and equipment (PCE) policy, which is that PCE is to be established, used and maintained in accordance with part 1910, title 29, Code of Federal Regulations (29 CFR 1910).

4. Ventilation and containment systems. Ventilation and containment equipment is not required for the licensed maintenance procedures due to the nature of the maintenance involved and the lack of an inhalation hazard.

5. Respiratory Protection. Licensed maintenance is intentionally limited to operations which do not present a potential inhalation hazard. As such, although respirators are often required for aircraft maintenance for protection against

chemicals, solvents, and/or paints utilized, respiratory protection is not required for exposure to thorium except in accident situation (fires).

6. Radiation detection and analysis equipment:

a. We will use instruments that meet the radiation monitoring instrument specifications published in Appendix M to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999. We reserve the right to upgrade our survey instruments as necessary.

**RADIATION MONITORING EQUIPMENT  
AVAILABLE AT AMCOM SAFETY OFFICE**

| Manufacturer | Model                         | Number Available | Radiation Detected    |
|--------------|-------------------------------|------------------|-----------------------|
| Eberline     | ASP-1                         | 2                | Alpha                 |
| Ludlum       | 19                            | 5                | Gamma                 |
| Exploranium  | 135                           | 1                | Alpha/Beta/Gamma      |
| Eberline     | E-600                         | 1                | Beta/Gamma            |
| Eberline     | E-520                         | 2                | Beta/Gamma            |
| APTEC-NRC    | SM-400A                       | 6                | Cal. for X-ray        |
| Victoreen    | 450-P                         | 1                | Gamma                 |
| Inovision    | 451-B                         | 4                | Beta/Gamma            |
| Staplex      | TF1A<br>Hi-Vol<br>Air Sampler | 2                | Airborne particulates |

**MILITARY RADIAC SURVEY INSTRUMENTS  
AVAILABLE THROUGHOUT U.S. ARMY**

(1) AN/PDR-27 Radiac Set: GM instrument for beta-gamma surveying and monitoring; range: 0 to 500 mR/hr (4 decade scales); window: 0.5 Mylar.

(2) Various configurations of the AN/PDR-77 radiac set to include RPO Kit versions.



b. AMCOM will ensure that adequate radiation safety resources are maintained to fully support this license. This support will include health physics instrumentation as required to analyze air samples. Additionally, organic assets/resources will be augmented by contractor owned and operated technical and laboratory resources as necessary to ensure license compliance.

c. Calibration.

Radiation survey instrument calibration will be performed in accordance with the manufacturer's specifications at intervals not to exceed 12 months and IAW TB 43-180, 15 January 2005, Calibration and Repair Requirements for the Maintenance of Army Materiel, at the U.S. Army Test, Measurement and Diagnostic Equipment activity, U.S. Army Radiation Standards Laboratory with the exception of Air Samplers, which are calibrated at the U.S. Army Primary Standards Laboratory, Applied Physics Standards Laboratory.

The U.S. Army Test, Measurement and Diagnostic Equipment activity, U.S. Army Radiation Standards Laboratory is accredited to ISO/IEC 17025 by the National Voluntary Laboratory Accreditation Program (NVLAP Lab Code 200715-0) and fully complies with the provisions of ANSI/NCSL Z540.3-2006.

The U.S. Army Primary Standards Laboratory, Applied Physics Standards Laboratory is accredited to ISO/IEC 17025 by the American Association for Laboratory Accreditation (A2LA cert. No. 1256.01) and fully complies with the provisions of ANSI/Z540-1-1994.

Calibration of radiac and air sampling instrumentation is an integral part of the Army calibration system. This system is under the direction of the U.S. Army TMDE Center Redstone Arsenal, Alabama. Radiac equipment to include surveying and monitoring equipment is calibrated at the frequency mandated by NRC with sources traceable to the National Institute of Standards and Technology (NIST). (Calibration frequency varies depending on whether an instrument is used for routine safety and health applications or is for contingency use only.) Commercially procured radiac instruments may be calibrated by Army calibration activity or contractors (usually manufacturers). Sources used for calibration include Cesium-137, Cobalt-60, and Plutonium-239 for beta-gamma and alpha sources, respectively. Air sampling equipment is also calibrated by TMDE, its subordinate activities, by contractors, or by Army personnel in accordance with manufacturer's procedures (i.e., Staplex or equivalent). It may be noted that some Army calibration facilities possess Strontium-Yttrium 90 sources with which to calibrate radiac instruments for wartime use. Instruments calibrated with these sources may not be adequately differentiated from instruments calibrated with NIST traceable sources and might, therefore, be used for radiation surveys.

ITEM 10. RADIATION SAFETY PROGRAM.

## I. Characterization of Thorium

A. Physical. Thorium is a naturally occurring radioactive material. Although there are several isotopes of thorium, almost 100 percent of the available, naturally occurring thorium is Thorium-232. Thorium-232 has a half-life of about 14 billion years. It is a pure alpha emitter but has 10 radioactive daughter products which emit alpha, beta, and/or gamma radiations. Thorium is purified prior to its conversion to the chemical form desired. As such, daughter products are removed. These daughters, however, grow back into equilibrium in a period of about 50 years. The long half-life of Thorium-232,  $1.4\text{E}+10$  years, results in a specific activity of  $1.09\text{E}-07$  curies per gram.

B. Environmental. Once released to the environment, thorium is comparatively insoluble in ground water and is poorly absorbed by plant life. "The current mobilization fraction (i.e., the fraction of the thorium inventory deposit by ground-water solubilization and transport is occurring at a rate of about  $1\text{E}-09$  per year, corresponding to a solubilization and transport half-time of about  $7\text{E}+08$  years." (NCRP 76) "Comparison of abundances of thorium in soil and in edible vegetables is consistent with the similarly poor absorption across the mammalian gut." Further, "Thorium is widely distributed in rocks and soils but is scarcely soluble, and, consequently, very little is incorporated by plants. Generally its concentration in the ash of serial parts of plants will be about half that in soil." (ICRP 23) "Mean Thorium-232 concentrations of  $0.018 \pm 0.022$  pCi/Kg have been found in edible portions of 25 vegetables including beans, carrots, corn, potatoes, and squash." As thorium is a naturally occurring radionuclide, its release to the environment due to radiological operations represents a net relocation and potential buildup of thorium rather than an increase in the environmental radiation load. (The average concentration for thorium in soil in the United States is about 1 picocurie per gram soil.) As such, and in view of the poor absorption by plants and animals, thorium released to the environment cannot present a potential safety hazard unless allowed to accumulate such that it could be inhaled, ingested in substantial amounts or add significantly to the population's external radiation load. (NUREG/CR 3585 specifies the following transfer factors: soil to plant –  $4.2\text{E}-03$ ; feed and water to meat –  $2.0\text{E}-04$  day/kg; food and water to milk –  $5.0\text{E}-06$  day/l.)

### C. Metabolic (ICRP 30)

1. ICRP 30 recommends annual limits on intake of  $3\text{E}+04$ ,  $4\text{E}+01$ , and  $1\text{E}+02$  becquerels ( $8.1$ ,  $1.1\text{E}-03$ , and  $2.7\text{E}-03$  microcuries) for oral intake and inhalation of Class W and Class Y forms of Thorium-232, respectively.

2. Ingestion. Absorption of orally administered thorium is low. "The thorium-232 decay series may also move through the food chain, but due to its relative insolubility and low specific gravity, it is present in biological materials

only in insignificant amounts.” (Eisenbud, Environmental Radioactivity, 1987) For soluble thorium salts and small doses, ICRP 23 specifies a retention of 0.06 – 0.6 percent. For insoluble forms of thorium, retention was still lower. ICRP 30 therefore specifies a retention percentage of 0.02 percent for orally administered thorium. Of the thorium transferred to the blood, about 70 percent is translocated to the bone where it is retained with a biological half-life of 8000 days, 4 percent is translocated to the liver and has a biological half-life of 700 days, and 16 percent is assumed to go directly to excretion. For thorium, the blood is assumed to be cleared with a biological half-life of 0.5 days. The daily intake of thorium in food and fluids is about three micrograms. Of this amount about 2.9 micrograms is assumed by ICRP to be eliminated through the feces and 0.1 micrograms is lost through urine.

3. Inhalation. The ICRP classifies oxides and hydroxides of thorium as very insoluble in the lung (inhalation Class Y) and all other compounds of thorium as comparatively soluble (inhalation Class W). About 60 percent of thorium which is deposited in the lungs is retained in the tissue. For thorium oxides and hydroxides, about 20 percent is translocated from the lungs to the blood, primarily via the lymphatic system, with the remaining 20 percent being eliminated from the body. For other compounds, normal lung blood interchange results in the transfer of about 40 percent of the thorium in the lung to be translocated to the blood. Once translocated to the blood, thorium retention and distribution is in the same manner as if it enters the blood through the gastrointestinal tract. Most intakes of naturally occurring thorium occur as the result of inhalation of dust particles (soil) containing thorium. (“The average concentration in soil on a worldwide basis has been reported as 0.7 pCi/g, equal to that of U-238.”) As these particles are translocated to the blood and ultimately to the bone, aging results in a progressive buildup of naturally occurring thorium in the body. Bioassays to determine the amount of thorium introduced as the result of NRC licensed operations must include preliminary bioassays to document the presence of preexisting concentrations of thorium in the body.

4. Bioassay. Urinalyses and whole body counting are generally the preferred bioassay methods for soluble forms of thorium especially if it is ingested rather than inhaled. Fecal analyses, Thoron breath analyses, lung counts and whole body counts are common bioassay methods for evaluating intakes of insoluble thorium with the exact method depending on amount of intake and mode of entry. Analyses of blood samples for thorium content is not generally used due to the short duration of thorium in the blood (0.5 days), the difficulty in corresponding blood levels to exposure, and excessive errors in analysis of blood samples for thorium content. Typical lower limits of detection are 160 and 650 picocuries for lung and whole body counts, respectively. Thoron breath analyses have a typical LLD of about 0.8 picocuries. These quantities commonly enable detection of about 0.25 ALI from insoluble forms of thorium such as magnesium-thorium alloys. Bioassay programs for thorium must be capable of distinguishing intakes of naturally occurring thorium from those

associated with NRC licensed operations, thus background bioassay samples take on added importance.

## II. Characterization of Magnesium-Thorium Alloys

A. Magnesium-thorium alloys used in the aircraft engines covered by this license contain 1.75 or 3.0 percent thorium (nominal). As the percentage by weight of thorium is less than four percent, possession of these materials is exempt from U.S. Nuclear Regulatory Commission (NRC) licensing. The licensing exemption, however, specifically precludes any physical, chemical, or metallurgical treatment or processing of the parts.

B. Magnesium is a comparatively soft, lightweight, metal which is used extensively in various forms in aircraft and related applications in which weight is a critical factor. (Density of magnesium is 1.74 grams per cubic centimeter versus 2.699 for aluminum and 7.86 for iron.) Although several different magnesium alloys are used in Army aircraft parts, only two of these, ASTM HZ32A and ZH62A, contain thorium. (See Enclosure 3)

C. Fire/Explosion Hazard. Magnesium-thorium alloys as casting/solid form ignite at about 650 degrees C (1200 degrees F), while in particle form they ignite at about 520 degrees C (970 degrees F). In addition, magnesium reacts with water and acids to evolve hydrogen which is a potentially dangerous fire and explosion hazard if sufficient quantities of hydrogen gas are generated. (The reaction with water can be self-limiting depending on size and geometry of a casting due to the formation of insoluble hydroxides, thus the hydrogen fire explosion hazard applies mainly to fines such as machine turnings.)

## III. Specific Maintenance to be Performed

A. Helicoil Insert. Being a comparatively soft metal, magnesium alloys are susceptible to damage when bolts are removed. This situation occurs most often when corrosion is present and involves stripping the threads in bolt holes. To correct this problem it is necessary that oversized (0.16 centimeter/0.0625 inch larger diameter with a depth of about 2.54 centimeters/1 inch) threads be tapped (or that the hole be drilled out and subsequently re-tapped). Helicoil, Rosan® or similar inserts are then installed to return the bolt hole threads to their original size. This repair operation is required on an average of about one bolt per engine disassembled with about 100 such operations per year representing worst case frequency at any single facility. The amount of material removed from each hole would be about 0.27 cubic centimeters of alloy for tapping alone or about 0.8 cubic centimeters if the bolt hole were drilled out and subsequently re-tapped. With a density of about 1.8 grams per cubic centimeter, 3.0 percent thorium by weight, and the specific activity of thorium of  $1.09\text{E-}07$  curies per gram, this would equate to  $1.6\text{E-}03$  microcuries if re-tapped and  $4.7\text{E-}03$

microcuries if drilled and then re-tapped. If 100 such operations were performed with one-half requiring re-drilling, this would equate to a total of  $3.1\text{E-}01$  microcuries of material being removed in a year at the worst case facility.

1. Corrosion control and treatment consists of removal of existing corrosion, blending of the corroded area with the surrounding metal, and reapplication of protective coatings. All severe corrosion which is repairable is treated at Corpus Christi Army Depot in accordance with their NRC Source Material License. Corrosion control performed under this license is typically limited to areas of less than 6.5 square centimeters (1.0 square inch).

2. If the corroded area is soiled by grease, dirt, or other foreign materials, it is necessary that the area be cleaned prior to any paint stripping or corrosion removal. Methyl-ethyl-ketone, acetone, trichloroethylene, perchloroethylene and alkaline are typical materials used for cleaning. Magnesium-thorium alloys will not be authorized by this license to be cleaned at the AVUM/AVIM level using submersion in tanks of such materials.

3. Corrosion is removed either chemically, using a chromic acid pickle or similar solution, or mechanically by hand brushing, sanding or filing, depending on the severity of the corrosion. The chemical method is generally preferable in that it causes less reduction in material thickness, but is not adequate by itself where deep pitting or heavy corrosion has occurred. Chromic acid pickle and similar solutions are generally applied with a cotton swab or paint brush. (Submersion of parts for corrosion removal is not authorized by this license.) Mechanical removal of corrosion is limited to hand filing, brushing, and/or sanding with a maximum of 0.025 centimeter (0.010 inch) of the surface being removed. Up to 0.005 centimeter (0.002 inch) of surface metal is removed by acid pickling.

4. Upon completion of corrosion removal, alloys are cleaned to ensure that protective coatings adhere properly and these coatings are then applied. Up to about 0.16 cubic centimeters of alloys would be removed per operation. It is estimated that no more than 200 such operations are performed at any single activity, thus a total of about 32 cubic centimeters (about 2 cubic inches) of material would be removed per year. This equates to a maximum of about 0.19 microcuries of thorium being removed annually using this process.

#### IV. Hazard Analysis.

A. General. The license exempt status of magnesium-thorium alloys containing less than four percent thorium and the low external radiation field produced by these alloys support the conclusion that the external exposure resulting from handling the alloys are de minimis. As such, this hazard analysis will address only the potential internal hazard.

B. Inhalation. Maintenance procedures authorized by this license were intentionally selected so as to ensure that no inhalation hazard would exist at troop units where the maintenance is performed. Operations which had the potential for generating potentially significant amounts of airborne thorium to include bead blasting, welding, and machine grinding were purposely not authorized. Extensive air sampling has been performed at Corpus Christi Army Depot, at troop installations performing licensed maintenance and at contractor facilities to quantify the nature of the potential hazard due to magnesium-thorium alloy maintenance operations. Corpus Christi Army Depot air sampling data is at Enclosure 4 for review. The air sample analysis equipment and air sampling technique used by the licensee have resulted in a lower limit of detection (LLD) that is below the 10 CFR 20, Appendix B, Table 2 Inhalation DAC of  $5E-13$   $\mu\text{Ci/ml}$ .

C. Ingestion. Based on a comparison of the ALI (0.7 microcuries bone surface and 2.0 microcuries other) and the worst case total amount of thorium generated at a single maintenance facility (0.5 microcuries), if a single individual were to ingest all of the thorium generated it would equate to less than 72 percent of the ALI. Obviously, such a scenario is not credible, thus it is easily concluded that ingestion cannot present a significant potential radiological hazard.

#### D. Accidents.

1. As previously noted, magnesium metal ignites when exposed to enough heat for a sufficient duration to allow ignition to occur. (The alloy ignites in castings/solid decision form at about 650 degrees C (1200 degrees F) while in small particle form such as shavings, ignition occurs at about 520 degrees C (970 degrees F). "On ignition, magnesium oxide and thorium will be emitted into the atmosphere and left will be thorium oxide dross in finely divided form.") If magnesium-thorium alloys were to ignite, there would be the potential for a significant amount thorium to be inhaled. (As the quantity of chips and filings generated is very small, the potential for ignition is not significantly greater than for non-licensed entities possessing these alloys.)

2. Testing was conducted by the Dow Metal Products Company to determine the amount of airborne radioactivity generated by burning magnesium-thorium alloys (See Enclosure 5) No airborne thorium was detected, but only 10 to 20 percent of the thorium was recovered in the dross. Accident analyses must, therefore, assume that the material which was not accounted for was actually airborne but was not detected by the air sampling. In addition, the lack of particle size data necessitates that all airborne material be considered as respirable.

3. T-53, T-55, and T-63 aircraft engines contain up to 370, 850, and 62 grams (40, 93, and 7 microcuries) of thorium, respectively. If a T-55 engine

were to be completely incinerated with 80 percent of the material becoming airborne, about 680 grams (74 microcuries) of thorium would become airborne. For a fire lasting 10 minutes this would produce an average of 0.12 microcuries of airborne thorium per second as a source term. Using equation 3.4, EPA Workbook of Atmospheric Dispersion Estimates, a ground level release of this magnitude would result in cloud centerline concentrations of 1E-10, 3E-11, 5E-12, and 1E-12 microcuries per milliliter for downwind distances of 100, 200, 500, and 1000 meters, respectively. (Based on atmospheric stability Class C and wind speed of four meters per second.) The short duration of such an exposure precludes the possibility of significant dose commitments. Further, the small amount of material involved and dispersion over a very large area precludes the existence of a significant environmental impact.

4. If a T-55 engine were to be completely incinerated in an aircraft hangar which is 30 meters square with a 10 meter ceiling (a small hangar) with all material becoming airborne and being retained in the hangar, the average airborne concentration would equate to about 8E-9 microcuries per milliliter. This is 8000 and 16000 times the derived air concentration for Class W and Class Y thorium-232, respectively, and emphasizes the need to ensure that emergency response personnel and workers are adequately informed of safety precautions. Use of pressure-demand self-contained breathing apparatus by fire fighters would, however, reduce the concentration by the protection factor of such apparatus (10,000), thus such fires would not present a major radiological inhalation hazard. Further, magnesium-thorium alloy castings are possessed as license exempt material, thus this hazard is not greater than would be present at any facility possessing such alloys.

B. Other Credible Accident Scenarios. Although magnesium reacts with water and acids to produce hydrogen, the nature and environment of licensed maintenance is such that amounts of hydrogen gas sufficient to cause an explosion could not accumulate. In addition, magnesium dust must have a concentration of 20 milligrams per liter to form an explosive concentration thus this is not a credible accident scenario. Fire is, therefore, judged to be the only credible accident situation applicable to AMCOM licensed maintenance.

## V. RADIATION SAFETY PROGRAM.

A. The Army and AMCOM Radiation Safety Programs are prescribed in Army Regulation 11-9, 28 May 1999, and AMCOM Regulation 11-1, 25 February 2002, respectively. Documents included at Enclosures X and Z.

B. Although maintenance authorized by this license is limited to operations which do not present a significant potential radiological hazard, action will be taken, nonetheless, to ensure that all exposures are maintained "as low as reasonably achievable" (ALARA) pursuant to the provisions of 10 CFR 20.2201.

C. Radiation safety surveys of magnesium-thorium operations will be accomplished in the event of unusual occurrences. The large, non-respirable nature of the chips, filings, etc., together with the nature of the material/alloy and operations to be performed, negates the need for routine surveys at each facility. The AMCOM Health Physicist will conduct surveys to include air sampling at activities authorized to perform licensed maintenance. The non-routine, unscheduled nature of the maintenance precludes establishment of a finite frequency due to the lack of operations to review. A minimum of two surveys will, however, be conducted annually if licensed maintenance is available for review.

D. Training. A copy of this application (including training materials at Enclosure 2), the approved license and copies of NRC Regulatory Guides 8.29 (Instruction Concerning Risk From Occupational Radiation Exposure) and 8.13 (Instruction Concerning Prenatal Radiation Exposure) will be provided to each unit authorized to perform maintenance under this license. These units will be directed to brief their personnel on the potential hazards and protective measures and to provide a list of names of personnel trained to the AMCOM Safety Office. Further, all female radiation workers will be specifically trained on the contents of NRC Regulatory Guide 8.13.

E. Bioassays were obtained from personnel performing depot level maintenance having the potential to generate significantly more airborne thorium than operations authorized by this license. In-vivo analysis of 657 such personnel by Battelle Pacific Northwest Labs determined that no internal deposition of radioactive material above the natural background had resulted from those operations. The Battelle study and lack of detectable airborne thorium for any operation authorized by this license support the conclusion that routine bioassays are not needed. Bioassays will, however, be performed in the event of unusual occurrences involving potential inhalation or ingestion of hazardous levels of thorium and may also be performed to document ALARA.

F. AMCOM will ensure that magnesium-thorium alloys are adequately identified to troop units through the National Stock Number Master Data Record/ Army Master Data File and TB 43-0116, 1 April 1998, (Identification of Radioactive Items in the Army) as well as license documentation. These efforts, together with warnings in maintenance technical manuals, should preclude troop units from inadvertently performing unauthorized maintenance on magnesium-thorium alloys.

## ITEM 11. WASTE MANAGEMENT

All waste (chips, filings, etc.) generated by the maintenance authorized by this license will be disposed of as radioactive waste. Special effort should be taken by aviation units performing licensed maintenance to ensure compliance with this requirement. Records of disposal will be maintained and copies retained by the licensee.



Activities have been directed to store waste generated by licensed maintenance as radioactive material until disposition instructions are requested IAW AR 11-9 from the Commander of the Joint Munitions Command (JMC) and received. JMC is the Army's Program Office for Low Level Radioactive Waste Disposal. Radioactive waste generated under STB-1579 will be disposed of in accordance with Army Regulations and current Nuclear Regulatory Commission and Department of Transportation regulations. JMC issues complete instructions to users on proper packaging and marking of shipment of radioactive waste.

**Army Regulation 385-10**

**Safety**

# **The Army Safety Program**

**Headquarters  
Department of the Army  
Washington, DC  
29 February 2000**

**UNCLASSIFIED**

# ***SUMMARY of CHANGE***

AR 385-10  
The Army Safety Program

This change 1-

- o Provides risk management policy and definitions.
- o Provides authorization for collateral duty personnel to perform SASOHIs.
- o Adds Appendix B to provide Management Control Evaluation Checklist guidance for the Army Safety Program.
- o Revises paragraph 2-1, Organizational structure.
- o Adds pertinent aspects of AR 385-15.
- o Rescinds AR 385-15 upon publication of this change.
- o Moves pertinent aspects of chapter 6, Personal Clothing and Equipment, into other sections.
- o Deletes chapter 6.
- o Changes the applicability and Army management control process paragraphs.
- o Changes paragraph 1-4, before subparagraph a.
- o Supersedes paragraph 1-4a with new text.
- o Supersedes paragraph 1-4a(1) with new text.
- o Adds paragraphs 1-4c(14) and (15).
- o Supersedes paragraph 1-4d(2) with new text.
- o Adds paragraph 1-4d(3).
- o Adds paragraph 1-4e(3).
- o Supersedes paragraph 1-4g(1) with new text.
- o Supersedes paragraph 1-4h(1) with new text.
- o Adds paragraph 1-4h(6).
- o Adds paragraph 1-4i(3).
- o Adds paragraph 1-4j(13).
- o Adds paragraph 1-4k(3).

- o Supersedes paragraph 1-4m with new text.
- o Supersedes paragraph 1-4m(2) with new text.
- o Supersedes paragraph 1-4n with new text.
- o Supersedes paragraph 1-4n(1) with new text.
- o Supersedes paragraph 1-4n(2) with new text.
- o Adds paragraphs 1-4n(5) and (6).
- o Supersedes paragraph 1-4o with new text.
- o Adds paragraph 1-4p(5).
- o Supersedes paragraphs 1-5a, b, and c with new text.
- o Supersedes paragraph 1-6 with new text.
- o Adds paragraph 1-7.
- o Supersedes paragraphs 2-1 through 2-1d(17) with new text.
- o Supersedes in paragraph 2-2, the unnumbered first paragraph.
- o Supersedes paragraph 2-2b with new text.
- o Supersedes paragraph 2-2e(2) with new text.
- o Supersedes paragraph 2-2j with new text.
- o Adds paragraphs 2-2j(1) through (5).
- o Supersedes paragraph 2-2n with new text.
- o Supersedes paragraphs 2-2n(1) and (2) with new text.
- o Adds paragraph 2-2n(3).
- o Adds paragraph 2-3d.
- o Supersedes table 3-1, Hazard severity, with new table 3-1 text from fig 2-3 of FM 100-14.
- o Supersedes table 3-2, Accident probability, with new table 3-2 text from fig 2-2 of FM 100-14.
- o Supersedes paragraph 4-1b with new text.
- o Changes paragraph 4-4d(2) in the last sentence.
- o Supersedes paragraph 5-2p with new text.

- o Rescinds chapter 6 in its entirety.
- o Adds in appendix A, section I, required publications TB MED 503, FM 101-5, FM 100-14, TB MED 575, and FM 21-20.
- o Changes In appendix A, section II, related publications AR 10-5, AR 385-14, AR 385-61, AR 708-1, and AR 710-2.
- o Adds in appendix A, section II, related publication FM 100-22.
- o Deletes In appendix A, section II, related publications AR 310-34, AR 385-26, AR 385-30, AR 385-60, AR 385-65, AR 385-80, and TB MED 501.
- o Adds in appendix A, section IV, referenced form DA Form 11-2-R.
- o Adds an appendix B.
- o Deletes in the glossary, section I, the acronyms HSC, QCS, ASA(I&L), and USAEHA.
- o Adds in the glossary, section I, the acronyms ASA(I&E) and USACHPPM.
- o Changes in the glossary, section II, the terms DA Personnel, MANPRINT, and Risk assessment.
- o Adds in the glossary, section II, the terms Control, Condition, Develop the force, Direct and resource the force, Exposure, Hazard, Probability, Project the force, Residual risk, Risk, Risk decision, Risk management, Risk management integration, Severity, and Sustain the force.
- o Adds at the back of the regulation, DA Form 11-2-R.
- o Supersedes AR 385-15, dated 15 October 1979.

**Summary of change of the 1988 revision.** The revision originally published 23 May 1988 consolidates AR 385-10 and AR 385-32. It--

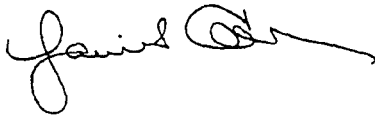
- o Provides expanded details on the responsibilities of commanders (chaps 1 and 2).
- o Provides guidance on internal safety office organization and structure (chap 2).
- o Details requirements for appointment of additional duty safety personnel (chap 2).
- o Adds guidance on procedures for managing protective clothing and equipment (chap 6).

Effective 29 March 2000

**Safety**

**The Army Safety Program**

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Louis Caldera  
*Secretary of the Army*

**History.** Army Regulation 385-10 was originally published on 23 May 1988. It was authenticated by Carl E. Vuono, General, United States Army, Chief of Staff, and Milton H. Hamilton, Administrative Assistant to the Secretary of the Army. This electronic edition publishes the basic 1988 edition and incorporates Change 1, published on 29 February 2000. Change 1 is authenticated by Louis Caldera, Secretary of the Army.

**Summary.** This regulation provides new

policy on Army safety management procedures with special emphasis on responsibilities and organizational concepts. It implements requirements of the Occupational Safety and Health Act of 1970 (OSHAct) as implemented in Executive Order 12196; part 1960, title 29, Code of Federal Regulations (CFRs); Department of Defense (DOD) Directive 1000.3; and DOD Instruction 6055.1.

**Applicability.** This regulation applies to the active Army, the Army National Guard (ARNG) of the U.S., the U.S. Army Reserve (USAR), and Army civilian employees. During mobilization, chapters and policies contained in this regulation may be modified by the proponent.

**Proponent and exception authority.** The proponent agency of this regulation is the Office of the Chief of Staff, Army, Army Safety Office.

**Army management control process.** This regulation contains management control provisions and identifies key management controls that must be evaluated.

**Supplementation.** Supplementation of

this regulation and establishment of command and local forms are prohibited without prior approval from HQDA (DACS-SF), WASH DC 20310-0300.

**Interim changes.** Interim changes to this regulation are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

**Suggested improvements.** Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Chief of Staff (DACS-SF) 200 Army Pentagon, Washington, DC 20310-0200.

**Distribution.** Distribution of this publication is made in accordance with initial distribution number (IDN) 093389, intended for command levels A, B, C, D, and E for Active Army, Army National Guard of the U.S., and U.S. Army Reserve.

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\*This regulation supersedes AR 385-15, dated 15 October 1979.

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## **Chapter 1**

### **Introduction**

#### **1-1. Purpose**

*a.* This regulation prescribes Department of the Army (DA) policy, responsibilities, and procedures to protect and preserve Army personnel and property against accidental loss. It provides for public safety incident to Army operations and activities, and safe and healthful workplaces, procedures, and equipment. This regulation assures statutory and regulatory compliance.

*b.* This regulation mandates Army Safety Program policies, procedures, and guidelines into one comprehensive safety program for all DA personnel and operations worldwide.

#### **1-2. References**

Required and related publications and prescribed and referenced forms are listed in appendix A.

#### **1-3. Explanation of abbreviations and terms**

Abbreviations and special terms used in this regulation are explained in the glossary.

#### **1-4. Responsibilities**

Principal officials of Headquarters, Department of the Army are responsible to direct, resource, and evaluate the integration of risk management into the Army.

*a.* The Office of the Assistant Secretary of the Army (Installations and Environment)(ASA(I&E)) is the principal consultant to the Secretary of the Army for Army safety and occupational health (OH) matters. The ASA(I&E) is the Army's designated safety and occupational health official and will—

(1) Approve policies, issue directives, make recommendations, and issue guidance on Army safety and OH plans, programs, and risk management integration within Army Safety and Occupational Health Program areas.

(2) Initiate programs, actions, and taskings to ensure adherence to DA and Department of Defense (DOD) safety and OH policies.

(3) Review and evaluate programs for carrying out approved safety and OH policies and standards.

(4) Serve on boards, committees, and other groups pertaining to safety and OH, and represent the Secretary of the Army on safety and OH matters outside DA.

(5) Participate in the planning, programming, and budgeting of safety and OH activities.

(6) Serve as Functional Chief for the Safety Management Career Program.

*b.* The Assistant Secretary of the Army (Research, Development, and Acquisition) (ASA(RDA)) will ensure system safety procedures are implemented by Project Executive Officers and Project Managers during materiel development phases.

*c.* The Director of Army Safety (DASAF), Office of the Chief of Staff, Army (OCSA) will—

(1) Administer and direct an effective Army safety program to reduce the occurrence of accidents.

(2) Act as principal adviser to Chief of Staff, Army (CSA), OCSA, and Army Staff elements on all safety matters.

(3) Provide staff supervision of the U.S. Army Safety Center (USASC) and the Army Safety Office.

(4) Develop, coordinate, and disseminate Army safety program policy, direction, and guidance to all Army commands and agencies.

(5) Monitor the Army safety program effectiveness.

(6) Support major Army command (MACOM) and installation commanders in developing specific plans and programs.

(7) Collect and distribute accident data and statistics relating to injuries, occupational illnesses, and report damage related to Army operations.

(8) Support appropriate funding to provide for an effective Army accident prevention effort.

(9) Develop safety countermeasures to reduce accidents.

(10) Investigate selected Army accidents according to AR 385-40.

(11) Administer a program of specialized safety training courses for the Army.

(12) Implement statutory requirements and national standards.

(13) Serve as Chairman of the DA Explosives Safety Council.

(14) Serve as the risk management advocate on the Army Staff, synchronize the risk management actions of risk management integrating agents, and provide periodic progress reports to the Secretary of the Army and the Chief of Staff, Army.

(15) Develop Army radiation safety policy relating to the use, licensing, disposal, transportation, dosimetry, accident



reporting, safety design, and inventory control of and radiation exposure standards for ionizing and nonionizing radiation sources.

*d.* The Deputy Chief of Staff for Personnel (DCSPER) will—

(1) Ensure systems safety is integrated into materiel development and acquisition phases through the Manpower and Personnel Integration (MANPRINT) Program.

(2) Include safety concerns and issues on Army materiel in MANPRINT assessments and presentations at the Army systems acquisition review council (ASARC).

(3) Support safety policy and procedure development and implementation with advocacy for soldier-oriented research and development, to include issues in personnel, training, human factors engineering, and soldier survivability.

*e.* The Deputy Chief of Staff for Logistics (DCSLOG) will—

(1) Establish and maintain procedures for safety-of-flight restrictions for Army aircraft and safety-of-use restrictions for other Army materiel.

(2) Develop procedures for the safe transportation, storage, and packaging of Army ordnance and hazardous materials.

(3) Manage Hazardous Materials Information System.

*f.* The Deputy Chief of Staff for Operations and Plans (DCSOPS) will—

(1) Act as focal point for all nuclear and chemical matters in Army.

(2) Establish procedures for nuclear weapons reliability, safety, security, nuclear force management, and employment policies.

(3) Establish procedures for the Army Flight Standardization Program.

*g.* The Surgeon General (TSG), in support of the Army Occupational Safety and Health Program, will—

(1) Formulate policy and guidance for the Army Occupational Health Program and related issues such as ergonomics.

(2) Formulate policy and provide guidance for the Army Health Hazard Assessment Program as described in AR 40-10.

(3) Provide guidance and policy on health and safety procedures and protocols for human use testing in accordance with AR 70-25.

(4) Establish procedure for implementing occupational health aspects of Public Law 91-596 (Occupational Safety and Health Act), 29 December 1970.

(5) Develop policies for and establish health standards as necessary for occupational exposure in industrial and military unique work areas.

(6) Provide technical guidance to the Army staff, MACOMs, and Army Medical Department in the evaluation and control of actual or potential occupational health hazards in Army work areas.

(7) Ensure system safety procedures are implemented in developing medical material.

*h.* The Commanding General, U.S. Army Materiel Command (CG, AMC) will—

(1) Develop airworthiness qualification of Army aircraft systems (AR 70-62); safety-of-use messages and a vehicle safety recall campaign (AR 750-10); and safety program aspects of toxic chemical munitions operations and demilitarization (AR 50-6).

(2) Assure that materiel and systems acquired for the Army and other military services are free of recognized hazards and conform to OSHA standards.

(3) Hazard classify ammunition and explosives per part 173, title 49, Code of Federal Regulations (49 CFR 173) and TB 700-2.

(4) Report and investigate malfunctions involving ammunition and explosives (AR 75-1).

(5) Develop and acquire new conventional and nonconventional munitions to provide for user and public safety during the manufacture, packaging, transportation, storage, use, and disposal/demilitarization.

(6) Coordinate activities across the Army to integrate risk management into programs to sustain the force, to include coordination with other MACOMs and staff elements that share AMC's functional interest.

*i.* The Commander, Military Traffic Management Command (CDR, MTMC) will—

(1) Develop policy for HQDA approval for safety in operations requiring DOD compliance with Department of Transportation (DOT) hazardous materials regulations; safety in maritime operations requiring compliance with the International Maritime Dangerous Goods Code when loading vessels at MTMC terminals; exemption requests by DOD

components for shipments of hazardous materials by DOD shippers that do not comply with DOT regulations; and traffic engineer support to installations.

(2) Assure that contracts within MTMC purview include adequate safety provisions and contract compliance.

(3) Coordinate activities across the Army to integrate risk management into programs to project the force, to include coordination with other MACOMS and staff elements that share MTMC's functional interest.

*j.* The Commanding General, U.S. Army Training and Doctrine Command (CG, TRADOC) will—

(1) Integrate safety and occupational health procedures into all Army training guidelines and techniques to be applied in the field.

(2) Ensure that safety and occupational health training is integrated into the curricula of appropriate Army schools.

(3) Incorporate safe operating practices and physical standards in field manuals, training circulars, and other documents.

(4) Coordinate activities across the Army to integrate risk management into programs to project the force, to include coordination with other MACOMS and staff elements that share MTMC's functional interest.

(5) Integrate safety and occupational health considerations into new equipment training.

(6) Integrate safety criteria into operational testing.

(7) Develop and publish range safety policies, procedures, and standards for the Army and Marine Corps.

(8) Monitor range safety operations and procedures to assure safety adequacy.

(9) Provide range safety instruction for Army personnel.

(10) Have, as part of task analysis, Combat Development Centers identify hazards and requisite safety standards to be met in critical combat tasks.

(11) Have Combat Development Centers incorporate critical safety and health parameters in the requirements documents for new systems acquisitions and ensure operational tests verify the product provides requisite protection.

(12) Approve the adequacy of solutions to acquisition safety problems.

(13) Direct and implement Army safety policy and programs for U.S. Army Reserve Officer's Training Corps (ROTCs) units.

(14) Serve as risk management integration proponent for doctrine, training, and combat development. Coordinate with other MACOM and staff elements that share TRADOC's functional interest. Coordinate risk management integration activities, across the Army and at Joint level into programs to develop the force to include: doctrine development, requirements definition, common applications, training support, and risk management education in the Army, including Army Forces (ARFOR) component in the joint-level functions.

*k.* Commanding General, Forces Command (CG, FORSCOM) will—

(1) Establish safety policy, standards, and guidance for use in Army exercises, maneuvers, and tactical operations.

(2) Direct and implement Army safety policy and programs for U.S. Army Reserve (USAR) units.

(3) Coordinate activities across the Army to integrate risk management into programs to project the force, to include coordination with other MACOMS and staff elements that share FORSCOM's functional interest.

*l.* The Commanding General, U.S. Army Corps of Engineers (CG, USACE) will—

(1) Promulgate the safety standards to be used in Army construction (EM 385-1-1).

(2) Assure that Army standards designs and USACE administered facility/utility designs and construction conform

to statutory and regulatory fire, safety, occupant health and explosives standards, and otherwise provide a safe and healthful workplace for user personnel and materiel.

(3) Provide safety policy to other elements of the Army that manage facility/utility design and construction at their level.

(4) Include provisions for public safety at civil works facilities with public recreation and visitation mission.

*m.* The Commanding General, U.S. Army Medical Command, in support of the Army Occupational Safety and Health Program will:

(1) Provide direct occupational health services to supported installations and tenant activities according to AR 40-5.

(2) Provide technical assistance to installation and tenant activity commanders and MACOM commanders on risk management integration and health assessment, control, and training.

*n.* MACOM commanders will—

(1) Ensure the full and effective implementation of the Army safety and OH program throughout their MACOM. This includes—

(a) Providing a safe and healthful workplace and environment.

(b) Providing risk management training to military and civilian personnel, as well as providing hazard recognition and abatement training specific to the work site or activity.

(c) Establishing standing operating procedures (SOPs) that will foster safe practices and procedures.

(d) Monitoring workplaces and practices to ensure adherence to established procedures and the prompt correction of unsafe acts and

(e) Investigating accidents to determine causes and prevent recurrence.

(2) Initiate additional accident prevention measures necessary to control hazards and resource losses for which there are no prescribed or established safety standards or procedures.

(3) Establish and enforce procedures for plans that assure maximum safety during training and tactical operations.

(4) Establish procedures for expeditiously funding and fixing hazards based on risk assessment codes (RACs) on a 'worst-first' basis. Commanders of MACOMs having troop organizations will establish safety and occupational health requirements and guidance for their troops participating in exercises. They will also assure coordination and integration of their safety and occupational health efforts with those of other commands and services involved in the exercise.

(5) Develop and implement programs to integrate risk management into Army safety and occupational health program throughout their command.

(6) Establish an ergonomics program consistent with paragraph 1-4g(1).

*o.* Commanders at all levels will be responsible for protecting personnel, equipment, and facilities under their command; effective implementation of safety and occupational health policies; and the integration of the risk management process into their safety and occupational health program.

*p.* Supervisory and operating personnel who direct or affect the actions of others will—

(1) Be responsible for accident prevention to the same extent that they are responsible for production or services.

(2) Maintain a safe and healthful workplace.

(3) Assure that employees under their supervision observe appropriate safety and occupational health rules and regulations, including the use of protective clothing and equipment (PCE) provided for their protection.

(4) Promptly evaluate and take action as required to correct hazards reported by employees or identified through accident investigation. They will not initiate or support reprisal action against employees who identify hazards, raise safety concerns or engage in authorized safety and occupational health activities.

(5) Use the risk management process during the planning, preparation for, and execution of all operations for which they are responsible.

## **1-5. Policy**

The following principles will be effectively integrated into all Army plans, programs, decision processes, operations, and activities:

*a.* Accidents are an unacceptable impediment to Army missions, readiness, morale, and resources: hence accident risk management will be exercised by decision makers.

*b.* Decision makers at every level will employ the risk management process, as specified in paragraph 2-3d of this regulation, to avoid unnecessary residual risk to missions, personnel, equipment, and the environment.

*c.* The acquisition of materials, equipment, facilities, and systems will maximize the use of engineering design to preclude unnecessary residual risk and control residual risks.

*d.* Life cycle safety considerations will be considered in the acquisition, use, and disposal of chemicals and hazardous materials so as not to endanger or compromise public health and safety.

*e.* Appropriate action will be taken to expeditiously correct nonconformities with mandated standards, workplace deficiencies hazards and accident causes.

*f.* Performance standards for military and civilian managers and supervisors will include accident prevention and OH responsibilities as a rating element. The success or shortcomings of managers or supervisory personnel in performing

safety and OH responsibilities will be considered in Army civilian employee performance appraisals, officer evaluation reports (OERs), and enlisted evaluation reports (EERs).

#### **1-6. Safety Coordinating Panel**

A Department of the Army (DA) Safety Coordinating Panel, chaired by the Director of Army Safety, will be chartered to facilitate coordination and communication between MACOMs, the Director of Army Safety, and the ARSTAF on risk management integration in Develop, Project, and Sustain the force, and safety issues having major Army-wide effect on policy, direction, and standards.

#### **1-7. Deviations**

Occasionally, the safety requirements of this regulation may be incompatible with mission accomplishment. In such cases, MACOM commanders may request that the Director of Army Safety approve deviation from the specific requirements (Chief of Staff (DACS-SF), 200 Army Pentagon, Washington, DC 20310-0200).

## **Chapter 2**

### **Army Safety Program Structure and Activities**

#### **2-1. Organizational structure**

All Army safety offices will be structured according to this chapter. Commanders will—

*a.* Designate a command safety and occupational health official to exercise staff supervision over safety and health, risk management, and accident prevention activities. Duties performed by this official will include the full range of program management responsibilities.

*b.* Ensure that the designated command safety and occupational health official will be a member of the commander's special staff reporting directly to the commander.

*c.* Ensure that designated command safety and occupational health officials meet Office of Personnel Management Standards for the positions of Occupational Safety and Health, GS 018/803.

*d.* Organize and staff a comprehensive safety office under the direction of a designated command safety and occupational health manager. This office will organize and administer a safety program that includes the following:

- (1) Accident reporting
- (2) Workplace safety
- (3) Transportation safety
- (4) Family and off-the-job safety
- (5) Range safety (when applicable)
- (6) Explosive safety (when applicable)
- (7) Aviation safety (when applicable)
- (8) Tactical safety (when applicable)
- (9) Radiation safety (when applicable)
- (10) System safety (when applicable)

*e.* Provide sufficient funds and other resources to carry out all responsibilities designated in this regulation to assure safety and OH program effectiveness. This staff will perform standard accident prevention functions and tasks as outlined in chapter 5. Safety, occupational health, fire prevention, environmental protection, and injury compensation staffs will work in close coordination on matters of mutual concern.

*f.* Appoint additional duty safety personnel to perform required safety and accident prevention functions in troop/industrial/administrative units not staffed with full-time safety personnel. In troop units, this includes company level or equivalent organizational component. These unit safety personnel will—

- (1) Be appointed in writing on orders.
- (2) Be a commissioned officer at battalion and higher unit levels.
- (3) Be in the rank of staff sergeant or higher at company level.
- (4) Have completed, or will complete, a local unit safety officer course.
- (5) Have 1 year or more retainability in the unit upon duty appointment.
- (6) Give their safety officer duties proper priority.
- (7) Report directly to the commander on safety-related matters.

*g.* Civilian collateral safety personnel will be given similar training.

*h.* Support efforts to develop military and civilian safety expertise through training programs, effective career development, and management procedures.

*i.* Provide safety, occupational health, and related loss control services to tenant and satellite commanders in support of their statutory and regulatory responsibilities. Installation commanders have responsibilities for safety of people, the

environment, and public on their installation. Local memorandum of understanding will be developed between host and tenant organizations to ensure necessary safety and OH responsibilities are addressed.

j. Provide safety services to USAR units in their geographic area of responsibility as defined in AR 5-9.

k. Establish at MACOM, installation, and community level a Safety and Occupational Health Advisory Council composed of management and military and civilian operating personnel. This council will make recommendations to the commander and perform such additional safety and occupational health tasks as the commander or the council may direct.

(1) Such councils will be chaired by the commander or the commander's designee, who will be a senior management official.

(2) Councils will meet periodically and will publish the minutes of the meetings.

(3) MACOM commanders may exempt installations having small populations from the requirements of this paragraph; however, these exemptions will document quality control measures. Such populations may be represented through participation in other command councils.

(4) Establishment of councils at other than installation level will be at MACOM discretion.

l. Authorize use of official time for employees when participating in occupational safety and health (OSH) activities, including walkaround inspections, authorized by this regulation.

## **2-2. Operational procedures**

Leaders and managers are responsible for integrating risk management into all Army processes and operations. Safety and occupational health staffs will provide risk management training, tools and other related assistance. Leaders and managers will—

a. Ensure that physical standards for facilities and equipment meet or exceed safety and health standards established in pertinent host government, Federal, State, and local statutes and regulations and in Army regulations. Specific requirements and guidance for applying such standards are in chapter 3.

b. Ensure that the risk management process is incorporated in regulations, directives, SOPs, special orders, training plans, and operational plans to minimize accident risk and that SOPs are developed for all operations entailing risk of death, serious injury, occupational illness or property loss. The risk assessment matrix can be tailored by the commander for the type of hazard identified. For example, the matrix in this regulation should be used for hazards involving unsafe or unhealthful working conditions and other hazards associated with base operations. The risk assessment matrix in FMs 100-14 and 101-5 should be used for military training and operational hazards. Effective integration of risk management into the military decision-making process for military training and operations may be found in FMs 100-14 and 101-5.

c. Develop and implement actions to meet responsibilities contained in the accident prevention plans of higher headquarters and to provide focus and continuity to safety program efforts.

d. Post DD Form 2272 (Department of Defense Safety and Occupational Health Program) in all industrial workplaces. (See fig 2-1.)

e. Ensure that appropriate safety and occupational health training is provided as follows:

(1) All Active Army, Army National Guard (ARNG), USAR, and Army civilian employees will be provided the training and education necessary to achieve the skills listed below. This training, as a minimum, will be in accordance with subpart H, part 1960, title 29, Code of Federal Regulations (29 CFR 1960).

(a) Recognize the hazards and accident risks associated with their duties and work environment and know the procedures necessary to control these risks and work safely.

(b) Know their accident prevention related rights and responsibilities as outlined in relevant statutes and regulations.

(c) As appropriate, know the safety responsibilities of their leaders, supervisors, and commanders.

(2) Commanders, supervisors, and safety and OH staff personnel will be provided specialized training to enable them to properly execute their safety, OH, and risk management leadership and staff responsibilities.

(3) Safety education and promotional materials such as posters, films, technical publications, pamphlets, incentive items, and related materials are proven cost-effective safety awareness tools.

f. Ensure personnel are protected from reprisals for exercising lawful OSH rights. All DA personnel, both military and civilian, will be protected from coercion, discrimination, or reprisals for participation in the Army safety and OH program.

(1) Such procedures will include provisions to preserve individual anonymity of those submitting safety and health complaints when requested; to ensure prompt, impartial investigation of allegations of reprisal; and to provide corrective action when such allegations are substantiated.

(2) Under the provisions of 29 CFR 1960.46, the above protection against reprisal extends specifically to the right of an Army civilian to decline to perform an assigned task because of a reasonable belief that, under the circumstances, the task poses an imminent risk of death or serious bodily harm and that there is insufficient time to seek effective redress through normal hazard reporting and abatement procedures.

g. Establish specific plans to assure continuity of safety and OH program services during tactical operations or

mobilization. These plans will address mission definition, organizational concepts, and staffing and operational procedures required to assure maximum safety function support to the combat mission. Such plans will be developed by all organizations and commands having a combat or combat support mission (for example, TOE units, depots, ammunition plants, and area support groups).

*h. Conduct annual safety and loss control program evaluations of subordinate commands using results-oriented criteria.*

*i. Develop effective programs to reduce injuries and illness to ensure that—*

(1) All injuries and illnesses have been thoroughly investigated and the facts from the investigation have been documented on appropriate reports and forms.

(2) Accident reports and compensation claim forms have been properly completed designating the injured employee's major command and servicing civilian personnel office.

(3) Compensation claims are challenged and controverted when necessary.

*j. Establish procedures to ensure required PCE for personnel are provided, used, and maintained in accordance with part 1910, title 29, Code of Federal Regulations (29 CFR 1910).*

(1) *Military personnel.* PCE will be furnished to military personnel performing industrial activities similar to those performed by civilian personnel.

(2) *Funding.* When required, PCE will be funded from appropriated fund accounts available at the installation or activity. Nonappropriated fund activities will provide PCE from their own funds unless authorized by appropriated fund sources or provided for in a host-tenant agreement.

(3) *Issuance of special clothing and equipment to Army civilians.*

(a) Special clothing and equipment include clothing and equipment needed for the protection of personnel to perform their assigned tasks efficiently under extreme conditions or situations. These include but are not limited to heat, cold, wetness, pressure, environmental pollution (for example, toxic or hazardous gases, vapors, fumes, or materials); deleterious animal, insect, parasitic, or amoebic life; or any combination of these conditions..

(b) Commanders are authorized to requisition and issue special clothing and equipment on a temporary loan basis from any inventories, other than those of the Army Stock fund, to all direct-hire civilian employees. The following criteria must be met:

1. The use of special clothing and equipment would serve a military purpose.

2. The purchase of such clothing and equipment from commercial sources would not be practicable or would cause undue hardship on the individual concerned.

3. The clothing and equipment issued would be returned to the issuing organization when no longer required.

(4) *Environmental differential pay.* Environmental differential pay for civilian employees, when warranted, does not relieve the commander of the responsibility to provide appropriate PCE and to continue efforts to eliminate or reduce any hazardous conditions that justify such pay. Conversely, the requirement to wear PCE in any particular work environment does not, of itself, provide justification for environmental differential pay.

(5) *Use of PCE by visitors and transients.* For all activities in which official visitors and transients may be potentially exposed to hazards, the host, guide, or area supervisor will conduct a risk assessment of the work location to determine the appropriate protective measures. If the host, guide, or area supervisor can reduce the hazard(s) to an acceptable level without requiring the use of PCE, those measures may be employed (that is, eliminate foot hazards-no safety shoes). However, if it is determined that a safe level of risk cannot be obtained by using these procedures, then the host, guide, or area supervisor will be responsible for providing and assuring the proper use of PCE and the official visitors and transients will be required to wear the specified PCE.

*k. Establish and operate an effective explosives safety program to include—*

(1) Exercising supervision over subordinate organizations to ensure that effective explosives safety procedures are implemented and maintained to include specific plans to correct violations of explosives safety standards.

(2) Publishing a command program to implement HQDA ammunition and explosives safety standards and to identify responsibilities for all subordinate organizations (including tenants) that store, handle, use, or transport explosives.

(3) Ensuring qualified safety personnel (GS/GM-018 or GS/GM-803) review explosives safety site plans, safety

submissions, and facility designs for new or modified explosives sites or facilities within the safety arcs of explosives operations.

(4) Ensuring qualified occupational safety personnel review explosives safety waivers and exemptions for facilities and equipment and provide the commander with essential risk data regarding the deficient situation.

*l.* Ensure that effective range safety procedures are implemented and sustained to include safety office review of all new range construction and all range waivers.

*m.* Publish command procedures to implement effective family, sports, and recreation safety programs and identify responsibilities for all subordinate organizations and installations.

*n.* Use the risk management process to establish and operate an effective water safety program to include—

(1) *Water-related activities.*

(a) Establish and operate a safety program for water operations and water recreational activities and publicize appropriate to the geographic area.

(b) Provide for inspection of water operations and recreational facilities, equipment, and adjacent areas on Army owned or leased properties. Such inspections will assure that safety and health requirements are met.

(c) Provide sufficient lifesaving equipment, communication equipment, first aid facilities, protective devices, and other equipment as shown in TB MED 575 at Army-controlled water operations and water recreational activities areas.

(d) Issue standing operating procedures for water operations and water recreational activities. Assure that all water operations and recreational facilities and equipment comply with safety and occupational health requirements. Army boats and lifesaving equipment must comply with U.S. Coast Guard and State or host country requirements.

(e) Inform personnel of the hazards of swimming alone, in cold water, after drinking, during hours of darkness, or in unauthorized areas.

(f) Provide water safety briefings before the start of any water operations and the swimming season.

(2) *Water operations.*

(a) Train persons involved in water operations on accident prevention measures.

(b) Identify military nonswimmers. Provide swimming instructions or water survival training for persons who will be involved in water operations. See FM 21-20 for detailed guidance.

(c) Ensure that equipment used for water crossing operations is pre-dipped to detect water leakage.

(3) *Water recreation activities.*

(a) When possible, provide swimming instruction and water survival training for persons who engage in water recreational activities.

(b) Ensure that Red Cross certified or equivalent lifeguards will be on duty at Army water recreational areas at all times during hours of operation.

## **2-3. Prevention program procedures**

*a. Inspections and surveys.* Inspections and surveys of operations and facilities will be conducted annually or more often (chap 4). Inspection procedures will emphasize use of interviews, operational reviews, performance testing, and similar techniques designed to detect high risks of both a behavior and environmental character at the earliest possible time. Standard Army Safety and Occupational Health Inspection (SASOHI) procedures outlined in chapter 4 implement 29 CFR 1960.26 provisions and will be used in inspections/surveys. Installations will have the appropriate diagnostic equipment consistent with their mission to collect the essential information for analysis.

*b. Reports of unsafe or unhealthful conditions.* All Army personnel will be advised of their right and responsibility to report unsafe or unhealthful conditions. Reports to their supervisors will normally expedite corrective actions. Such reports may be submitted directly to unit safety personnel, installation safety offices, or other appropriate points of contact such as inspectors general. To provide an additional channel for such reports when employees find routine channels ineffective, commanders will conform to Army Employee Hazard Reporting System procedures outlined in chapter 4.

*c. Department of Labor (DOL) inspections and investigations of Army working conditions.* In accordance with the provisions of Executive Order 12196 and DODI 6055.1, and within the scope of the Public Law 91-596, OSHA, and National Institute for Occupational Safety and Health (NIOSH) officials, acting as representatives of the Secretary of Labor, are authorized to conduct announced or unannounced inspections of all Army civilian workplaces except those identified as military- unique workplaces. Procedures for these inspections are in chapter 4.

*d. Risk management.* Risk Management is the Army's principal risk reduction process to assist leaders in identifying and controlling hazards and making informed decisions.

(1) Every commander, leader and manager is responsible for protecting the force and persons affected by Army

operations. The five-step process is the commander's principal risk reduction process to identify and control hazards and make informed decisions.

- (a) Identify hazards.
- (b) Assess hazards.
- (c) Develop controls and make risk decisions.
- (d) Implement controls.
- (e) Supervise and evaluate.

(2) The standard for risk management is leadership at the appropriate level of authority making informed decisions to control hazards or accept risks.

(3) In those circumstances where local resources are not available to control residual risks, leaders will make conscious decisions to either accept the risk or elevate the risk decision to the next higher level of leadership.

(4) The risk management process supplements, but does not supersede, the compliance requirements of federally mandated standards, this regulation or any other regulation.

## **2-4. Department of the Army personnel**

All DA personnel, military and civilian, will—

- a. Comply with safety and occupational health rules, regulations, and standards.
- b. Use and maintain PCE provided for their protection.
- c. Report any unsafe and unhealthful working conditions and accidents to their immediate supervisor.

## **Chapter 3**

### **Safety Standards Application**

#### **3-1. Standards**

a. All standards established by DOL pursuant to sections 6 and 19 of Public Law 91-596 are adopted as Army safety standards and will be complied with in applicable Army workplaces. Army workplaces are generally comparable to private sector workplaces.

b. The U.S. Army Corps of Engineer safety and health requirements publication (EM 385-1-1) applies to all Army construction operations incorporating part 1926, title 29, Code of Federal Regulations (29 CFR 1926).

c. Commanders will apply OSHA and other non-DA regulatory or consensus safety and health standards to military-unique equipment, systems, operations, or workplaces, in whole or in part, insofar as practicable. When military design, specifications, or requirements render compliance infeasible, or when no regulatory or consensus standard exists for such military application, commanders will request development and publishing of special military standards, rules, or regulations prescribing Occupational Safety and Health measures from the Army Safety Office (HQDA).

d. Certain operations are subject to mandatory safety standards or rules that derive from separate, specific statutory authority. The application of special functional standards does not exempt any workplace from other appropriate safety criteria. Thus, a workplace in a munitions facility subject to special explosives safety standards is also subject to OSHA safety criteria for machine guarding, guard rails, eye protection, and so forth. Any publication that sets forth job safety requirements for such a workplace must take this into account.

e. In workplaces overseas where the Status of Forces Agreement (SOFA) requires that U.S. Armed Forces comply with host country law which prescribes different safety standards, the latter standards take precedence if stricter. If host country law is less strict or nonexistent, Army requirements will apply.

#### **3-2. Conflicts**

When standards in Army publications conflict with a legal standard such as the OSHA Act, or provide a lower degree of protection, the legal standard will apply. When the Army standards are equal to or exceed such requirements in providing workplace safety, the Army requirement will apply.

#### **3-3. Additional safeguards**

Whenever possible, commanders will evaluate the level of safety provided by established safety and occupational health standards to determine if additional safeguards are required. Priority for these reviews will be given to activities with high loss potential.



# DEPARTMENT OF DEFENSE SAFETY AND OCCUPATIONAL HEALTH PROTECTION PROGRAM



THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, EXECUTIVE ORDER 12196 AND 29 CFR 1960 REQUIRE THE HEADS OF FEDERAL AGENCIES TO ESTABLISH PROGRAMS TO PROTECT THEIR PERSONNEL FROM JOB SAFETY AND OCCUPATIONAL HEALTH HAZARDS.

1. THE DEPARTMENT OF DEFENSE (DDO) DESIGNATED AGENCY SAFETY AND OCCUPATIONAL HEALTH OFFICIAL IS THE ASSISTANT SECRETARY OF DEFENSE (FORCE MANAGEMENT AND PERSONNEL)

2. THE DEPARTMENT OF THE ARMY  
DDO COMPONENT

DESIGNATED SAFETY AND OCCUPATIONAL HEALTH OFFICIAL IS

ASALIBILI, WASH. DC  
NAME ADDRESS

3. THE FT OWENS  
NAME OF INSTALLATION/FACILITY

SAFETY AND OCCUPATIONAL HEALTH DESIGNEE IS

MR. TUCKER, SAFETY MANAGER  
NAME TITLE

4. THE FT OWENS  
NAME OF INSTALLATION/FACILITY

SAFETY POINT OF CONTACT IS

MS. JONES, 555-9876  
NAME PHONE NUMBER

5. THE FT OWENS  
NAME OF INSTALLATION/FACILITY

OCCUPATIONAL HEALTH POINT OF CONTACT IS

MR. GLASS, 555-0102  
NAME PHONE NUMBER

WAPA CLINIC, FT OWENS  
NAME OF INSTALLATION/FACILITY

HAS THE RESPONSIBILITY TO:

1. COMPLY WITH APPLICABLE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) COMPONENT SAFETY AND OCCUPATIONAL HEALTH STANDARDS
2. SET UP PROCEDURES FOR SUBMITTING AND RESPONDING TO EMPLOYEE REPORTS OF UNSAFE AND UNHEALTHY WORKING CONDITIONS
3. ACQUIRE, MAINTAIN AND REQUIRE THE USE OF APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AND SAFETY EQUIPMENT
4. INSPECT ALL WORKPLACES with participation by civilian employee representatives to identify potential hazards
5. ESTABLISH PROCEDURES TO ASSURE the employer is subject to reports of violations, citation, abatement, or request for stopping further rights under the DDO safety and occupational health program
6. POST NOTICES of unsafe or unhealthy working conditions found during inspections
7. ASSURE PROMPT ABATEMENT of hazardous conditions. Workers exposed to the conditions shall be informed of the abatement plan. Imminent danger corrections must be made immediately
8. SET UP A MANAGEMENT INFORMATION SYSTEM to keep records of occupational accidents, injuries, illnesses and their causes and to post annual summaries of injuries and illnesses for a minimum of 30 days at each installation/facility
9. CONDUCT SAFETY AND OCCUPATIONAL HEALTH TRAINING for management, supervisors, workers and worker representatives

DDO PERSONNEL HAVE THE RESPONSIBILITY TO:

1. COMPLY with all applicable OSHA/DOO/DOO component safety and occupational health standards
2. COMPLY with FT OWENS  
NAME OF INSTALLATION/FACILITY policies and directives relating to the safety and occupational health program
3. USE personal protective equipment and safety equipment provided by your installation/facility
4. REPORT hazardous conditions, injuries, illnesses or other mishaps promptly to your supervisor or to the safety or occupational health point of contact for your installation/facility

DDO PERSONNEL AND CIVILIAN EMPLOYEE REPRESENTATIVES HAVE THE RIGHT TO:

1. HAVE ACCESS to applicable OSHA/DOO/DOO component standards, installation/facility policy and area standards and safety and occupational health program procedures
2. COMMENT on standards proposed by DOO/DOO component
3. REPORT AND REQUEST INSPECTIONS OF UNSAFE AND UNHEALTHY WORKING CONDITIONS to appropriate officials who include in order of preference, the immediate supervisor, the safety or occupational health point of contact, the safety and occupational health designee for your installation/facility, the installation/facility commander, the safety and occupational health designee for your DDO component, the safety and occupational health designee for DDO and the Secretary of Labor. However, the Secretary of Labor encourages personnel to use DDO procedures for reporting hazardous conditions as the most expeditious means to achieve abatement. The hazard report form provided by your installation/facility should be used for this purpose. Anonymity when requested is assured
4. PARTICIPATE in the installation/facility safety and occupational health program. Civilian workers shall be authorized official time to participate in the activities provided by the DDO safety and occupational health program

OTHER INFORMATION:

1. When the safety or occupational health point of contact for your installation/facility is notified by a worker of a hazardous working condition, the worker will make an inspection of the workplace and the worker will report the results of the inspection in writing to the worker making the report
2. Inspector General channels may be used to investigate complaints from either DDO civilian or military personnel concerning alleged acts of discrimination or reprisal due to participation in safety and occupational health activities. For DDO civilian personnel, allegations of reprisal may also be raised by them in accordance with applicable appeal procedures or administrative or negotiated grievance procedures
3. For further information about the installation/facility safety and occupational health program, procedures, standards, commission, Federal laws, or other related matters, contact the safety or occupational health point of contact for your installation/facility as noted on this poster
4. How well you carry out your safety and occupational health responsibilities will be an important factor in the success of the program

DD FORM 2272, FEB 87

Figure 2-1. Sample DD Form 2272

### **3-4. Standards publications**

Commander will ensure that publications which implement Army safety and occupational health criteria—

- a. Reach every DA workplace in a form appropriate to the specific operation.
- b. Are understood and complied with by affected personnel and implementation is enforced by supervisors.
- c. Are applied in the procurement or renovation of material, equipment, systems and facilities.

### **3-5. Modification of OSHA standards**

Commanders may not issue waivers or variances to OSHA standards.

a. *Alternate standards.* When a MACOM commander determines that an OSHA standard should be modified for application to particular nonmilitary-unique working conditions, a proposed alternate standard will be developed and submitted to the Director of Army Safety (DASAF), ATTN: CSSC-PR, Fort Rucker, AL 36362-5363 (with a copy sent to HQDA (DACS-SF), WASH DC 20310-0300) following guidelines established in 29 CFR 1960.17. The DASAF will review the proposed standard and, if appropriate, forward it through the chain of command to the Secretary of Labor for approval. Upon approval of an alternate standard, the originating MACOM may proceed with implementation. If adjudged to have Armywide applications, DASAF will advise the MACOMs.

b. *Supplementary standards.* In those cases where no appropriate OSHA standards exist for exposure of Army employees to unique, specific, or general hazards, MACOM commanders will develop appropriate emergency temporary or permanent supplementary standards that apply to the working conditions of Army employees. These proposed supplementary standards will be submitted through command channels to the Director of Army Safety, ATTN: CSSC-PR, Fort Rucker, AL 36362-5363 (with a copy sent to HQDA (DACS-SF), WASH DC 20310-0300). ASA(I&L) will interact with DOL for their review.

c. *Emergency temporary standards.* Commanders will implement OSHA emergency temporary standards (ETS) on the prescribed effective date established. Federal court rulings that advance or delay implementation of change, or that rescind OSHA standards, including ETS, will be adhered to by commanders, although commanders may continue to apply more stringent criteria than OSHA.

### **3-6. Host installation standards**

Personnel of different DA organizations, other DOD components, other Federal agencies, or private organizations who work at the same installation will be governed by installation safety standards. Conflicts concerning safety standards should be resolved by the installation commander. However, when local efforts cannot resolve these problems, they should be referred to the next higher command level to adjudicate.

### **3-7. General Services Administration facilities**

Deficiencies involving General Services Administration facilities will be corrected according to 29 CFR 1960.30.

### **3-8. Violation-correction policy**

To discharge their responsibility for the prevention of occupational injuries and illnesses, heads of Army installations and activities will, where possible, eliminate work hazards and health risks through engineering controls or modifications. Although less desirable, management controls such as controlling the exposure time may be used to lessen personnel exposure to all hazards except noise hazards.

a. The following priorities will be used to eliminate or reduce the effects of hazards:

- (1) Engineer to eliminate the hazard or to incorporate fail-safe devices.
- (2) Guard or control the hazard including automatic monitoring and alarming of unsafe/unhealthful conditions.
- (3) Limit personnel exposures (number of people and duration).
- (4) Train and educate personnel to avoid hazards.
- (5) Provide protective clothing or equipment adequate to minimize injury potential.
- (6) Use color coding and signs to alert personnel of hazards.

b. PCE will be issued in situations where—

- (1) Engineering or management controls are not possible.
- (2) Development or installation of engineering controls are pending.
- (3) Short-term, nonroutine operations for which engineering controls are not practical are involved.
- (4) Emergencies occur; for example, spills and associated cleanup operations, ventilation malfunctions, emergency egress, and damage control activities.

(5) Engineering or management controls cannot reduce the hazard to acceptable levels.

c. When engineering and management controls are not possible and PCE does not reduce the hazard, the operation

will be suspended and guidance will be requested from the Director of Army Safety. The request will document a demonstrated effort to correct or reduce the hazard.

d. New equipment or systems acquired will meet Army and Federal safety and health standards so that engineering modifications, management controls, or the use of PCE will not be required to provide a safe and healthful workplace. Guidance for providing safety and health input throughout the acquisition cycle is in AR 385-16 and AR 40-10.

### 3-9. Abatement program

a. *Procedures.* An analysis of all hazards will be made to determine the degree of risk. The procedures below will be followed in analyses of safety hazards.

(1) Hazards will be risk assessed in terms of hazard severity (table 3-1) and accident probability (table 3-2) and assigned a risk assessment code (RAC) (table 3-3). Cost of correction, future intended use of the facility, and availability of desirable alternative methods of control will be considered. Coordination will be effected between fire department and OH personnel to ensure that hazards identified by those organizations are entered into appropriate abatement plans according to AR 420-90, paragraph 6-9, and TB Med 503, paragraph 3-2c(2).

(2) Hazards will be eliminated on a worst-first basis. An abatement plan must be prepared for each RAC 1 or 2 hazard whose correction will exceed 30 days. Individual deficiencies of an identical character may be grouped together into a single abatement plan or into an associated abatement project. The plans will be kept current by adding new projects and by placing completed projects in a completed projects section. Corrections of violations that have a high dollar cost can be included in the abatement. The command element involved will approve abatement plans.

(3) Procedures such as spot checking or sampling will be used to ensure that interim control measures are being implemented.

(4) Copies of abatement plans will be placed in each unit in the place where personnel notices are usually posted.

(5) Violations that are the responsibility of another Army command or installation, DOD, or outside agency will be brought to the attention of the responsible official for action.

(6) MACOM representatives will review installation abatement plans at least annually to ensure adequate resource allocation and ensure nonresource-intensive corrective actions are accomplished. These plans are also subject to review by HQDA, OSHA, and union representatives.

---

**Table 3-1**  
**Hazard severity**

---

**Category: I**

**Description:** Catastrophic

**Definition:** Loss of ability to accomplish the mission or mission failure. Death or permanent total disability (accident risk). Loss of major or mission-critical system or equipment. Major property (facility) damage. Severe environmental damage. Mission-critical security failure. Unacceptable collateral damage.

---

**Category: II**

**Description:** CRITICAL

**Definition:** Significantly (severely) degraded mission capability or unit readiness. Permanent partial disability, temporary total disability exceeding 3 months time (accident risk). Extensive (major) damage to equipment or systems. Significant damage to property or the environment. Security failure. Significant collateral damage.

---

**Category: III**

**Description:** MARGINAL

**Definition:** Degraded mission capability or unit readiness. Minor damage to equipment or systems, property, or the environment. Lost day due to injury or illness not exceeding 3 months (accident risk). Minor damage to property or the environment.

---

**Category: IV**

**Description:** NEGLIGIBLE

**Definition:** Little or no adverse impact on mission capability. First aid or minor medical treatment (accident risk). Slight equipment or system damage, but fully functional and serviceable. Little or no property or environmental damage.

---

**Table 3-2**  
**Accident probability**

**Probability:** Frequent. Occurs very often, continuously experienced.

**Level:** (A)

**Single item:** Occurs very often in service life. Expected to occur several times over duration of a specific mission or operation. Always occurs.

**Fleet or inventory of items:** Occurs continuously during a specific mission or operation, or over a service life.

**Individual soldier:** Occurs very often in career. Expected to occur several times during mission or operation. Always occurs.

**All soldiers exposed:** Occurs continuously during a specific mission or operation.

**Probability:** Likely. Occurs several times.

**Level:** (B)

**Single item:** Occurs several times in service life. Expected to occur during a specific mission or operation.

**Fleet or inventory of items:** Occurs at a high rate, but experienced intermittently (regular intervals, generally often).

**Individual soldier:** Occurs several times in career. Expected to occur during a specific mission or operation.

**All soldiers exposed:** Occurs at a high rate, but experienced intermittently.

**Probability:** Occasional. Occurs sporadically.

**Level:** (C)

**Single item:** Occurs some time in service life. May occur about as often as not during a specific mission or operation.

**Fleet or inventory of items:** Occurs several times in service life.

**Individual soldier:** Occurs some time in career. May occur during a specific mission or operation, but not often.

**All soldiers exposed:** Occurs sporadically (irregularly, sparsely, or sometimes).

**Probability:** Seldom. Remotely possible; could occur at some time.

**Level:** (D)

**Single item:** Occurs in service life, but only remotely possible. Not expected to occur during a specific mission or operation.

**Fleet or inventory of items:** Occurs as isolated incidents. Possible to occur some time in service life, but rarely. Usually does not occur.

**Individual soldier:** Occurs as isolated incident during a career. Remotely possible, but not expected to occur during a specific mission or operation.

**All soldiers exposed:** Occurs rarely within exposed population as isolated incidents.

**Probability:** Unlikely. Can assume will not occur, but not impossible.

**Level:** (E)

**Single item:** Occurrence not impossible, but can assume will almost never occur in service life. Can assume will not occur during a specific mission or operation.

**Fleet or inventory of items:** Occurs very rarely (almost never or improbable). Incidents items may occur over service life.

**Individual soldier:** Occurrence not impossible, but may assume will not occur in career or during a specific mission or operation.

**All soldiers exposed:** Occurs very rarely, but not impossible.

**Table 3-3**  
**Risk assessment code matrix**

| Hazard Severity | Accident Probability |   |   |   |   |
|-----------------|----------------------|---|---|---|---|
|                 | A                    | B | C | D | E |
| I               | 1                    | 1 | 2 | 3 | 5 |
| II              | 1                    | 2 | 3 | 4 | 5 |
| III             | 2                    | 3 | 4 | 5 | 5 |
| IV              | 3                    | 4 | 5 | 5 | 5 |

*b. Funding for hazard abatement.*

(1) Operating plans and budgets will include appropriate planning, programming, and resources to correct RAC 1 and 2 hazards from the abatement plan according to abatement priority numbers and any supplemental DA program guidance. When abatement projects require military construction funds or exceed local funding ceilings, the local commander will submit appropriate funding requests through command channels.

(2) Funding will be accomplished generally from local operations and maintenance monies or overhead funds in industrially funded activities. Installations that are RDTE funded will program funding for hazard abatement.

(3) All construction and modernization projects are required to incorporate life safety, explosives safety, fire

protection, environmental, and other appropriate safety and occupational health standards. Many existing hazards are abated as a by-product of new construction that has been justified for other reasons. However, military construction projects whose paramount justification is abatement of such hazards normally do not involve new construction; they typically consist of retrofit of one or more existing facilities, such as the installation or replacement of ventilation systems in places where toxic chemicals present hazards. An exception to this general rule could occur when a life-cycle analysis results in the determination that replacement or relocation of an existing facility is more cost effective than correction of multiple or gross existing hazards.

(4) MACOMs will make provisions to account for actual expenditures for hazard abatement projects at all echelons of command.

## **Chapter 4**

### **Safety and Occupational Health Inspections of Army Workplaces**

#### **4-1. Standard Army safety and occupational health inspections**

The procedures outlined below, designated as Standard Army Safety and Occupational Health Inspections (SASOHI), are mandatory and will be followed on selected installation-level inspections as indicated in *a* below.

*a.* All workplaces will be inspected at least annually using SASOHI procedures.

(1) Facilities and operations involving special hazards will be inspected more frequently as determined by qualified safety and occupational health personnel.

(2) Civilian personnel offices may request assistance in determining environmental differential pay or hazard pay cases. In these cases, qualified safety and health professionals will evaluate specific workplaces and conditions and provide a professional opinion as to the nature of the hazards and the required protective procedures.

(3) Inspections of workplaces in contractor installations where fewer than 25 DA personnel are employed will be at the discretion of the MACOM commander based on existing conditions. While no formal annual inspection is required, DA and MACOM commanders are required to ensure the health and safety of their employees in the contractor facility.

*b.* Unless specifically exempted in this paragraph, SASOHIs for all work sites will be conducted by qualified safety and occupational health professionals as defined in section II of the glossary. SASOHIs for tenant activities will be conducted in accordance with the host installation and tenant activity agreement. The SASOHIs for work sites meeting the criteria specified below may be performed by trained, qualified and appointed collateral duty safety personnel. If there is a dispute over interpretation of safety and health standards, hazard, or risk severity and probability, a qualified safety and occupational health professional, as defined in section II of the glossary, will make the final determination on the disputed issue. Personnel conducting SASOHIs will have access to diagnostic equipment and to personnel necessary to identify, document, and analyze the significance of the hazards discovered during the inspection. Current reference materials pertinent to the work site, such as standards, regulations, SOPs, hazard analyses/job hazard analysis, risk assessments, materiel safety data sheets, technical and field manuals, will be readily available.

(1) Criteria for work sites where SASOHI can be conducted by collateral duty safety personnel:

*(a)* Low risk operations as determined by a written hazard assessment specified in *(c)* below.

*(b)* Lost time job-related injury rate of no more than 10 per 1,000 personnel (military and civilian) averaged for the last 3 years.

*(c)* Written hazard assessment (title 29 of the Code of Federal Regulations, 1910.132) for current operations on file at the work site, conducted by qualified civilian or military safety and occupational health professional as defined in section II of the glossary.

(2) Qualifications for collateral duty safety personnel conducting SASOHIs include—

*(a)* Appointment and validation by the activity commander that personnel can accomplish tasks required in title 29 of the Code of Federal Regulations, 1960.57, and outlined below:

*(b)* Recognize hazards.

*(c)* Assess risks including the requirement and procedures to contact safety or health professionals when risks are assessed medium or higher.

*(d)* Advise on abatement options, complete abatement documentation, and follow-up on corrective actions.

*(e)* Use Occupational Safety and Health Administration standards and Army requirements appropriate to the work site(s).

*(f)* Use equipment necessary to conduct a thorough inspection.

*(g)* Complete supervisor and/or employee training as required by title 29 of the Code of Federal Regulations, 1960.55 and 1960.59.

*(h)* Conduct at least one inspection accompanied by qualified safety personnel as defined in section II of the glossary.

(3) Collateral duty personnel should conduct their inspections on a quarterly basis and a qualified safety person, as

defined in section II of the glossary, should accompany them on at least one inspection per year in order to assure quality inspections are being conducted.

c. SASOHI may be conducted with or without prior notice. No-notice inspections will be used when local safety and health personnel determine they will provide a significantly more meaningful assessment of actual operating conditions and practices. However, appropriate representatives of civilian employees and recognized employee organizations will be notified when management receives prior notice of an inspection.

d. A representative of the official in charge of a workplace and an authorized representative of civilian employees will be given the opportunity to accompany the inspector during physical inspection of workplaces. Installation and activity commanders, or their designated representative, may deny the right of accompaniment to any person who, in their judgment, will interfere with the inspection.

e. The inspector conducting SASOHI will consult a sampling of personnel on matters affecting their safety and health and offer them the opportunity to identify, confidentially, unsafe or unhealthful working conditions in the work areas.

f. When an "imminent danger" situation is discovered, the immediate supervisor and activity head will be notified as soon as possible.

(1) The inspector will provide technical advice to the supervisor on the scene, who will correct the condition or cease operation and withdraw personnel from exposure.

(2) If the inspector finds the hazard cannot be immediately eliminated, he or she will notify the installation safety and occupational health official. If this official finds that corrective action is inadequate, he or she will secure approval of the commander or an authorized representative of the commander for measures to be taken to prevent employee exposure to the hazard.

(3) Imminent danger hazards from which personnel have been withdrawn as an interim measure will be identified on the forms described in *i* below.

(4) Commanders may authorize specific safety personnel to temporarily halt operations when imminent danger situations are found.

g. Upon completion of a formal inspection, a closing conference will be held with the commander or his or her designated representative, and a notice of unsafe or unhealthful working conditions will be discussed for each RAC 1, 2, or 3 hazard that was not corrected immediately. An appropriate employee representative will be given the opportunity to participate in the closing conference.

h. Written reports of violations resulting from SASOHI will be provided to the head of the activity or the commander of the unit inspected. These reports will cite hazards and safety management deficiencies and will recommend corrective actions. DA Form 4753 (Notice No. \_\_\_\_\_ of Unsafe or Unhealthful Working Conditions) may be used for this purpose. (See fig 4-1 for a sample form.) RAC 1 and 2 violations that cannot be corrected within 30 calendar days of discovery will be recorded and maintained at the installation on DA Form 4756 (Installation Hazard Abatement Plan). (See fig 4-2 for a sample form and instructions.) Written reports of inspections will be retained on file for 5 years after the deficiencies have been corrected. Automatic data processing systems may be used to facilitate the recording and documentation of SASOHI and abatement plans provided the requirements of this regulation are met.

i. Notices of violations for RAC 1 or 2 hazards detected during SASOHI will be recorded on DA Form 4753 or equivalent. Copies of each notice of unsafe or unhealthful conditions will be given to the appropriate official in charge of the workplace and any participating employee representative. Notices will be posted by the official in charge of the workplace where the condition was discovered. Where it is not practical to post the notice at or near the hazard, it will be posted in a prominent place where it will be readily observable by all affected personnel. Delivery and posting will take place within 15 days of detection for safety violations and 30 days for health violations. The notices will remain posted for 3 working days or until correction, whichever is later. All posted notices will describe the nature and severity of the violation, the substance of the abatement plan, and interim protective measures.

j. All violations of standards detected during SASOHI will be entered on DA Form 4754 (Violation Inventory Log) or equivalent. (See fig 4-3 for a sample form.) This log will be used to monitor compliance. It will show all violations in order of discovery and prescribe an abatement date and the date for followup on correction of the deficiencies.

k. Procedures will be established to follow up on the correction of deficiencies identified during a SASOHI. If corrective action has not been accomplished or it is discovered that interim safety measures are not being enforced, the inspector will inform the installation safety and occupational health official who will determine remedial action, to include notifying the installation or activity commander if appropriate. For all uncorrected violations, entries on DA Form 4756 will reflect the revised corrective action schedule and appropriate remarks.

l. All safety and occupational health inspection procedures will conform to security regulations.

#### **4-2. Department of Labor inspections**

The procedures below will be followed on DOL inspections of Army workplaces.

a. DOL inspections may be in response to a complaint from an Army employee or employee representative; they

may be scheduled as part of OSHA's annual evaluation of agency programs, OSHA target program, or in response to a fatal accident. Procedures for such inspections conform generally to procedures in paragraph 4-4.

b. DOL representatives will be admitted to conduct inspections at selected workplaces in a reasonable manner without delay during normal working hours.

c. DOL representatives will initially report to the host installation commander or designated representative and will be accompanied at all times on the Army installation. They will be required to show proof of appropriate security clearance if entry into closed areas is required. A closing conference with the installation or activity commander or command designee will be arranged before the DOL inspector's departure. Employee representatives will be invited to attend the opening and closing conference.

d. DOL representatives will, upon request, be provided available safety and health information on worksites to be visited. Such information may include data on hazardous materials in use, copies of recent DOD inspection or survey reports, accident reports and abatement project information.

e. When DOL representatives issue notice of unsafe or unhealthful conditions (OSHA-2H Form), local officials should treat such notices in the same manner as similar internal notices and provide for abatement of significant deficiencies. Installations that receive an OSHA-2H will immediately transmit copies through command channels to HQDA (DACS-SF) WASH DC 20310-0300, and copy furnished to Commander, USASC, ATTN: CSSC-PR, Fort Rucker, AL 36362-5363. The OSHA-2H will assist in developing appropriate DA policy in the OSH program.

f. Response to DOL inspection reports will originate at the local level. Elevation of unresolved conflicts to higher echelons for interagency resolution will be at DOL's initiative via DOL channels. This provision, however, will not inhibit normal internal communication within command channels to apprise higher echelons of the results of DOL inspections and coordinate responses to DOL.

g. With respect to investigation of Army accidents, which is solely a DOD responsibility under Executive Order 12196, DOL officials may be shown or provided factual portions of pertinent accident investigation reports as outlined in AR 385-40. DOL officials, upon request, may also be authorized to accompany Army accident investigators in an observer status. Separate, duplicate DOL investigations of Army accidents, either concurrent with or subsequent to required Army investigations, are not expected. DOL officials may, however, inspect for residual hazardous conditions at the site of an Army accident.

#### **4-3. Federal and State OSHA inspections of contractor workplaces**

Inspection of contractor workplaces by Federal and State will be accomplished according to DODI 6055.1. and 29 CFR 1960.

#### **4-4. Army employee hazard reporting**

a. Procedures for employee reports of hazards will be established in accordance with 29 CFR 1960.28 and 29 CFR 1960.46. Reports under these procedures will be completed on DA Form 4755 (Employee Report of Alleged Unsafe or Unhealthful Working Conditions). (See fig 4-4 for a sample form.) Normally, reports will be signed; however, anonymous reports will be investigated in the same manner as other reports. Reports can be submitted directly to the installation safety and occupational health official, to the appropriate tenant safety and occupational health official, or through supervisory and command channels.

b. Names of people submitting signed reports who request anonymity will not be revealed by the installation safety and occupational health official to anyone other than necessary members of his or her staff or other appropriate installation-level staff.

c. If reports that appear to involve an imminent danger situation are submitted, the inspector will follow the procedures in paragraph 4-1f and 29 CFR 1960.28.

d. All reports will be investigated by safety or health personnel. The originator, if known, will be notified in writing of the results of the investigation within 10 working days of receipt of the hazard report. If the 10-workday suspense cannot be met, the originator should be provided an interim response.

(1) If it is determined that a hazard exists, the reply will include a summary of the actions to be taken and anticipated date for corrective action. Procedures for inspections outlined in paragraph 4-1 will apply, if appropriate.

(2) If it is determined that a hazardous condition does not exist, the reply to the employee will include the basis for that determination. This reply will encourage informal contact with installation safety and health officials if additional explanations are desired. It will also inform the individual of his or her right of appeal as outlined below. Every effort, to include consulting with a regional Federal OSHA office and requests for technical advice from the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), or the USASC will be made to resolve the originator's questions or dissatisfaction.

(3) If a hazard report also involves a grievance action, the local safety and OH manager will determine if there is a need for priority action for safety or health reasons.

e. If the originator is dissatisfied with the safety and occupational health official's response, the originator may appeal to the installation commander. The installation commander will review the finding and take appropriate action. If the originator is dissatisfied with the installation commander's response, the originator may appeal to the MACOM

OSH official. Such appeals will be transmitted through channels to the MACOM, which will review the finding, investigate as necessary, and verify the appropriateness of the installation-level response. If the report of hazard is judged unfounded, a reply to the originator rejecting his or her appeal will explain the basis for the rejection and will advise of his or her right to appeal to the Army-designated safety and occupational health official ASA(I&L). Upon receipt of an appeal, this official will review the case and reply to the originator with a statement of findings. If the appeal is rejected, the reply will advise the originator of his or her right to further appeal according to 29 CFR 1960 to the DOD-designated occupational safety and health official.

f. Although personnel have the right to report hazards directly to DOL, they are encouraged to follow the review levels prescribed in paragraph e above. Reports received directly by DOL will be forwarded to DA for handling in accordance with these procedures.

g. Copies of reports submitted under the Army employee hazard reporting system will be retained at the installation safety office and a Federal Record Retention Center for at least 5 years following the end of the calendar year to which they relate.

| NOTICE NO. <u>34-186</u> OF   |                                |
|---|--------------------------------|
| <b>UNSAFE OR UNHEALTHFUL<br/>WORKING CONDITION</b>  |                                |
| DO NOT REMOVE NOTICE UNTIL CONDITION IS ABATED  |                                |
| For use of this form, see AR 385-10, the procedure manual, in effect at the reporting location. |                                |
| 1. UNIT NOTIFICATION NO.  | 2. DATE OF REPORT NO.          |
| 3. NAME, ADDRESS OF WORKPLACE   | 4. NAME OF REPORTER            |
| 5. SUPERVISOR'S NAME  | 6. SPECIFIC LOCATION OF HAZARD |
| 7. DESCRIPTION OF HAZARD  |                                |
| 8. INTERIM SAFETY MEASURES  |                                |
| 9. NAME OF INSTALLATION SAFETY AND OCCUPATIONAL HEALTH OFFICIAL                                 |                                |
| 10. DATE OF REPORT  |                                |

1. UNIT NOTIFICATION NO. 34-186

2. DATE OF REPORT NO. 1-10-80

3. NAME, ADDRESS OF WORKPLACE: 10000 100th Ave, NE, Redmond, WA 98073

4. NAME OF REPORTER: J. J. J. J.

5. SUPERVISOR'S NAME: J. J. J. J.

6. SPECIFIC LOCATION OF HAZARD: 10000 100th Ave, NE, Redmond, WA 98073

7. DESCRIPTION OF HAZARD: Air sampling in industrial hygiene laboratories (AR 385-10) indicates that the personnel in this area are exposed to hazardous substances (there will be a source of airborne levels). Exposure to substances, especially caused by the effect of chemical breakdown of the existing material by air conditioning ventilation and air flow.

8. INTERIM SAFETY MEASURES: Remove employees from the area. Cleanroom employees will be detected, isolated and equipped (AR applicable regulations). All materials removed or temporary library will be thoroughly cleaned by capable character.

9. NAME OF INSTALLATION SAFETY AND OCCUPATIONAL HEALTH OFFICIAL: J. J. J. J.

10. DATE OF REPORT: 1-10-80

11. AIRBORNE EXPOSURE WILL BE ABATED BY REMOVAL OF DECONTAMINATION OF EXISTING MATERIALS. AIR WILL BE SAMPLED AND SHOWN TO BE WITHIN ALLOWABLE LIMITS BEFORE ROUTINE REENTRY.

12. NAME OF INSTALLATION SAFETY AND OCCUPATIONAL HEALTH OFFICIAL: J. J. J. J.

13. DATE OF REPORT: 1-10-80

14. NAME OF REPORTER: J. J. J. J.

15. DATE OF REPORT: 1-10-80

Legend for Figure 4-1;

#### Instructions for completion of DA Form 4753

**Block 1.** Enter name of unit, and installation on which hazard was found.

**Block 2.** Enter name of workplace supervisor.

**Block 3.** Enter date of the inspection.

**Block 4.** Enter specific reference to the standard violated (AR, OSHA).

**Block 5.** Enter exact location of the violation.

**Block 6.** Describe hazardous condition found in terms of physical standards and the Risk Assessment Code (RAC) (chap 3).

**Block 7.** Describe interim safety measures supervisory personnel and employees should maintain until the hazard is abated to an acceptable level.

**Block 8.** Enter name of installation safety and occupational health manager, and his or her office phone number.

Figure 4-1. Sample DA Form 4753



| INSTALLATION HAZARD ABATEMENT PLAN  |  |   |
|---|--|---|
| For use of this form, see DA Form 4756 in the appropriate Army or Office of The Inspector General.  |  |   |
| 1. PROJECT NO.<br>88-26   | 2. DATE PREPARED<br>3 Jan 89               | 3. DATE REVIEWED<br>16 May 89                       |
| 4. ACTIVITY/ORGANIZATION<br>School Brigade Tech Services<br>Library   | 5. HAZARD LOCATION<br>Main Storage Ceiling | 6. RISK ASSESSMENT CATEGORY<br>LA (1)               |
| 7. CITATION OF SPECIFIC OSHA AND OTHER STANDARDS VIOLATED<br>1910.1001 (c). TB MED 513  |  |   |
| 8. DESCRIPTION OF PROPOSED CORRECTIVE ACTION OR REMEDIAL MEASURES<br>Revised original proposal to encapsulate ceiling material to complete removal based on cost and requirements for monitoring. All ceiling material which tests positive for asbestos content is to be removed and disposed of IAW the Installation Hazardous Materials Control plan.                                |  |   |
| 9. ESTIMATED COST OF CORRECTIVE ACTION \$ 16,000 APPROPRIATION CMA<br>PROGRAM ELEMENT NUMBER 343-J08-7788 BUDGET COST ESTIMATED-NEE *40 R 40  |  |   |
| 10. ESTIMATED ADDITIONAL OPERATING AND MAINTENANCE COSTS, IF ANY<br>NONE  |  |   |
| 11. DESCRIPTION OF INTERIM HAZARD CONTROL MEASURES IN EFFECT<br>Essential library operations have been moved to temporary facilities in Bldg 5049. Equipment and materials moved into that building were thoroughly cleaned by contractors with expertise in this area. Air sampling established that detectable levels of asbestos contamination were not present in the new facility. |  |   |
| 12. OTHER RELEVANT INFORMATION  |  |   |
| 13. ESTIMATED ABATEMENT COMPLETION DATE<br>1 Sep 89   |  |   |
| PREPARED BY<br>R.A. Walter,<br>Safety and Occ. Health Spec.   |  | APPROVED BY<br>John Mershon,<br>Chief, Loss Control |

DA FORM 4756 10 4756

Legend for Figure 4-2;

Instructions for completion of DA Form 4756

Block 1. Obtain from Directorate of Engineering and Housing (DEH).

Block 2. Self-explanatory.

Block 3. Enter date when plan is amended.

Block 4. Enter name of unit, and installation which hazard was found.

Block 5. Enter building number and room number location.

Block 6. Enter risk Assessment Code (RAC) (chap 3).

Block 7. State specific OSHA, Army, or other recognized safety and occupational standards violated.

Block 8. Describe project details necessary to abate the hazard to an acceptable level.

Block 9. Self-explanatory.

Block 10. Self-explanatory.

Block 11. Explain interim measures supervisors and employees maintain until hazard is abated to an acceptable level.

Block 12. Include points of contact in DEH, Safety Office, and others as appropriate.

Block 13. Enter initial estimate of final abatement date; update as required.

Figure 4-2. Sample DA Form 4756

| VIOLATION INVENTORY LOG  |   |                                    |        |  |   |   |                  |                |
|--|---|------------------------------------|--------|--|---|---|------------------|----------------|
| For use of this form see AR 385-10, the predecessor agency is OMA of The Inspector General |   |                                    |        |  |   | 4 Dec 88  |                  |                |
| LOG OF SCHEDULE OF CORRECTIVE ACTION - COMPLIANCE WITH SAFETY AND HEALTH STANDARDS         |   |                                    |        |  |   |   |                  |                |
| NAME OF INSTALLATION   |   |                                    |        |  |   |   |                  |                |
| US Army Driver Training Center, Ft Arnold, RI (School Bde Tech Services Library)           |   |                                    |        |  |   |   |                  |                |
| ITEM   | LOCATION OF INCONSISTENCY                               | OSHA REFERENCE                     |        | INCONSISTENCY  | CORRECTIVE ACTION   | TARGET DATE FOR CORRECTIVE ACTION                 | DESIGN OF HAZARD | ESTIMATED COST |
|  |   | FILE PART                          | SUPPAA |  |   |   |                  |                |
| 1  | Main Room (stacks)<br>NE & NW corners<br>and throughout | 1910,<br>1001<br><br>18 MED<br>513 | (c)    | Personnel are<br>exposed to as-<br>bestos concen-<br>trations sever-<br>al times higher<br>than standards. | Remove or encap-<br>sulate asbestos<br>IAH engineering<br>study. Clean all<br>contaminated sur-<br>faces and materi-<br>al to levels be-<br>low cited refer-<br>ences. Withdraw<br>personnel during<br>interim. | Interim:<br>accom-<br>plished<br>Final:<br>30 Jun | 1A (1)           |                |

NOTES

1/ Based on OSHA's 29 CFR and Building Number

2/ Include 29 CFR 1910.1000 as reference in addition to further references

3/ Use OSHA's 29 CFR 1910.1000 as reference in addition to further references

4/ Use OSHA's 29 CFR 1910.1000 as reference in addition to further references

DA FORM 4754  
1 OCT 76

Figure 4-3. Sample DA Form 4754

| <b>EMPLOYEE REPORT OF<br/>ALLEGED UNSAFE OR UNHEALTHFUL WORKING CONDITIONS</b><br><small>For use of this form, see AR 385-10, the government agency's Office of The Inspector General.</small>  |                              |                         |
|---|------------------------------|-------------------------|
| <small>This form is provided for the assistance of any complainant and is not intended to constitute the exclusive means by which a complaint may be registered with the local Safety Office (Ref OSHA Poster on rights of employees and their representatives).</small>  |                              |                         |
| The undersigned (check one):<br><input checked="" type="checkbox"/> <b>Employee</b> <input type="checkbox"/> <b>Representative of employees</b> <input type="checkbox"/> <b>Other (Specify):</b> _____  |                              |                         |
| believes that a job safety or health hazard exists at the following place of employment:<br><br><div style="text-align: center; font-weight: bold;">Technical Services Library (Main Room), Bldg 6001, School Brigade</div>   |                              |                         |
| Does the hazard immediately threaten serious physical harm? <input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>No</b><br>If "yes" checked, immediately contact your supervisor or safety representative.    I did, but he didn't fix it (Union too)   |                              |                         |
| Name of official in charge <u>Mr. M. Rostopovich</u>  | Telephone <u>x6510</u>       |                         |
| Operation/Activity <u>Library</u>   |                              |                         |
| Exact location of work site <u>The whole main room, especially near the air conditioning vents</u>  |                              |                         |
| 1. Kind of operation <u>Shelving and signing out publications, helping patrons</u>  |                              |                         |
| 2. Describe briefly the hazard which exists there including the appropriate number of employees exposed to or threatened by such hazard:<br><u>White powder blows down from the ceiling when the air conditioning runs. Sometimes it gets all over the desks. A lot of people say it might be asbestos, but no one will check and tell us for sure. Only 4 of us work in the room, but a lot of patrons come through.</u>   |                              |                         |
| 3. List by number and/or name the particular occupational safety and health standard(s) which may have been violated, if known:<br><u>I don't know, but I know it's against the law.</u>  |                              |                         |
| 4. (a) To your knowledge, has this hazard been the subject of any union/management grievance or have you (or anyone you know) otherwise called it to the attention of, or discussed it with the employer or any representative thereof? <u>I don't think so.</u><br>(b) If so, please give the results thereof, including any efforts by management to eliminate or reduce the severity of the hazard:<br><u>The supervisor says it can't be asbestos, cause the building is too new.</u> |                              |                         |
| 5. Please indicate your desire:<br><br><input type="checkbox"/> I do not want my name revealed to the official in charge.<br><br><input checked="" type="checkbox"/> My name may be revealed to the official in charge.   |                              |                         |
| WORK LOCATION<br><u>Technical Services Library, Bldg 6001</u><br><br>TYPED OR PRINTED NAME OF EMPLOYEE OR EMPLOYEE REPRESENTATIVE<br><u>Ms. Louise Morra</u>  | TELEPHONE NO<br><u>x6510</u> | DATE<br><u>3 Dec 88</u> |
| SIGNATURE<br>   |                              |                         |

DA FORM 4755  
1 OCT 78

Figure 4-4. Sample DA Form 4755

## **Chapter 5**

### **Standard Safety Staff Functions and Tasks**

#### **5-1. General**

Each safety staff in the Army has numerous basic functions and tasks. This chapter lists those safety staff functions and tasks that are standard to all safety offices.

#### **5-2. Standard safety staff functions and tasks**

Standard safety staff functions and tasks are shown below. The safety staff—

- a.* Functions as the principal staff advisers, technical consultants, and coordinators to the commander and the staff in planning, organizing, directing, and evaluating all safety and occupational health efforts within the command.
- b.* Provides guidance for establishing and implementing plans, policies, and procedures for conducting safety and occupational health activities at all levels of command.
- c.* Provides interpretation of safety and occupational health policies and procedures.
- d.* Budgets for resources necessary to conduct safety activities.
- e.* Provides technical and professional assistance to eliminate or control unsafe behavior and environments.
- f.* Assists subordinate commanders and supervisors in determining the numbers and qualifications of personnel necessary to ensure an effective safety program.
- g.* Assists subordinate commanders and supervisors in developing safety and occupational health training.
- h.* Determines the need to procure and distribute safety and occupational health promotional and educational materials within the command.
- i.* Provides technical assistance in accident investigating and reporting to ensure accuracy, completeness, and timeliness. Reviews accident reports to ensure they comply with AR 385-40.
- j.* Collects, analyzes, and disseminates data concerning the accident experience of the command and subordinate elements. Prepares progress reports of accident prevention and occupational health activities and other reports and studies required by higher authority.
- k.* Develops recommendations for corrective measures where warranted by adverse accident rates or trends, hazardous conditions or procedures, and other deficiencies.
- l.* Ensures that adequate safe practices and safe physical standards are incorporated in operating procedures, manuals, directives, and other instructions.
- m.* Reviews plans for proposed demonstrations, exhibits, exercises, or contingencies to ensure the safety and occupational health of Army personnel and the public.
- n.* Provides loss control material and ensures high-quality training for civilian and military staff personnel at all levels.
- o.* Provides direction for the safety and occupational health segment of the civilian career program.
- p.* Maintain close liaison with other staff agencies on all relevant safety, occupational health, and ergonomics matters.
- q.* Conducts evaluations and inspections of safety programs and activities.
- r.* Investigates and analyzes field exercise accidents and other special emphasis areas to determine cause factors and provide appropriate prevention measures.
- s.* Participates in the planning, conduct, and debrief of exercises. Participates in related activities to include in-process reviews. Ensures the incorporation of safety principles into all field training operations orders.
- t.* Establishes and maintains liaison with other military services, Federal and civilian agencies, and, where appropriate, host nations to ensure cooperation on matters of mutual concern.
- u.* Develops policies, standards, and procedures for implementing accident prevention efforts as listed in paragraph 2-1.
- v.* Maintains appropriate Army safety regulations, directives, messages, and publications in a reference library.
- w.* Manages the conduct of safety and occupational health advisory councils.
- x.* Participates in MACOM/Installation Planning Boards to ensure that safety considerations are presented in Master Planning, MCA, and OMA project approvals and work order prosecutions.

## **Appendix A References**

### **Section I Required Publications**

#### **AR 5-3**

Installation Management and Organization. (Cited in paras 2-1 and 2-1b.)

#### **AR 5-9**

Interservice Support Installation Area Coordination (Cited in para 2-1j.)

#### **AR 40-5**

Preventive Medicine. (Cited in paras 1-4g(1), 1-4h(1), 6-1c, and 6-6a.)

#### **AR 385-9**

Safety Requirements for Military Lasers. (Cited in para 2-1d(14).)

#### **AR 385-11**

Ionizing Radiation Protection. (Cited in para 2-1d(14).)

#### **AR 385-16**

System Safety Engineering and Management. (Cited in paras 2-1d(12), 2-1d(13) and 3-8d).

#### **AR 385-40**

Accident Reporting and Records. (Cited in paras 1-4c(10), 2-1d(10) and 4-2g).

#### **AR 385-55**

Prevention of Motor Vehicle Accidents. (Cited in para 2-1d(2).)

#### **AR 385-62**

Regulations for Firing Guided Missiles and Heavy Rockets for Training, Target Practice and Combat. (Cited in para 2-1d(3).)

#### **AR 385-63**

Policies and Procedures for Firing Ammunition for Training, Target Practice and Combat. (Cited in para 2-1d(3).)

#### **AR 385-64**

Ammunition and Explosives Safety Standards. (Cited in para 2-1d(4).)

#### **AR 385-95**

Army Aviation Accident Prevention. (Cited in para 2-1d(8).)

#### **FM 21-20**

Physical Readiness Training. (Cited in paragraph 2-2n(2)(b ).)

#### **FM 100-14**

Risk Management. (Cited in paragraph 2-2b.)

#### **FM 101-5**

Staff Organization and Operations. (Cited in paragraph 2-2b.)

#### **TB MED 503**

The Army Industrial Hygiene Program. (Cited in paragraph 3-9a (1).)

**TB MED 575**

Swimming Pools and Bathing Facilities. (Cited in paragraph 2-2*n* (1)(*c*).)

**Section II**

**Related Publications**

A related publication is merely a source of additional information. The user does not have to read it to understand this regulation.

**AR 10-5**

Organization and Functions, Headquarters, Department of the Army

**AR 40-10**

Health Hazard Assessment Program in Support of the Army Materiel Acquisition Decision Process

**AR 40-61**

Medical Logistics Policies and Procedures

**AR 40-63**

Ophthalmic Services

**AR 50-6**

Nuclear and Chemical Weapons and Material Chemical Surety

**AR 70-25**

Use of Volunteers as Subjects of Research

**AR 70-62**

Airworthiness Qualification of U.S. Army Aircraft Systems

**AR 75-1**

Malfunctions Involving Ammunition and Explosives

**AR 385-14**

Transportation Accident Prevention and Emergency Response Involving Conventional Munitions and Explosives

**AR 385-15**

Water Safety

**AR 385-42**

Investigation of NATO Nation Aircraft or Missile Accidents and Incidents.

**AR 385-61**

The Army Chemical Agents Safety Program

**AR 420-90**

Fire Protection

**AR 672-74**

Army Accident Prevention Awards

**AR 700-141**

Hazardous Material Information System

**AR 708-1**

Cataloging of Supplies and Equipment cataloging and Supply Management Data

**AR 710-2**

Inventory Management Supply Policy Below the Wholesale Level

**AR 750-10**

Modification of Materiel and Issuing Safety-of-Use Messages and Commercial Vehicle Safety Recall Campaign Directive

**AR 752-50**

System Requisitioning, Receipt, and Issue System

**DA Pam 385-3**

Protective Clothing and Equipment

**DODI 6055.1**

DOD Occupational Safety and Health Program (FM&P)

**DODI 6055.2**

Personal Protective Equipment

**EM 385-1-1**

U.S. Army Corps of Engineers Safety and Health Requirements Manual

**FM 100-22**

Installation Management

**TB Med 502**

Occupational and Environmental Health—Respiratory Protection Program

**TB Med 503**

The Army Industrial Hygiene Program

**TB 700-2**

Department of Defense Explosives Hazard Classification Procedures

**Section III**

**Prescribed Forms**

**DA Form 4753**

Notice No. of Unsafe or Unhealthful Working Conditions. (Cited in paras 4-1h and i.)

**DA Form 4754**

Violation Inventory Log. (Cited in para4-1j.)

**DA Form 4755**

Employee Report of Alleged Unsafe or Unhealthful Working Conditions. (Cited in para 4-4a.)

**DA Form 4756**

Installation Hazard Abatement Plan (Cited in paras 4-1h and 4-1k.)

**DD Form 2272**

DOD Occupational Safety and Health Protection Program (Cited in para 2-2d.)

**Section IV**

**Referenced Forms**

**DA Form 11-2-R**

Management Control Evaluation Certification Statement

**DA Form 285**

U.S. Army Accident Investigation Report

**DA Form 3645**

Organization Clothing and Equipment Record

**Appendix B**  
**Management Control Evaluation Checklist**

**B-1. Function**

The function covered by this checklist is the Army Safety Program.

**B-2. Purpose**

The purpose of this checklist is to assist commanders in evaluating the key management controls outlined below. It is **not** intended to cover **all** controls.

**B-3. Instruction**

Answers must be based on the actual **testing** of key management controls (for example, document analysis, direct observation, sampling, simulation, other). Answers that indicate deficiencies must be explained and corrective action indicated in supporting documentation. These key management controls *must* be formally evaluated at least once every 5 years. Certification that this evaluation has been conducted must be accomplished on DA Form 11-2-R (Management Control Evaluation Certification Statement). A copy of DA Form 11-2-R for local reproduction is at the back of this publication.

**B-4. Test questions**

- a. Has a command safety and OH manager been designated to exercise staff supervision over the command safety and occupational health program?
- b. Have command integrating agents developed and implemented plans and programs to integrate Risk Management into their functional area of responsibility?
- c. Do command safety and health managers meet the Office of Personnel Management standards for the position of Occupational Safety and Health Manager?
- d. Has the command requested, obtained, and designated sufficient funds and other resources to carry out all responsibilities designated in this regulation?
- e. Are procedures in place and in operation to determine if facilities and equipment meet or exceed safety and health standards established in pertinent host Government, Federal, State, and local statutes and regulations and in Army Regulations? Are deficiencies abated?
- f. Are practices and procedures that minimize accident risk incorporated into regulations, directives, SOPs, special orders, training plans, operations plans and SOPs developed for all operations?
- g. Are commanders, supervisors, and safety and OH staff provided specialized training to enable them to properly execute their safety and OH leadership and staff responsibilities?
- h. Are there specific plans to ensure continuity of safety and occupational health and the risk management process during tactical operations or mobilization?
- i. Is there a program or policy for reporting unsafe or unhealthful conditions?
- j. Are standard Army safety and Occupational health inspections (SASOHIs) performed to evaluate the status of the safety and occupational health program and risk management integration?

**B-5. Comments**

Help make this a better test for evaluating management controls. Submit comments to the Office of the Director of Army Safety: Chief of Staff (DACS-SF), 200 Army Pentagon, Washington, DC 20310-0200.



## **Glossary**

### **Section I Abbreviations**

**AMC**

U.S. Army Materiel Command

**ARNG**

Army National Guard

**ASA(I&E)**

Assistant Secretary of the Army (Installations and Environment)

**ASARC**

Army System Acquisition Review Council

**CG**

Commanding General

**CSA**

Chief of Staff, U.S. Army

**CTA**

common table of allowances

**DA**

Department of the Army

**DASAF**

Director of Army Safety

**DCSLOG**

Deputy Chief of Staff for Logistics

**DCSOPS**

Deputy Chief of Staff for Operations and Plans

**DCSPER**

Deputy Chief of Staff for Personnel

**DOD**

Department of Defense

**DOL**

Department of Labor

**DOT**

Department of Transportation

**EER**

enlisted evaluation report

**ETS**

emergency temporary standard

**FORSCOM**

Forces Command

**HQDA**

Headquarters, Department of the Army

**MACOM**

major Army command

**MANPRINT**

Manpower and Personnel Integration

**MCA**

Military Construction, Army

**MEDCOM**

Medical Command

**MTMC**

Military Traffic Management Command

**NIOSH**

National Institute for Occupational Safety and Health

**OCSA**

Office of the Chief of Staff, U.S. Army

**OER**

officer evaluation report

**OH**

occupational health

**OMA**

Operation and Maintenance, Army

**OSH**

occupational safety and health

**OSHA**

Occupational Safety and Health Administration

**OSHAct**

Occupational Safety and Health Act of 1970

**PCE**

protective clothing and equipment

**RAC**

risk assessment code

**RDTE**

research, development, test, and evaluation

**ROTC**

Reserve Officers' Training Corps

**SASOHI**

Standard Army Safety and Occupational Health Inspection

**SOFA**

Status of Forces Agreement

**SOP**

standing operating procedure

**TDA**

tables of distribution and allowances

**TOE**

Tables of Organization and Equipment

**TRADOC**

U.S. Army Training and Doctrine Command

**TSG**

The Surgeon General

**USACE**

U.S. Army Corps of Engineers

**USACHPPM**

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

**USAR**

U.S. Army Reserve

**USASC**

U.S. Army Safety Center

**Section II****Terms****Abate**

To eliminate or reduce an OSH hazard by complying with OSH standards criteria or taking equivalent protective measures.

**Closed area**

A controlled area established to safeguard classified material that, because of its size or nature, must be safeguarded by controlling access.

**Cognizant security office**

The Defense Contract Administration Services Region of the Defense Logistics Agency having contract administration services jurisdiction over the geographical area in which the contractor workplace is located (18 USC 795, para 1-211).

**Consultation with representatives of employees**

Includes written or oral consultations or conferences with employees or their representatives including, when applicable, negotiations or other dealings with labor organizations that represent such employees.

**Condition**

The status of personnel and equipment (readiness) as they interact with the operational environment during mission planning, preparation and execution; a situation or circumstance.

**Contracting officer**

A designated officer who performs administrative functions listed in the Federal Acquisition Regulation.

**Control**

Action taken to eliminate hazards or reduce their risk.

**DA contractor**

A non-Federal employer engaged in performance of a DA contract, whether as prime contractor or subcontractor.

**DA installation**

A grouping of facilities located in the same vicinity that supports particular DA functions. Installations may include locations such as posts, camps, stations, or communities and land and improvements permanently affixed thereto which are under the DA control and used by Army organizations. Where installations are located contiguously, the combined property is designated as one installation and the separate functions as activities of that installation. In addition to those

used primarily by troops, the term 'installation' applies to such real properties as depots, arsenals, ammunition plants (both contractor and Government operated), hospitals, terminals, and other special mission installations.

**DA personnel**

a. Civilian. Includes Senior Executive Service, General Schedule, and Wage Grade employees (including National Guard and Reserve technicians); Nonappropriated Fund employees; Youth/Student Assistance Program employees, and foreign nationals directly employed by DOD components.

b. Military. Includes all military personnel on active duty, Reserve or National Guard personnel on active duty or on drill status, service academy midshipmen or cadets, Reserve Officer Training Corps cadets when engaged in directed training activities, and foreign national military personnel assigned to DOD components.

**Develop the force**

One of the Army's four core capabilities. This capability includes the processes of developing doctrine; developing requirements; acquiring, training and sustaining people; and identifying and developing leaders. This core capability encompasses the various functions that must be accomplished to create tactical units that comprise the Operational Force.

**Direct and resource the force**

One of the Army's four core capabilities composed of four core processes: planning and policy development; direction and assessment; financial management; and information management. These processes have six functions: Leadership; Human Resource Management; Force Management; Military Strategy; Acquisition and Logistics Management; and Installations & Facilities Management.

**Evaluation**

A specialized inspection designed to determine the effectiveness of a unit's safety and health program.

**Exclusive Federal jurisdiction**

(Otherwise termed 'exclusive legislative jurisdiction.') Applies to situations where the Federal Government has received, by whatever method, all the authority of the State, with no reservation made to the State, except of the right to serve process resulting from activities that occurred off the land involved.

**Exposure**

The frequency and length of time personnel and equipment are subjected to a hazard.

**Federal OSHA official**

Investigator or compliance officer employed by, assigned to, or under contract to OSHA.

**Hazard**

Any actual or potential condition that can cause injury, illness, or death of personnel, damage to or loss of equipment, property, or mission degradation.

**Imminent danger**

Conditions or practices in any workplace that pose a danger that reasonably could be expected to cause death or severe physical hardship before the imminence of such danger could be eliminated through normal procedures.

**Inspection**

The process of determining compliance with safety and health standards through formal and informal surveys of workplaces, operations, and facilities.

**MANPRINT**

MANPRINT is a comprehensive management and technical program designed to improve total system (leader, unit/soldier, and equipment) performance by focusing on the human requirements for optimal system performance. This is achieved by examination of optimal allocation of total system functions and tasks to man, machine, or a combination, and the continuous integration of Personnel Capabilities, Manpower, Training, Human Factors Engineering, System Safety, Health Hazards and Soldier Survivability.

**Occupational hazard**

Conditions, procedures, and practices directly related to the work environment that create a potential for producing occupational injuries or illnesses.

**Probability**

The likelihood that an event will occur.

**Qualified safety and health personnel**

Includes persons who meet Office of Personnel Management standards for Safety and Occupational Health Manager/Specialist, GS-018, and Safety Engineer, GS/GM-803. Other job specialties will provide support in their respective specialty areas (for example, Safety Engineering Technician, GS-802; Safety Technician, GS-019; Aviation Safety Officer, GS-1825; Air Safety Investigating Officer, GS-1815; Fire Protection Engineer, GS-804; Fire Protection Specialist/Marshal, GS-081; Medical Officer, GS-602; Health Physicist, GS-1306; Industrial Hygienist, GS-690; Occupational Health Nurse, GS-610; Environmental Health Technician, GS-699; or other personnel determined to be equally qualified as compared to the above Office of Personnel Management standards.

**Project the force**

One of the Army's four core capabilities. This capability includes the processes of tailoring, mobilizing and projection of land power, and supporting organizational training. Recognized as the overriding capability by which the Army will be measured is the ability to rapidly deploy ready forces into a distant area of operations and keep them coming as dictated by the tempo of battle.

**Residual risk**

The level of risk remaining after controls have been identified and countermeasures selected for hazards that may result in loss of combat power.

**Risk**

Chance of hazard or bad consequence; The probability of exposure to chance of injury or loss from a hazard. Risk level is expressed in terms of hazard probability and severity.

**Risk assessment**

Steps one and two of Army's Risk Management Process, identification and assessment of potential loss in terms of hazards. An identified hazard is assessed to determine the risk (both the probability of occurrence and resulting severity) of an incident due to the presence of the hazard.

*a. Hazard severity.* An Assessment of the expected consequence, defined by degree of injury or occupational illness, property damage or effect on the mission that could occur from a hazard. A hazard is coded by an uppercase Roman numeral according to the criteria in table 3-1.

*b. Accident probability.* An assessment of the likelihood that, given exposure to a hazard, an accident will result. Accident probability is coded by an uppercase letter according to the criteria in table 3-2.

*c. Exposure to hazard.* An expression of personnel exposure that considers the number of persons exposed and the frequency or duration of the exposure.

**Risk assessment code**

An expression of the risk associated with a hazard that combines the hazard severity and accident probability into a single Arabic numeral as shown in table 3-3.

**Risk decision**

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

**Risk management**

The process of identifying, assessing, and controlling risk arising from operational factors and making decisions that balance risk cost with mission benefits.

**Risk management integration**

The embedding of risk management principles and practices into Army operations, culture, organizations, systems, and individual behavior.

**Severity**

The expected consequence of an event (hazardous incident) in terms of degree of injury, property damage, or other mission impairing factors (loss of combat power and so on) that could occur.

**Standard items**

Items normally stocked and issued by the Army and listed in DA supply publications with an established stock number and nomenclature.

**State OSHA official**

An investigator or compliance officer employed by a State that has an OSHA-approved OSH plan.

**Sustain the force**

One of the Army's four core capabilities. This capability includes the processes of acquiring, maintaining and sustaining equipment; maintaining and sustaining land operations; acquiring and sustaining infrastructure and operating installations.

**Workplace**

*a.* Nonmilitary-unique workplaces and operations. DA military and civilian workplaces and operations that are similar to those of private industry. Examples include facilities used for and work performed in the repair and overhaul of vessels, aircraft, or vehicles (except for equipment trials); construction; supply services; civil engineering or public works; medical services; and office work.

*b.* Military-unique equipment, systems, operations, or workplaces.

(1) Equipment and systems that are unique to the national defense mission, including the operation, testing, and maintenance procedure dictated by design configuration. Examples are military weapons, aircraft, ships, submarines, missiles and missile sites, early warning systems and sites, military space systems, ordnance, tanks, and tactical vehicles.

(2) Operations or workplaces that are uniquely military, such as field maneuvers; combat training; naval operations; military flight and missile operations; associated research, test and development activities; and actions required under emergency conditions.

(3) Toxic chemical munitions/agents storage, maintenance, and demilitarization.

*c.* DA contractor workplace. Any place including a reasonable access route to and from where work has been, will be, or is being performed by contractor employees under a DA contract. DA contractor workplace does not include any area, structure, machine, apparatus, device, equipment, or material therein with which the contractor employee is not required or reasonably expected to have contact; nor does it include any working condition for which OSHA jurisdiction has been preempted pursuant to section 4(b)(1) of Public Law 91-596

**Section III****Special Abbreviations and Terms**

There are no special terms.

**RESERVED**

|  |  |  |
|--|--|--|
| <b>MANAGEMENT CONTROL EVALUATION CERTIFICATION STATEMENT</b><br>For use of this form, see AR 11-2; the proponent agency is ASA(FM)   |  | 1. REGULATION NUMBER   |
|  |  | 2. DATE OF REGULATION  |
| 3. ASSESSABLE UNIT   |  |  |
| 4. FUNCTION  |  |  |
| 5. METHOD OF EVALUATION (Check one)  |  |  |
| <input type="checkbox"/> a. CHECKLIST  |  | <input type="checkbox"/> b. ALTERNATIVE METHOD (Indicate method) |
| APPENDIX (Enter appropriate letter)  |  |  |
| 6. EVALUATION CONDUCTED BY   |  |  |
| a. NAME (Last, First, MI)  |  | b. DATE OF EVALUATION  |
| 7. REMARKS (Continue on reverse or use additional sheets of plain paper)   |  |  |
| 8. <b>CERTIFICATION</b><br>I certify that the key management controls in this function have been evaluated in accordance with provisions of AR 11-2, Army Management Control Process. I also certify that corrective action has been initiated to resolve any deficiencies detected. These deficiencies and corrective actions (if any) are described below or in attached documentation. This certification statement and any supporting documentation will be retained on file subject to audit/inspection until superseded by a subsequent management control evaluation. |  |  |
| a. ASSESSABLE UNIT MANAGER   |  | b. DATE CERTIFIED  |
| (1) Typed Name and Title   |  |  |
| (2) Signature  |  |  |





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**Army Regulation 11-9**

**Army Programs**

# **The Army Radiation Safety Program**

Headquarters  
Department of the Army  
Washington, DC  
28 May 1999

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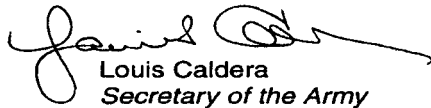
Headquarters  
Department of the Army  
Washington, DC  
28 May 1999

## \*Army Regulation 11-9

Effective 29 June 1999

### Army Programs

## The Army Radiation Safety Program



Louis Caldera  
Secretary of the Army

**History.** This is a new regulation.

**Summary.** This regulation prescribes Army radiation safety policy. It is a consolidation of several regulations that partially covered this policy. It implements DODI 6055.8 and DODI 6055.11. It includes Army policy for the use, licensing, disposal, transportation, dosimetry, accident reporting, safety design, and inventory control of and radiation exposure standards for ionizing and nonionizing radiation sources. This regulation updates policy to be consistent with current Federal radiation safety regulations; simplifies Army radiation authorization, Army radiation permit, and Nuclear Regulatory Commission license application procedures; requires Army radiation authorizations for the use of machine-produced ionizing radiation; and strengthens MACOM and installation radiation safety authority.

**Applicability.** This regulation applies to the Active Army, the Army National Guard of the

United States, the Army Reserve, and Army contractors. This regulation does not apply to nuclear weapons (AR 50-5).

**Proponent and exception authority.** The proponent of this Army regulation is the Director of the Army Staff (DAS). The DAS has the authority to approve exceptions to this regulation that are consistent with controlling law and regulation. The DAS may delegate this authority, in writing, to a division chief within the proponent agency in the grade of colonel or civilian equivalent.

**Army management control process.** This regulation contains management control provisions and identifies key management controls that must be evaluated.

**Supplementation.** Supplementation of this regulation is prohibited without prior approval from HQDA (DACS-SF), WASH DC 20310-0200.

**Suggested improvements.** Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA (DACS-SF), WASH DC 20310-0200.

**Distribution.** This publication is available in electronic media only and is intended for command level C for Active Army and D for Army National Guard of the United States.

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\*This regulation supersedes AR 40-14, 30 June 1995; AR 40-46, 15 November 1974; AR 385-9, 1 April 1982; and AR 385-11, dated 1 May 1980  
AR 11-9 ● 28 May 1999

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# Summary of Change

AR 11-9

## **Army Programs**

The Army Radiation Safety Program

This publication—

- Establishes radiation safety policies and procedures for all ionizing and nonionizing radiation sources used by Army personnel or on Army installations (located throughout).
- Establishes the position of Army Radiation Safety Officer (para 1-4).
- Establishes the Army Radiation Safety Council (para 1-5).
- Provides personnel radiation exposure standards (table 5-1).
- Provides radioactive contamination guidelines and radioactive waste disposal instructions (para 5-3).
- Provides radiation accident and incident reporting policies (chap 6).
- Provides instructions for applying for Nuclear Regulatory Commission licenses, Army radiation authorizations, and Army radiation permits (chap 2).
- Integrates risk management into the Army radiation safety program (chap 1).

## **Chapter 1**

### **Introduction**

#### **1-1. Purpose**

This regulation establishes policies and procedures for the use of, licensing, disposal, transportation, safety design, and inventory control of ionizing and nonionizing radiation sources. It also provides radiation exposure standards and dosimetry and accident reporting instructions. Its objective is to assure safe use of radiation sources and compliance with all applicable Federal and DOD rules and regulations.

#### **1-2. References**

Required and related publications are listed in appendix A.

#### **1-3. Explanation of terms**

Abbreviations and special terms used in this regulation are explained in the glossary.

#### **1-4. Responsibilities**

- a. The Assistant Secretary of the Army (Installations and Environment) (ASA(I&E)) establishes overall Army environment, safety, and occupational health policy and maintains general oversight of and serves as advocate for the Army Radiation Safety Program.
- b. The Assistant Secretary of the Army (Manpower and Reserve Affairs) establishes overall Army health and preventive medicine policy and maintains oversight of medical and health aspects of the Army Radiation Safety Program.
- c. The Director of Army Safety (DASAF), Office of the Chief of Staff, Army, will—
  - (1) Provide Army Staff oversight of the Army Radiation Safety Program.
  - (2) Administer, direct, and integrate Army Force Protection risk management (AR 385-10).
  - (3) Chair the Army Radiation Safety Council (ARSC).
  - (4) In coordination with the ASA (I&E), designate, in writing, a qualified nuclear medical science officer (SSI 72A67C) colonel to serve as Army Radiation Safety Officer (Army RSO).
- d. The Commanding General, Army Materiel Command (AMC) will—
  - (1) Control NRC (Nuclear Regulatory Commission) licenses and Army radiation authorizations for Army radioactive commodities.
  - (2) Provide ionizing radiation dosimetry services (at the Army Ionizing Radiation Dosimetry Center (AIRDC)) that meet the requirements of 10 CFR 20.1501(c). The Chief, AIRDC, will—
    - (a) Publish instructions for starting, maintaining, and ending personnel dosimetry services (SB 11-206).
    - (b) Maintain the Army's Central Dosimetry Records Repository (CDRR). The CDRR will archive comprehensive dosimetry records for all Army personnel and for other personnel who use Army dosimetry services. Records will meet the requirements of 10 CFR 20.2106 and 20.2110. Records will include results of bioassays, administrative dose assignments (including copies of documents that make the assignments), and supplementary occupational dose equivalent information (for example, dosimetry information resulting from off-duty employment, "moonlighting") that any radiation safety officer (RSO) reports. In particular, the AIRDC will meet the requirements of 10 CFR 20.2106(f) for long-term retention of these records.
    - (c) Provide quarterly personnel dosimetry reports (automated dosimetry record (ADR)) to RSOs for all personnel who received dosimetry services during the previous calendar quarter. These reports will enable supported RSOs to meet all recordkeeping requirements in 10 CFR 20.2106.

- (d) Provide reporting services that enable RSOs to meet all requirements of 10 CFR 19.13, 29 CFR 1910.1096(n) and (o), and 29 CFR 1926.53(p) and (q).
  - (e) Provide reporting services that meet the requirements of 10 CFR 20.2206.
  - (f) Notify immediately (by telephone or message) the RSO, The Surgeon General (TSG), the major Army command (MACOM) radiation safety staff officer (RSSO), and the Army RSO when AIRDC records indicate that any Army personnel ionizing radiation exposure standard (table 5-1) may have been exceeded.
- (3) Provide Army low-level radioactive waste disposal services (TM 3-261) (at the Army Low-Level Radioactive Waste Disposal Division, U.S. Army Industrial Operations Command, ATTN: AMSIO-DMW, Rock Island, IL 61299-6000). In addition:
  - (a) Establish procedures for implementing the Army's responsibility as DOD Executive Agent for Low-Level Radioactive Waste Disposal.
  - (b) Maintain records of all Army radioactive waste disposal by burial.
- (4) Provide the Army radiation test, measurement, and diagnostic equipment (TMDE) program and accredited radiation instrument calibration services (AR 750-43 and TB 750-25).
- (5) In coordination with CG, U.S. Army Medical Command (MEDCOM), maintain capability to provide on-site radiation safety support following radioactive material contamination accidents and incidents.
- (6) Assure that foreign military sales of radioactive material (RAM) and items that contain RAM comply with applicable United States regulations and DOD directives.
- e. The Surgeon General will—
  - (1) Establish Army radiation safety personnel exposure standards as necessary and provide them to the Army RSO for promulgation (para 1-41(3)).
  - (2) Approve all radiation dose limits in excess of limits promulgated in this regulation (chap 5) and provide these limits to the Army RSO for promulgation as necessary (para 1-41(3)).
  - (3) Establish and promulgate Army radiological health guidelines for deployment operations as necessary.
  - (4) Provide Army Staff supervision on the medical and health aspects of exposure to ionizing radiation associated with doses that AIRDC documents.
- f. The Commanding General, Training and Doctrine Command (CG, TRADOC), will—
  - (1) Include appropriate radiation safety training in MOS/SSI-producing courses and in unit mission-essential task list (METL) profiles for personnel in MOS/SSIs (military occupational specialty/specialty skill identifier) and TOE units that use radiation and radioactive commodities.
  - (2) Prepare training modules [in coordination with CG, AMC and CG, Army Medical Department Center and School (CG, AMEDDC&S), about protection from U.S. and foreign ionizing and nonionizing radiation sources that may expose Army personnel to radiation during deployment. These modules will be available for radiation safety training of deploying and deployed personnel as necessary.
- g. The Commanding General, U.S. Army Medical Command will—
  - (1) Prepare training modules (at AMEDDC&S), in coordination with CG, TRADOC and CG, AMC about health hazards of, protection from, and medical treatment of injuries caused by U.S. and foreign radiation sources that may expose Army personnel during deployment. These modules will be available for radiation safety training of deploying and deployed personnel as necessary.
  - (2) In coordination with CG, AMC, maintain capability to provide on-site medical advice and support following radioactive contamination accidents or incidents (AR 40-13).

- (3) Survey each installation and each NRC license, Army reactor permit, or Army radiation authorization (ARA) holder at least once every three years for compliance with applicable radiation safety and health regulations and guidance (AR 40-5).
  - (4) Establish appropriate occupational health surveillance for personnel occupationally exposed to radiation (AR 40-5).
  - (5) Perform health hazards assessments (HHAs) of commodities and systems that emit radiation or contain RAM as early as practical in development and before fielding (AR 40-10).
  - (6) Provide radiation bioassay services (AR 40-5) that comply with criteria of the American National Standards Institute (ANSI) (see ANSI N13.30). Such services are available from the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) on a cost-reimbursable basis.
  - (7) Provide medical support for investigations of alleged excessive radiation exposures (DODI 6055.11 and DA PAM 40-18).
- h. The Assistant Chief of Staff for Installation Management (ACSIM) will provide oversight for all radioactive contamination surveys conducted in support of base closure or installation restoration activities.
- i. Each MACOM commanding general will—
- (1) Assure installation and subordinate command compliance with conditions of AMC-held radioactive commodity NRC licenses and ARAs. (See para 2-1b.)
  - (2) Designate, in writing, a person to be the MACOM RSSO.
  - (3) Issue ARAs as necessary (para 2-3).
  - (4) As necessary, establish and employ procedures to assure that captured, purchased, borrowed, or otherwise obtained foreign equipment and materiel are surveyed for RAM and that appropriate actions are taken following discovery of any RAM in those items.
  - (5) Concerning the MACOM radiation safety program:
    - (a) Establish review and approval procedures for conducting risk management in accordance with established doctrine (DODI 6055.1).
    - (b) Maintain a central register of risk decisions regarding deviations from the Army standards of this regulation and DA PAM 40-18 within the command.
    - (c) Assure that the complete risk management process is executed before the conduct of all operations.
  - (6) Report excess military-exempt lasers to the Defense Reutilization and Marketing Service for utilization screening within DOD (DOD 4160.21-M-1). (See para 3-2c.)
    - (a) Maintain accountability during the screening period.
    - (b) Losing and gaining organizations will transfer excess directly between themselves.
    - (c) After utilization screening is completed, identify supply system requirements for usable parts. Return required parts to the supply system.
- j. Each installation commander—
- (1) Will designate, in writing, a qualified individual to be Installation RSO.
  - (2) May establish an Installation Radiation Safety Committee (RSC). (See para 1-6.)
  - (3) Will prepare and maintain historical records of location of use or storage of RAM on the installation and the responsible activity for that use or storage (para 2-5).
  - (4) Will maintain documentation listing locations categorized as “RF controlled” and “RF uncontrolled” environments as necessary (DODI 6055.11).
  - (5) Issue Army radiation permits as necessary (para 2-4).
- k. Each commander will—
- (1) Designate, in writing, a person to be the RSO when any of the following is true.

- (a) When a NRC license, Army reactor permit, ARA, or applicable technical publication requires it.
  - (b) When para 5-2b requires any personnel in the command to wear AIRDC-issued dosimetry.
  - (c) When para 5-2c requires any personnel in the command to participate in a bioassay program.
  - (d) When the activity operates, maintains, or services a class IIIb or class IV laser system (section 1.3, ANSI Z136.1) that is not type-classified. The title of the person so designated may be "laser safety officer" (LSO).
- (2) When paragraph (1) above requires the designation of an RSO (or LSO)—
  - (a) Establish written policies and procedures to assure compliance with applicable Federal, DOD, and Army radiation safety regulations and directives. These documents will include emergency reaction plans as necessary and procedures for investigating and reporting radiation accidents, incidents, and overexposures (chap 6).
  - (b) Assure that an internal (for example, the RSO or local acting IG (Inspector General)) or external (for example, the TSG (para 1-4g(3)) or an RSO from another command) agent or agency audits the radiation safety program annually.
- (3) Assure that all personnel occupationally exposed to radiation receive appropriate radiation safety training commensurate with potential hazards from radiation sources they may encounter.
- (4) Maintain an inventory of radiation sources as higher headquarters directs and in accordance with requirements of NRC licenses, Army reactor permits, ARAs, and technical publications.
- (5) For radioactive commodities in the command, establish written policies and procedures as necessary to assure compliance with radiation safety requirements in applicable technical publications. (See para 2-1b(1).)
- l. The Army Radiation Safety Officer will—
  - (1) On behalf of the DASAF, direct the Army Radiation Safety Program.
  - (2) On behalf of the DASAF, develop, manage, and promulgate Army radiation safety policy and guidance.
  - (3) On behalf of TSG, promulgate Federal and Army radiation safety personnel exposure standards within the Army.
  - (4) On behalf of the ASA (I&E), provide HQDA oversight of the DOD Executive Agency for Low-Level Radioactive Waste, to include matters concerning depleted uranium.
  - (5) Resolve radiation safety issues between MACOMs as necessary.
  - (6) Promote good radiation safety practices throughout the Army.
  - (7) Provide radiation safety consultation to the DA staff and MACOM commanders and staffs.
  - (8) Serve as HQDA radiation safety point-of-contact with other DOD and Federal agencies.
  - (9) Represent HQDA on DOD radiation safety committees, working groups, and panels.
  - (10) Coordinate HQDA-level radiation safety plans and responses to radiation emergencies, accidents, and incidents.
  - (11) Integrate risk management into the Army Radiation Safety Program.
- m. Major Army command RSSOs will—
  - (1) Assure MACOM implementation of Army radiation safety policy.
  - (2) Direct the MACOM radiation safety program.
  - (3) Establish MACOM radiation safety policy.

- (4) Provide radiation safety consultation to the MACOM commanding general and staff and to subordinate commanders and staffs.
  - (5) Serve as MACOM radiation safety point-of-contact.
- n. Each Installation RSO will—
  - (1) Direct the installation radiation safety program.
  - (2) Assist TOE (Table of Organization and Equipment) units on the installation to meet requirements of NRC licenses and ARAs for radioactive commodities. In particular, the installation RSO will—
    - (a) Assure that TOE unit personnel receive appropriate radiation safety training as necessary.
    - (b) Meet all reporting requirements for accidents or incidents (para 6-2).
    - (c) Assure appropriate inventory control per applicable technical publications and logistics regulations.
  - (3) Notify the AMC RSSO when a building or area that currently or formerly contained radioactive commodities is scheduled for demolition or will no longer contain radioactive commodities. This is to provide AMC radioactive commodity license holders appropriate notice so that they can take decommissioning actions as necessary.
- o. Each RSO (or LSO), including the installation RSO, will—
  - (1) Perform or be responsible for the performance of all radiation safety functions that applicable Federal, DOD, and Army regulations and NRC license, Army reactor permit, and ARA conditions require.
  - (2) Establish plans and procedures for handling credible emergencies involving radiation and radioactive materials. This includes coordination with civilian and military emergency response organizations as necessary.
  - (3) Coordinate with supporting medical personnel to help assure that personnel receive appropriate occupational health surveillance (AR 40-5).
  - (4) For an RSO with laser safety responsibilities, assume the responsibilities of an LSO as listed in section 1.3.2, ANSI Z136.1, except for occupational health responsibilities. (The RSO or LSO will assist the occupational health physician as necessary in meeting laser occupational health responsibilities.)

#### **1-5. Army Radiation Safety Council**

- a. The ARSC is the Chief of Staff, Army's advisory body to provide recommendations for Army radiation safety directives and to gather and disseminate information about the status of the Army radiation safety program.
- b. Membership includes the DASAF as chair (para 1-4c(3)), the Army RSO as recorder, the Radiological Hygiene Consultant to TSG, a representative of the ACSIM (Assistant Chief of Staff for Installation Management), a representative of the Army Reactor Office (AR 50-7), and the RSSO from each MACOM, the National Guard Bureau, and the Office, Chief Army Reserve.
- c. The ARSC will meet at least once each 6 month period and at the call of the chair.

#### **1-6. Installation Radiation Safety Committee**

- a. The installation RSC is the installation commander's advisory body to gather and disseminate information about the status of the installation radiation safety program.
- b. Membership includes a chair that the commander designates, the installation RSO (recorder), and all tenant RSOs. Installations with large numbers of TOE unit personnel that use radioactive commodities will include military representatives knowledgeable about the TOE units' radiation safety programs.
- c. Each installation RSC will meet at least once each calendar year and at the call of the chair.

### 1-7. Radiation Safety Committee

When a technical publication or conditions of a NRC license, Army reactor permit, or ARA require an RSC, it will meet the following requirements in addition to any other requirements of applicable directives.

- a. The RSC will meet at least once in each six-month period and at the call of the chair.
- b. A representative of the commander (that is, the commander or someone at the executive level in the organization who is not a radiation user) should chair the RSC. The RSO should be recorder and will be a voting member. The installation RSO may be a non-voting member.
- c. The RSO will provide a copy of the minutes of each RSC meeting to the installation RSO.

### 1-8. General

- a. Although a commander may assign radiation safety functions and the organizational location of the RSO (or LSO) to anywhere in the organization, the RSO and LSO will have direct access to the commander for radiation safety purposes as necessary.
- b. Keep personnel exposure to ionizing radiation at a level as low as is reasonably achievable (ALARA).
- c. Organizations involved in research, development, testing, and evaluation (RDTE), and in acquisition of equipment that emits radiation or contains RAM will-
  - (1) Identify hazards and controls and incorporate protection measures or identify operational restrictions before fielding.
  - (2) Process residual risks for acceptance per AR 70-1 and AR 385-16 before fielding material.
- d. Proponents of technical publications will include radiation safety requirements about siting, operation, and maintenance of commodities and systems that contain RAM or emit radiation, as appropriate.
- e. Army overseas controls of radiation sources will be at least as protective as are Army domestic controls.
- f. Use risk management to identify the options and residual risk for decision by the decision authority. See FM 25-101 and FM 101-5 for a detailed discussion of steps for performing the risk management process.

### 1-9. Deviations

- a. Limit deviations to only those from Army radiation safety standards and procedures. Deviations from Federal and DOD regulations and standards and from NRC license, Army reactor permit, and ARA conditions, including those implemented in technical publications, are not authorized.
- b. The following personnel may authorize deviations from Army standards and procedures (para a above). (Deviations from personnel radiation exposure standards require TSG's approval.)
  - (1) Each MACOM commanding general.
  - (2) The Superintendent, U.S. Military Academy.
  - (3) The Chief, National Guard Bureau (NGB). (The Chief, NGB may sub-delegate deviation authority to the State Adjutant Generals.)
- c. Only personnel listed in paragraph b above may approve residual risk levels deemed to be high or extremely high. Authority to accept residual risk will be per FM 101-5. For the purpose of this paragraph, the personnel listed in paragraph b above are considered MACOM commanding generals.
- d. Grant deviations for 1 year or less. The respective approval authority may approve deviation renewals provided conditions cited in the original deviation remain the same.
- e. Any accident or mishap occurring under an approved deviation will cause automatic termination of the approval until the respective approving authority completes an investigation and re-validates the deviation.

- f. Forward requests through command channels to HQDA (DACS-SF), WASH DC 20310-0200, for waivers and exceptions to Federal or DOD radiation safety regulations. Prior approval from HQDA (DACS-SF), WASH DC 20310-0200, is required before such requests are sent to a Federal agency or to DOD. Prior approval of TSG is also required before requests for waivers or exceptions to Federal or DOD personnel radiation exposure standards are sent to a Federal agency or to DOD.

## **Chapter 2**

### **Ionizing Radiation Sources**

#### **2-1. General**

- a. Materiel. AR 70-1 applies to developmental and non-developmental materiel containing radiation sources.
- b. Compliance with NRC regulations and NRC license, Army reactor permit, and ARA conditions.
  - (1) All Army personnel using RAM will comply with all applicable NRC regulations and conditions of NRC licenses, Army reactor permits, and ARAs held by their own or by another command (paras 2-2a(2) and 2-3b(2)).
  - (2) Holders of NRC licenses, Army reactor permits, and ARAs will assure that all personnel using RAM are aware of applicable regulations and conditions as appropriate.
- c. Shielding and control designs. A qualified expert will design, review, and test shielding of and controls for access to radiation areas, high radiation areas, and very high radiation areas. Perform these procedures per applicable regulations and guidelines before routinely using radiation sources within the area. Each design for high radiation and very high radiation areas will receive an additional independent review by a qualified expert that the MACOM RSSO designates.
- d. Environmental requirements. See 10 CFR 51, 40 CFR, AR 200-1, and AR 200-2 for RAM environmental requirements.

#### **2-2. Nuclear Regulatory Commission licenses**

The NRC licenses special, source, and byproduct material in the U.S. and its possessions.

- a. Send applications for new licenses, license renewals, and license amendments through command channels to the MACOM headquarters for forwarding to the NRC.
  - (1) The MACOM commanding general may allow subordinate commanders to forward applications directly to the NRC without MACOM review.
  - (2) When compliance with conditions proposed in the application requires efforts of personnel of another command, obtain a letter of agreement from an authorized representative of that command (paras 1-4l(5) and 2-1b).
  - (3) The applicant or MACOM RSSO will provide a copy of all correspondence relating to applications to Commander, CHPPM, Aberdeen Proving Ground, MD 21010-5422.
  - (4) Tenant commanders will provide a copy of each NRC license, including all amendments, to the installation commander.
- b. Except as specified in paragraphs 1-9f and 2-2a, all Army personnel may communicate directly with the NRC without restriction. However, a person considering such communication should also consider whether information to be requested is obtainable from Army sources and whether information provided or obtained is of interest to the chain of command or other Army organizations.

#### **2-3. Army radiation authorizations**

- a. The Army uses ARAs to control specific Army ionizing radiation sources (including machines that emit ionizing radiation) that the NRC does not license. An ARA is required for all such sources except



- (1) Byproduct, source, or special material that the NRC has declared to be license-exempt (10 CFR 30, sections 30.14 through 30.20; 10 CFR 40, sections 40.13 and 40.14; and 10 CFR 70, section 70.14) or generally licenses (10 CFR 31; 10 CFR 40, sections 40.20 through 40.28; and 10 CFR 70, section 70.19).
  - (2) Less than 0.1 microcurie ( $\mu\text{Ci}$ ) [3.7 kilobecquerels (kBq)] of radium.
  - (3) Less than 1 ( $\mu\text{Ci}$  (37 kBq) of any naturally occurring or accelerator produced RAM (NARM) other than radium. See paragraph c(2) for other NARM exemptions.
  - (4) For electron tubes containing less than 10 ( $\mu\text{Ci}$  (370 kBq) of any NARM radioisotope.
  - (5) For machine-produced ionizing radiation sources not capable of producing a high radiation area or very high radiation area. (For example, medical and dental diagnostic x-ray systems do not require an ARA.) However, commanders will establish policies and procedures to assure that design and use of these excepted sources are in compliance with applicable radiation safety regulations and guidelines and that only appropriately trained and authorized personnel operate them.
  - (6) For Army nuclear reactors and Army reactor-produced RAM that remains at the reactor site. The Army Reactor Office issues Army reactor permits for these sources (AR 50-7).
- b. Forward applications for new ARAs, ARA renewals, and ARA amendments through command channels to MACOM headquarters for approval.
    - (1) Use DA Form 3337, Application for Army Radiation Authorization (appendix B) for new ARAs. Use either DA Form 3337 or a memorandum that refers to the original DA Form 3337 for ARA renewals and amendments.
    - (2) When compliance with conditions proposed in the application requires efforts of personnel of another command, obtain a letter of agreement from an authorized representative of that command (paras 1-4l(5) and 2-1b).
    - (3) The MACOM RSSO will assure that applications meet appropriate regulatory and advisory guidelines before sending approval through command channels to the applicant.
    - (4) Tenant commanders will provide a copy of each ARA, including all amendments, to the installation commander.
  - c. The Army's ARA program will be similar to the NRC's licensing program. The Army will apply NRC regulations and guidance, modified as necessary, in its control of ARA ionizing radiation sources. Most ARA conditions will be similar to standard NRC license conditions.
    - (1) When an ARA applicant possesses or is applying for a NRC license to which ARA RAM use can be linked the application need only reference the NRC license. The issued ARA may reference the NRC license and incorporate the expiration date and all conditions of the NRC license.
    - (2) The NRC's regulations regarding license-exempt concentrations (10 CFR 30.14) and quantities (10 CFR 30.18) will be applied similarly to NARM with respect to ARA exemption upon HQDA approval. Applicants for such exemptions will send supporting documents through command channels to HQDA (DACS-SF), WASH DC 20310-0200.
  - d. The MACOM RSSO will provide a copy of all correspondence relating to ARA applications to Commander, CHPPM, Aberdeen Proving Ground, MD 21010-5422.
  - e. A sample ARA is in figure 2-1.

#### **2-4. Army radiation permits**

Non-Army agencies (including civilian contractors) require an Army radiation permits (ARP) to use, store, or possess ionizing radiation sources on an Army installation (32 CFR 655.10). (For the purpose of this paragraph, ionizing radiation source means any source that, if held or owned by an Army organization, would require a specific NRC license or ARA.)

- a. The non-Army applicant will apply by letter with supporting documentation (para b below) through the appropriate tenant commander to the installation commander. Submit the letter so that the installation commander receives the application at least 30 days before the requested start date of the permit.

- b. The ARP application will specify start and stop dates for the ARP and describe for what purposes the applicant needs the ARP. The installation commander will approve the application only if the applicant provides evidence to show that one of the following is true.
  - (1) The applicant possesses a valid NRC license or Department of Energy (DOE) radiological work permit that allows the applicant to use the source as specified in the ARP application.
  - (2) The applicant possesses a valid Agreement State license that allows the applicant to use RAM as specified in the ARP application, and the applicant has filed NRC Form-241, Report of Proposed Activities in Non-Agreement States, with the NRC in accordance with 10 CFR 150.20. An ARP issued under this circumstance will be valid for no more than 180 days in any calendar year.
  - (3) For NARM and machine-produced ionizing radiation sources, the applicant has an appropriate State authorization that allows the applicant to use the source as specified in the ARP application or has in place a radiation safety program that complies with Army regulations.
  - (4) For overseas installations, the applicant has 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 radiation safety program that complies with Army regulations. (Applicants will comply with applicable status-of-forces agreements [SOFAs] and other international agreements.)
- c. All ARPs will require applicants to remove all permitted sources from Army property by the end of the permitted time.
- d. Disposal of RAM by non-Army agencies on Army property is prohibited. However, the installation commander may authorize radioactive releases to the atmosphere or to the sanitary sewerage system that are in compliance with all applicable Federal, DOD, and Army regulations. (The installation commander also will give appropriate consideration to State or local restrictions on such releases.)
- e. A sample ARP is in figure 2-2.

## **2-5. Decommissioning records**

- a. Holders of NRC licenses will establish and maintain decommissioning records in accordance with 10 CFR 30.35(g), 40.36(f), and 70.25(g), as applicable.
- b. Holders of ARAs will establish and maintain decommissioning records similar to those that the NRC requires.
- c. Holders of NRC licenses and ARAs will provide information about the location of use and storage of RAM to the installation commander for the installation RAM history records (para 1-4j(3)).

## **2-6. Transfer and transport**

- a. Transfer radioactive material only to persons authorized to receive and possess it.
  - (1) The holder of the commodity license or ARA will in accordance with technical publications and applicable instructions establish transfer of Army radioactive commodities.
  - (2) For all other RAM, the shipper will obtain and retain appropriate evidence (for example, a copy of the recipient's ARA or NRC or Agreement State license) before shipping the RAM.
- b. Domestic shipments of RAM will be in accordance with applicable NRC (10 CFR 71), Department of Transportation (DOT) (49 CFR), and U.S. Postal Service (39 CFR) regulations and per DOD 4500.9-R (Part II). International shipments of RAM will be per applicable U.S. and International Atomic Energy Agency (IAEA) transportation regulations.
- c. Do not transfer radium and items containing radium to non-DOD agencies or activities (except for disposal as radioactive waste).

## **2-7. Radioactive waste disposition**

- a. Do not bury radioactive waste on Army property.
- b. Coordinate with and obtain the approval of the Chief, Army Low-Level Radioactive Waste Disposal Division, U.S. Army Industrial Operations Command, ATTN: AMSIO-DMW, Rock Island, IL 61299-6000, for all disposal by burial on non-Army property of radioactive wastes.
  - (1) This includes approval for the off-site storage, packaging, shipment, treatment, and final disposition of such unwanted low-level RAM.
  - (2) Project managers of special projects, such as U.S. Army Corps of Engineers environmental restoration projects that generate unusually large amounts of radioactive waste may arrange for radioactive waste disposal as part of the project. However, they will coordinate such actions with the Chief, Army Low-Level Radioactive Waste Disposal Division (para 1-4d(3)(b)).
- c. Release of RAM to the atmosphere or to the sanitary sewerage system will comply with all applicable NRC and EPA regulations. (Also, give appropriate consideration to State or local restrictions on such releases.)
- d. If allowed by applicable regulations or by NRC license, Army reactor permit, or ARA conditions, RAM may be held for decay and subsequent disposal without regard to radioactivity. However, disposal of such material may still require special handling as hazardous waste (AR 40-5).

## **2-8. Survey instruments**

Calibrate radiation survey instruments used for health or safety purposes at least annually using National Institute of Standards and Technology (NIST)-traceable radiation sources (AR 750-43 and TB 750-25).

- a. Some instruments may require more frequent calibration. Consult applicable technical publications and with TMDE personnel for appropriate calibration intervals as necessary.
- b. Calibration sources will be of a type and activity appropriate for the intended use of the instrument.

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DEPARTMENT OF THE ARMY  
HQ, MACOM  
CITY, STATE, AND ZIP CODE

REPLY TO ATTENTION OF

XXXX-XX (11-XXm)

15 January 2000

MEMORANDUM FOR Commander, U.S. Army Activity, Installation, City,  
State XXXXX-XXXX

SUBJECT: Army Radiation Authorization (ARA) No. XXX-XX

1. Reference memorandum, HQ, U.S. Army Activity, XXXX-XX-X, 15 November 1999, subject: Application for Renewal of Army Radiation Authorization No. XXX-XX, and enclosures thereto.

2. In accordance with referenced memorandum ARA No. XXX-XX is amended in its entirety to read as follows:

a. Expiration date: 31 January 2002.

b. Description of machine-produced ionizing radiation source and of radioactive material, its chemical and/or physical form, and maximum amount at any one time authorized under this ARA: See enclosure.

c. Authorized use: See enclosure.

d. Radiation Safety Officer: CPT Dan Hamilton.

e. Conditions: See enclosure.

3. Except as specifically provided otherwise in this ARA, conduct your program in accordance with the statements, representations, and procedures in the documents, including any enclosures, listed: referenced memorandum.

4. Our point of contact is Mr. John A. Manfre, MACOM Radiation Safety Staff Officer, DSN XXX-XXXX.

FOR THE COMMANDER:

Encl

RUPERT K. THORNE

as

LTC, GS

Adjutant

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**Figure 2-1. Sample Army radiation authorization**

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DEPARTMENT OF THE ARMY INSTALLATION

CITY, STATE, AND ZIP CODE

October 7, 1999

Radiation Safety Office

Mr. Peter H. Myers

President, Myers and Associates, Inc.

19900 W. 49th Street

Austin, Texas 78799

Dear Mr. Myers:

This letter responds to your application dated September 20, 1999, for an Army radiation permit to use a lead-paint analyzer containing no more than 30 millicuries (1.11 gigabecquerels) of cadmium-109. Your application meets the requirements of Army Regulation 11-9 (The Army Radiation Safety Program) and of title 32, Code of Federal Regulations, part 655, section 655.10.

The (Installation) Commander hereby permits you to use the lead-paint analyzer on this installation during the period October 8 through November 22, 1999 in accordance with the terms specified in your application.

You must remove all radioactive material from the installation by the end of the permitted time and provide evidence to indicate that you have done so. We do not permit disposal of radioactive material on Army property. Reapply if you wish to use the lead-paint analyzer on this installation after November 22, 1999.

Sincerely,

John A. Manfre

Radiation Safety Officer

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**Figure 2-2. Sample Army radiation permit**

## **Chapter 3 Lasers**

### **3-1. General**

- a. The design of Army laser safety programs will follow applicable guidelines in ANSI Z136.1 and ANSI Z136.3. Military-exempt laser users will comply with laser safety requirements in applicable technical publications.
- b. Army laser range safety guidance is in AR 385-63 and MIL-HBK 828.
- c. Use a type-classified or commercial class IIIb or class IV laser on an Army range only if the DOD Laser Systems Safety Working Group or CHPPM has performed a prior laser hazard evaluation for that specific kind of laser.
  - (1) A list of approved lasers is in MIL-HDBK-828. Send requests for approval of an unlisted laser through command channels to Commander, CHPPM, ATTN: MCHB-DC-OLO, Aberdeen Proving Ground, MD 21010-5422.
  - (2) Use an unlisted class IIIb and class IV laser on an Army range for RDTE purposes only. Users of such lasers will comply with paragraph a.
- d. Only a qualified expert will design, review, and test controls for access to a class IIIb or IV laser facility. Meet this requirement in accordance with applicable directives before routinely using class IIIb or IV lasers within such a facility. A qualified expert will design or review for adequacy all radiation safety SOPs (standing operating procedures) for each such facility.
- e. Use only class I, class II, and class IIIa lasers indoors on Army installations as hand-held laser pointing devices. Do not use class IIIb or class IV lasers for such purposes.

### **3-2. Military-exempt lasers**

- a. Although exempt, military-exempt lasers will meet as many of the laser safety standards in 21 CFR 1040 as practical.
- b. Proponents of military-exempt lasers will include laser safety requirements in technical publications about siting, operation, and maintenance of these lasers and laser systems.
- c. Dispose of unwanted military-exempt lasers in accordance with DOD 4160.21-M-1. Do not dispose of potentially usable lasers or laser parts through utilization outside DOD, donation, or sale without the prior approval of the Deputy Undersecretary of Defense (Environmental Security) or designee. Send requests for such disposition through supply channels to the commanding general of the appropriate materiel readiness command.
- d. Military-exempt lasers will not include lasers intended primarily for indoor classroom training and demonstration, industrial operations, scientific investigations, or medical applications.
- e. Commanding General, USACHPPM, will maintain records for all military-exempt lasers that indicate types of laser products and manufacturers.

## **Chapter 4 Radiofrequency electromagnetic radiation**

### **4-1. General**

- a. The Army will comply with RF (radiofrequency) radiation safety program elements in DODI 6055.11. Type-classified RF EMR (electromagnetic radiation) emitting system users will comply with radiation safety requirements in applicable technical publications.
- b. Adopt no practice and conduct no operation involving planned exposure of personnel to RF levels in excess of the applicable maximum permissible exposures in DODI 6055.11.
- c. Do not use radiofrequency protective clothing for routine use to protect personnel. Protective equipment, such as electrically insulated gloves and shoes for protection against RF shock and burn or for insulation from the ground plane is permissible where necessary for compliance with induced current limits in DODI 6055.11.

- d. Identify, attenuate, or control potentially hazardous radiofrequency (RF) electromagnetic fields and other radiation hazards associated with Army electronic equipment by engineering design, protective equipment, administrative actions, or a combination thereof.
- e. Proponents of RF electromagnetic radiation-emitting systems will include radiation safety requirements in technical publications about siting, operation, and maintenance of these systems.

#### **4-2. Measurement and evaluation of RF fields**

Use measurement procedures and techniques recommended in IEEE C95.3 as basic guidance for evaluating RF hazards.

- a. Commanding General, CHPPM, will maintain records of surveys, reports, calculations, and control measures for each type-classified RF EMR emitter.
- b. Where multiple RF EMR emitters are located in fixed arrangements, RF evaluation data will include a determination of weighted contributions from expected simultaneously operated emitters.

### **Chapter 5**

#### **Radiation safety standards, dosimetry, and recordkeeping**

##### **5-1. General**

Personnel exposure limits in this chapter do not apply to doses or exposure due to background radiation, due to any medical administration the individual has received, or due to voluntary participation in medical research programs.

##### **5-2. Ionizing radiation**

- a. Personnel exposure standards. Table 5-1 summarizes the Federal personnel radiation exposure standards that the Army follows.
  - (1) Unrestricted areas. The dose in any unrestricted area from external sources will not exceed 2 millirems (mrem) [0.02 millisievert (mSv)] in any one hour.
  - (2) Nuclear Regulatory Commission jurisdiction. Standards for exposure to ionizing radiation emitted from NRC-licensed RAM are in 10 CFR 20. The Army also applies these standards to Army reactors and to a combination of exposures to NRC-licensed RAM and other ionizing radiation sources.
  - (3) Occupational Safety and Health Administration (OSHA) jurisdiction. Federal standards for occupational exposure to all other ionizing radiation sources are in OSHA regulations (29 CFR 1910.1096 and 1926.53). However, adhere to NRC standards for all ionizing radiation sources when NRC standards are more protective than OSHA standards.
- b. Dosimetry. All occupationally exposed personnel using AIRDC dosimetry services will wear a whole-body dosimeter (worn closest to the source of radiation exposure on the trunk between the shoulders and waist). Wear supplemental dosimeters as necessary to monitor exposures to specific organs or areas, such as the thyroid, finger, hand, lens of eye, and fetus or embryo.
  - (1) Monitor, using AIRDC-supplied dosimeters (see para(2)), occupational exposure of all personnel working in Army facilities or on Army projects (including Army Corps of Engineers civil works projects) for:
    - (a) Adults likely to receive, in 1 year from sources external to the body, a dose in excess of 10 percent of any of the occupational limits in table 5-1.
    - (b) Minors and declared pregnant women likely to receive, in 1 year from sources external to the body, a dose in excess of 10 percent of any of the applicable limits in table 5-1.
    - (c) Individuals entering a high or very high radiation area.

- (2) Personnel at Army government-owned contractor-operated (GOCO) facilities and contractor personnel who are working in Army facilities and require dosimetry will use AIRDC-supplied dosimeters unless a written contract specifically exempts them. (Non-GOCO contractor personnel working under provisions of an ARP may use contractor-supplied dosimetry.)
  - (3) AIRDC dosimeters may be used to monitor the exposure of other personnel and for area monitoring. Evaluate requirements for continued use of AIRDC dosimetry for such purposes periodically (at least annually).
  - (4) DA PAM 40-18 contains instructions for wearing supplemental dosimeters.
- c. Bioassay.
- (1) Monitor occupational intake of RAM and, as necessary, assess the committed effective dose equivalent (CEDE) for:
    - (a) Adults likely to receive, in 1 year, an intake in excess of 10 percent of applicable annual limits of intake (ALI). The ALIs for NRC-licensed RAM are in table 1, columns 1 and 2, 10 CFR 20, appendix B. The Surgeon General will provide, as necessary, ALIs and related air and water concentrations for radioisotopes used under ARA authority and not listed in 10 CFR 20, appendix B to the Army RSO for promulgation.
    - (b) Minors and declared pregnant women likely to receive, in 1 year, a CEDE in excess of 0.05 rem (0.5 mSv).
  - (2) Intake of RAM may be monitored and the CEDE assessed for other individuals. Evaluate the requirement for continued intake monitoring periodically (at least annually).
  - (3) All Government- and contractor-provided bioassay will be in accordance with procedures in ANSI N13.30.
- d. Dosimetry and bioassay records.
- (1) All personnel will complete DD Form 1952, Dosimeter Application and Record of Occupational Radiation Exposure, before receiving AIRDC dosimetry or participating in a routine bioassay program.
  - (2) The RSO will provide a copy of determinations of administrative doses (para e), determinations of non-Army occupational dose histories (obtained from somewhere other than AIRDC), bioassay results, and results of assessing CEDE by bioassay or by determination of the time-weighted air concentrations to which an individual has been exposed [that is, derived air concentration (DAC)-hours] to the AIRDC for archiving.
  - (3) The RSO will provide a copy of each DD Form 1952 and calendar year ADR for routinely monitored personnel to the supporting medical treatment facility or occupational health clinic (AR 40-66). (Examples: A visitor monitored only during a short-term visit of a few days is not routinely monitored. A student or intern monitored over a period of a few months is routinely monitored.)
- e. Administrative doses.
- (1) Only TSG may approve assigning an administrative dose in place of any AIRDC-recorded occupational dose equivalent that exceeds a value in table 5-1.
  - (2) RSOs will estimate TEDE (total effective dose equivalent) or CEDE when they cannot determine it from dosimetry or bioassay (for example, if a dosimeter was lost, damaged, or believed to be deliberately exposed). The estimate of the administrative dose may be based on any of the following.
    - (a) Occupancy or workload information and radiation dose levels at the radiation source operator location.
    - (b) Data supplied by a supplemental dosimeter.
    - (c) Average of the individual's previous occupational dose for the preceding 6 to 12 months if conditions prevailed similar to those during the period for which the dose is being estimated.



- (d) Recorded doses accrued by coworkers performing similar duties under similar circumstances.
- (3) The RSO will document the reason for the administrative dose assignment and the method used to estimate it.
  - (a) For alleged overexposures, the RSO will forward request for approval of the administrative dose, with supporting documentation, through command channels to TSG.
  - (b) For all other administrative dose assignments, the RSO will provide a report to Chief, AIRDC, to be included with the person's records in the CDRR.
- f. Other requirements. Federal requirements for security of RAM; control of access to radiation areas, high radiation areas, and very high radiation areas; caution signs; posting and labeling requirements; radioactive material shipping and receiving; and so on are in 10 CFR, 29 CFR 1910.1096 and 1926.53, 49 CFR, and other applicable documents listed in the References section (app A).

### 5-3. Radioactive contamination

In the absence of other regulatory or advisory guidance, a surface is contaminated if either the removable or total radioactivity is above the levels in table 5-2.

- a. If a surface cannot be decontaminated promptly to levels below those in table 5-2, control, mark, designate, or post it per applicable regulations.
- b. Always reduce radioactive contamination to levels ALARA.
- c. Local commanders may use contamination standards more strict than those in table 5-2 but will not use standards less strict without applying risk management principles (para 1-9).

### 5-4. Nonionizing radiation

See table 5-3 for a description of the electromagnetic radiation spectrum. Refer to the following indicated references for personnel radiation exposure standards for the following types of nonionizing radiation.

- a. Lasers: ANSI Z136.1 and ANSI Z136.3.
- b. Ultraviolet, visible, infrared, and extremely low frequency electromagnetic radiation and static electric fields: (latest edition of) American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs<sup>TM</sup>) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs<sup>TM</sup>).
- c. Radiofrequency electromagnetic radiation: DODI 6055.11.
- d. Static magnetic fields: International Commission on Non-Ionizing Radiation Protection (ICNIRP), "Guidelines on Limits of Exposure to Static Magnetic Fields," *Health Physics*, vol. 66, January, 1994, pp. 100-106.

**Table 5-1.**  
**Army Personnel Ionizing Radiation Exposure Standards.**

| Category   | Maximum <sup>1,2,3</sup>  |
|--|---|
| Member of the general public                                   | 100 mrem (1 mSv) (TEDE) in calendar year <sup>4</sup>   |
| Fetus/embryo of occupationally exposed declared pregnant woman | 500 mrem (5 mSv) (DDE of mother + ED due to radionuclides in fetus/embryo) for entire pregnancy |
| Occupational exposure of adults                                | 5 rem (0.05 Sv) (TEDE) in calendar year   |
| Lens of the eye  | 15 rem (0.15 Sv) (EDE) in calendar year <sup>3</sup>  |
| Individual organ   | 50 rem (0.5 Sv) (DDE + CDE) in calendar year  |
| Skin or extremity  | 50 rem (0.5 Sv) (SDE) in calendar year  |
| Occupational exposure of minors                                | 10% of limits for adults  |

- 
1. From 10 CFR 20. Refer to 10 CFR 20 for detailed standards.
  2. Abbreviations: TEDE = total effective dose equivalent; DDE = deep dose equivalent; ED = effective dose; EDE = effective dose equivalent; CDE = committed dose equivalent; SDE = shallow dose equivalent.
  3. OSHA standard for occupational exposure of adults and for the lens of the eye is  $1\frac{1}{4}$  rem in calendar quarter. OSHA standard for skin of whole body is  $7\frac{1}{2}$  rem in calendar quarter. OSHA standard for hands and forearms; feet and ankles is  $18\frac{3}{4}$  rem in calendar quarter.
  4. The dose in any unrestricted area from external sources, exclusive of the dose contributions from patients administered radioactive material and released in accordance with applicable regulations, will not exceed 2 mrem (0.02 mSv) in any one hour.
-

**Table 5-2.**  
**Surface Radioactivity Values in dpm/100 cm<sup>2</sup>**

| Nuclide <sup>a</sup>   | Removable <sup>b, c</sup> | Total<br>(Fixed + Remov-<br>able <sup>b, d</sup> ) |
|--|---------------------------|--|
| nat U, <sup>235</sup> U, <sup>238</sup> U, and associated decay products   | 1,000                     | 5,000  |
| Transuranics, <sup>226</sup> Ra, <sup>228</sup> Ra, <sup>230</sup> Th, <sup>228</sup> Th, <sup>231</sup> Pa, <sup>227</sup> Ac, <sup>125</sup> I, <sup>129</sup> I | 20                        | 500  |
| nat Th, <sup>232</sup> Th, <sup>90</sup> Sr, <sup>223</sup> Ra, <sup>224</sup> Ra, <sup>232</sup> U, <sup>126</sup> I, <sup>131</sup> I, <sup>133</sup> I          | 200                       | 1,000  |
| Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except <sup>90</sup> Sr and others noted above <sup>e</sup>       | 1,000                     | 5,000  |
| Tritium and tritiated compounds <sup>f</sup>   | 10,000                    | NA   |

- a. See para 5-3 for applicability of this table. This table is extracted from 10 CFR 835, appendix D. The values in this table apply to radioactive contamination deposited on, but not incorporated into the interior of, the contaminated item. Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, apply the limits established for alpha- and beta-gamma-emitting nuclides independently.
- b. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- c. The amount of removable radioactive material per 100 cm<sup>2</sup> of surface area should be determined by swiping the area with dry filter or soft absorbent paper, applying moderate pressure, and then assessing the amount of radioactive material on the swipe with an appropriate instrument of known efficiency. (Note: The use of dry material may not be appropriate for tritium.) When removable contamination on objects of surface area less than 100 cm<sup>2</sup> is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. Except for transuranics and <sup>228</sup>Ra, <sup>227</sup>Ac, <sup>228</sup>Th, <sup>230</sup>Th, <sup>231</sup>Pa and alpha emitters, it is not necessary to use swiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.
- d. The levels may be averaged over one square meter provided the maximum surface activity in any area of 100 cm<sup>2</sup> is less than three times the value specified. For purposes of averaging, any square meter of surface shall be considered to be above the activity guide *G* if: (1) From measurements of a representative number *n* of sections it is determined that  $\frac{1}{n} \sum_{i=1}^n S_i \geq 3G$ , where  $S_i \geq G$  is the dpm/100 cm<sup>2</sup> determined from measurement of section *i*; or (2) it is determined that the sum of the activity of all isolated spots or particles in any 100 cm<sup>2</sup> area exceeds 3*G*.
- e. This category of radionuclides includes mixed fission products, including the <sup>90</sup>Sr which is present in them. It does not apply to <sup>90</sup>Sr which has been separated from the other fission products or mixtures where the <sup>90</sup>Sr has been enriched.
- f. Tritium contamination may diffuse into the volume or matrix of materials. Evaluation of surface contamination shall consider the extent to which such contamination may migrate to the surface in order to ensure the surface radioactivity value provided in this table is not exceeded. Once this contamination migrates to the surface, it may be removable, not fixed; therefore a "Total" value does not apply.

**Table 5—3.**  
**Electromagnetic Radiation.**

| <b>REGION</b>                  | <b>WAVELENGTH</b>        | <b>FREQUENCY</b>            | <b>AUTHORITY</b> |
|--------------------------------|--------------------------|-----------------------------|------------------|
| Ionizing<br>(gamma and x rays) | < 100 nm                 | > 3 PHz<br>( $E > 12.4$ eV) | NRC and<br>OSHA  |
| Ultraviolet (UV)               | 100 to 380-400 nm        | 0.75-0.79 to 3 PHz          | ACGIH            |
| Visible (light)                | 380-400 to 760-780<br>nm | 380-390 to 750-790 THz      | ACGIH            |
| Infrared (IR)                  | 760-780 nm to 1 mm       | 300 GHz to 380-390 THz      | ACGIH            |
| Radiofrequency                 | 1 mm to 100 km           | 3 kHz to 300 GHz            | DOD              |
| Extremely low<br>frequency     | > 100 km                 | < 3 kHz                     | ACGIH            |
| Static electric fields         | NA                       | NA                          | ACGIH            |
| Static magnetic fields         | NA                       | NA                          | ICNIRP           |

**Notes.**

1. Unit abbreviations: nm = nanometer ( $10^{-9}$  m); mm = millimeter ( $10^{-3}$  m); km = kilometer ( $10^3$  m); PHz = petahertz ( $10^{15}$  Hz); THz = terahertz ( $10^{12}$  Hz); GHz = gigahertz ( $10^9$  Hz); kHz = kilohertz ( $10^3$  Hz); and eV = electron volt ( $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$ ).
2. Wavelength x frequency = speed of light =  $3 \times 10^8 \text{ m s}^{-1}$ .
3. Authority = The regulating authority for personnel exposure for the purposes of this regulation (para 5-4).

## **Chapter 6**

### **Special reporting requirements**

#### **6-1. General**

- a. Reporting requirements of AR 40-5, AR 385-40, and DA PAM 40-18 apply for radiation accidents, incidents, and over-exposures. Additional requirements are in paras b and 6-2.
- b. IMMEDIATELY EVACUATE PERSONNEL SUSPECTED OF EXPERIENCING POTENTIALLY DAMAGING EYE EXPOSURE FROM LASER RADIATION TO THE NEAREST MEDICAL FACILITY FOR AN EYE EXAMINATION (See FM 8-50). LASER EYE INJURIES REQUIRE IMMEDIATE SPECIALIZED OPHTHALMOLOGIC CARE TO MINIMIZE LONG-TERM VISUAL ACUITY LOSS. MEDICAL PERSONNEL SHOULD OBTAIN MEDICAL GUIDANCE FOR SUCH EMERGENCIES FROM THE WALTER REED ARMY INSTITUTE OF RESEARCH DETACHMENT AT BROOKS AFB (Commercial [800] 473-3549).
- c. Notify the installation or activity public affairs officer at the onset of the accident or incident in order to activate public affairs contingency measures (AR 360-5). 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.

#### **6-2. Ionizing radiation**

Federal reporting requirements for accidents, incidents, and over-exposures are in 10 CFR 20, subpart M and in 29 CFR 1910.1096(m) and 1926.53(o).

- a. Send information copies of all reports required by 10 CFR 20.2201 through 20.2205, 29 CFR 1910.1096(m), or 29 CFR 1926.53(o) and of any other accident or incident report to the NRC or OSHA through command channels to HQDA (DACS-SF), WASH DC 20310-0200.
- b. Reports through command channels will meet the same time requirements, as do required reports to the NRC and OSHA. For example, if the NRC requires immediate telephonic notification, follow it with immediate telephonic notification through the chain of command to HQDA (DACS-SF), WASH DC 20310-0200.

## **Appendix A Publications**

### **Section I Required Publications**

#### **ANSI N13.30**

American National Standards Institute, Performance Criteria for Radiobioassay. (Cited in para 1-4e(6).) (This publication may be obtained from American National Standards Institute, 1430 Broadway, New York, NY 10018.)

#### **ANSI Z136.1**

American National Standards Institute, American National Standard for Safe Use of Lasers. (Cited in paras 1-4k(e), 1-4n(5), 3-1a, and 5-4a.) (This publication may be obtained from the Laser Institute of America, Suite 125, 2424 Research Parkway, Orlando, FL 32826.)

#### **ANSI Z136.3**

American National Standards Institute, American National Standard for the Safe Use of Lasers in Health Care Facilities. (Cited in paras 3-1a, and 5-4a.) (This publication may be obtained from the Laser Institute of America, Suite 125, 2424 Research Parkway, Orlando, FL 32826.)

#### **AR 40-5**

Preventive Medicine. (Cited in paras 1-4g(3), (4), and (6); 1-4n(4); 2-7d; and 6-1a.)

#### **AR 40-10**

Health Hazard Assessment Program (HHA) in Support of the Army Materiel Acquisition Decision Process. (Cited in para 1-4g(5).)

#### **AR 40-13**

Medical Support-Nuclear/Chemical Accidents and Incidents. (Cited in para 1-4g(2).)

#### **AR 40-66**

Medical Record Administration. (Cited in para 5-2d(3).)

#### **AR 50-7**

Army Reactor Program. (Cited in paras 1-5b and 2-3a(6).)

#### **AR 70-1**

Systems Acquisition Policy and Procedure. (Cited in paras 1-8c and 2-1a.)

#### **AR 200-1**

Environmental Protection and Enhancement (Cited in para 2-1d.)

#### **AR 200-2**

Environmental Effects of Army Actions. (Cited in para 2-1d.)

#### **AR 360-5**

Public Information. (Cited in para 6-1c.)

#### **AR 385-10**

Army Safety Program. (Cited in para 1-4c(2).)

#### **AR 385-40**

Accident Reporting and Records. (Cited in para 6-1a.)

#### **AR 385-63**

Policies and Procedures for Firing Ammunition for Training, Target Practice and Combat. (Cited in para 3-1b.)

#### **AR 750-43**

Army Test, Measurement and Diagnostic Equipment Program. (Cited in paras 1-4d(4) and 2-8.)

**DA PAM 40-18**

Personnel Dosimetry Guidance and Dose Recording Procedures for Personnel Occupationally Exposed to Ionizing Radiation. (Cited in paras 1-4g(7), 1-4i(5)(b), 5-2b(4), and 6-1a.)

**DOD 4160.21-M-1**

Defense Demilitarization Manual. (Cited in para 3-2c.)

**DOD 4500.9-R (Part II)**

Defense Transportation Regulation - Cargo Movement. (Cited in para 2-6b.)

**DODI 6055.1**

DOD Occupational Safety and Health Program (Cited in para 1-4i(5)(a).)

**DODI 6055.11**

Protection of DOD Personnel from Exposure to Radiofrequency Radiation and Military Exempt Lasers. (Cited in paras 4-1a through c, 1-4g(7), 1-4j(4), and 5-4c.)

**FM 8-50**

Prevention and Medical Management of Laser Injuries. (Cited in para 6-1b.)

**FM 25-101**

Battle Focused Training. (Cited in para 1-8f.)

**FM 101-5**

Staff Organization and Operations. (Cited in paras 1-8f and 1-9c.)

**IEEE C95.3**

Institute of Electrical and Electronics Engineers, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields RF and Microwave. (Cited in para 4-2.) (This publication may be obtained from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th St., New York, NY 10017.)

**MIL-HDBK-828**

Laser Range Safety. (Cited in paras 3-1b and 3-1c(1).) (This publication may be obtained from the Standardization Documents Order Desk, Building 4D, 700 Robbins Ave., Philadelphia, PA 19111-5094.)

**SB 11-206**

Personnel Dosimetry Supply and Service for Technical Ionizing Radiation Exposure Control. (Cited in para 1-4d(2)(a).)

**TB 750-43**

Army Test, Measurement, and Diagnostic Equipment (TMDE) Calibration and Repair Support Program. (Cited in paras 1-4d(4) and 2-8.)

**Title 10, CFR, Chapter I**

Nuclear Regulatory Commission. (Cited in paras 1-4d(2), 1-4d(2)(b) through (e); 2-1d; 2-3a(1) and (4); 2-3c(2); 2-4b(2); 2-5a; 5-2a(1), c(1)(a), and f; 6-2; and 6-2a.)

**Title 21, CFR, Subchapter J**

Radiological Health. (Cited in paras 3-2a.)

**Title 29, CFR, Part 1910**

Occupational Safety and Health Standards. (Cited in paras 1-4d(2)(d), 5-2a(2) and f, 6-2, and 6-2a.)

**Title 32, CFR, Part 655**

Radiation Sources on Army Land. (Cited in para 2-4.)

**Title 39, CFR**

U.S. Postal Service. (Cited in para 2-6b.)

**Title 40, CFR**

Environmental Protection Agency. (Cited in para 2-1d.)

**Title 49, CFR**

Department of Transportation. (Cited in paras 2-6b and 5-2f.)

**TM 3-261**

Handling and Disposal of Unwanted Radioactive Material. (Cited in para 1-4d(3).)

**Unnumbered Publication**

ACGIH Threshold Limit Values (TLVs™) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs™). (Cited in para 5-4b.) (This publication may be obtained from the American Conference of Governmental Industrial Hygienists, Technical Affairs Office, 1330 Kemper Meadow Dr., Cincinnati, OH 45240.)

**Unnumbered publication**

International Commission on Non-Ionizing Radiation Protection (ICNIRP), Guidelines on Limits of Exposure to Static Magnetic Fields, *Health Physics*, vol. 66, pp. 100-106. (Cited in para 5-4d.)

**Section II****Related Publications**

A related publication is merely a source of additional information. The user does not have to read it to understand this regulation.

**AR 11-2**

Management Control

**AR 11-34**

The Army Respiratory Protection Program

**AR 25-400-2**

The Modern Army Recordkeeping System (MARKS)

**AR 50-5**

Nuclear Surety

**AR 55-38**

Reporting of Transportation Discrepancies in Shipments

**AR 70-6**

Type Classification of Army Materiel

**AR 190-54**

Nuclear Reactor Security Program

**AR 210-10**

Installations—Administration

**AR 385-16**

System Safety Engineering and Management

**AR 700-64/DLAM 4145.8/NAVSUPINST 4000.34/AFR 67-8/MCO P4400.105**

Radioactive Commodities in the DOD Supply Systems

**AR 700-93**

Processing and Shipping DOD Sponsored Retrograde Materiel Destined for Shipment to the United States, Its Territories, Trusts, and Possessions

**AR 725-50**

Requisitioning, Receipt, and Issue System

**AST-1500Z-100-93**

Identification Guide for Radioactive Sources in Foreign Materiel (This publication is available from Commander, U.S. Army Foreign Science and Technology Center, ATTN: IAFSTC-PO, 220 Seventh St. NE, Charlottesville, VA 22901-5396.)

**DODI 6055.8**

Occupational Radiation Protection Program

**IEEE C95.1**

Institute of Electrical and Electronics Engineers, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz (This publication may be obtained from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th St., New York, NY 10017.)

**NBS Handbook 107**

Radiological Safety in the Design and Operation of Particle Accelerators (The National Bureau of Standards is now known as the National Institute of Standards and Technology) (This publication may be obtained from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082, or from the National Technical Information Service, 5258 Port Royal Rd., Springfield, VA 22161.)

**NBS Handbook 111**

Radiation Safety for x-ray Diffraction and Fluorescence Analysis Equipment (This publication may be obtained from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082, or from the National Technical Information Service, 5258 Port Royal Rd., Springfield, VA 22161.)

**NBS Handbook 114**

General Safety Standards for Installations Using Non-Medical X-Ray and Sealed Gamma-Ray Sources, Energies up to 10 MeV (This publication may be obtained from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082, or from the National Technical Information Service, 5258 Port Royal Rd., Springfield, VA 22161.)

**NCRP Reports**

Approximately 100 numbered reports on a variety of radiation safety topics (These publications may be obtained from the National Council on Radiation Protection and Measurements, 7910 Woodmont Ave., Suite 1016, Bethesda, MD 20814.)

**NRC Regulatory Guide 8.13**

Instruction Concerning Prenatal Radiation Exposure (This publication may be obtained from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082, or from the National Technical Information Service, 5258 Port Royal Rd., Springfield, VA 22161.)

**NRC Regulatory Guide 8.29**

Instruction Concerning Risks from Occupational Radiation Exposure (This publication may be obtained from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082, or from the National Technical Information Service, 5258 Port Royal Rd., Springfield, VA 22161.)

**TB 43-0116**

Identification of Radioactive Items in the Army

**TB 43-0121**

Inspection and Certification of RADIAC Meters (Dosimeters)

**TB 43-0122**

Instructions for the Safe Handling and Identification of U.S. Army Communications-Electronics Command-Managed Radioactive Items in the Army Inventory

**TB 43-0216**

Safety and Hazard Warnings for Operation and Maintenance of TACOM Equipment

**TB 43-0133**

Hazard Criteria for CECOM Radiofrequency and Optical Radiation Producing Equipment

**TB 43-0137**

Transportation Information for CECOM Radioactive Commodities (Use this bulletin for general guidance only; refer to 10 CFR 71 and 49 CFR for current NRC and DOT regulations.)



**TB 43-0141**

Safe Handling, Maintenance, Storage, and Disposal of Radioactive Commodities Managed by the U.S. Army Troop Support and Aviation Material Readiness Command

**TB 43-180**

Calibration and Repair Requirements for the Maintenance of Army Materiel

**TB 385-4**

Safety Requirements for Maintenance of Electrical and Electronic Equipment

**TB MED 502**

Respiratory Protection Program

**TB MED 506**

Occupational Vision

**TB MED 521**

Management and Control of Diagnostic X-Ray, Therapeutic X-Ray, and Gamma-Beam Equipment

**TB MED 522**

Control of Health Hazards from Protective Material Used in Self-Luminous Devices

**TB MED 523**

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

**TB MED 524**

Control of Hazards to Health from Laser Radiation

**TB MED 525**

Control of Hazards to Health from Ionizing Radiation Used by the Army Medical Department

**Title 10, CFR, Part 835**

Occupational Radiation Protection

**TM 5-315**

Transportability Guidance for Safe Transport of Radioactive Materials (Use this manual for general guidance only; refer to 10 CFR 71 and 49 CFR for current NRC and DOT regulations.)

**TM 55-315**

Transportability Guidance for Safe Transport of Radioactive Materials (Use this manual for general guidance only; refer to 10 CFR 71 and 49 CFR for current NRC and DOT regulations.)

**TM 55-4470-400-12-1**

Transportability Guidance for Nuclear Reactor Irradiated Fuel Elements (Use this manual for general guidance only; refer to 10 CFR 71 and 49 CFR for current NRC and DOT regulations.)

**Section III**

**Prescribed Forms**

**DA Form 3337**

Application for Army Radiation Authorization. (Cited in para 2-3b(1).)

**Section IV**

**Referenced Forms**

**DA Form 11-2-R**

Management Control Evaluation Certification Statement

**DD Form 1952**

Dosimeter Application and Record of Occupational Radiation Exposure

**NRC Form 241**

Report of Proposed Activities in Non-Agreement States

## Appendix B

### Sample application for Army Radiation Authorization (DA Form 3337)

| APPLICATION FOR ARMY RADIATION AUTHORIZATION  |   |
|---|---|
| For use of this form, see AR 11-9; the proponent agency is DAS  |   |
| 1. THIS IS AN APPLICATION FOR (Check appropriate item)<br><input type="checkbox"/> NEW ARA<br><input type="checkbox"/> AMENDMENT TO ARA NUMBER _____<br><input type="checkbox"/> RENEWAL OF ARA NUMBER _____  | 2. NAME, MAILING ADDRESS, AND E-MAIL ADDRESS OF APPLICANT<br>(Include ZIP Code)   |
| 3. ADDRESSES WHERE AUTHORIZED IONIZING RADIATION SOURCES WILL BE USED OR POSSESSED  |   |
| 4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION  | 5. TELEPHONE NUMBER AND FAX NUMBER  |
| <p>Items 6 through 12 may be continued on the following page or on 8 1/2 x 11 in. paper. The type and scope of information to be provided should be adequate to show complete compliance with applicable regulations and guidance. (If you can link use of radioactive material to a valid Nuclear Regulatory Commission (NRC) license, provide number and expiration date of the license and only submit items that differ from the NRC license application and associated documents.)</p> |   |
| 6. RADIATION SOURCE(S)  |   |
| a. RADIOACTIVE MATERIAL (Element and mass number, chemical and/or physical form, and maximum amount that you will possess at any one time.)   | b. ACCELERATOR(S) AND X-RAY SYSTEM(S) CAPABLE OF PRODUCING "HIGH RADIATION AREA" OR "VERY HIGH RADIATION AREA" (Describe) |
| 7. PURPOSE(S) FOR WHICH IONIZING RADIATION SOURCE(S) WILL BE USED   | 8. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE                               |
| 9. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS  | 10. FACILITIES AND EQUIPMENT (Describe rooms or areas, shielding, safety devices, monitoring equipment, and so on.)       |
| 11. RADIATION SAFETY PROGRAM  | 12. WASTE MANAGEMENT  |
| 13. CERTIFICATION   |   |
| <p>The applicant understands that all statements and representations made in this application are binding upon the applicant. The applicant and any official executing this certification on behalf of the applicant, named in Item 2, certify that all information contained in this application is true and correct to the best of their knowledge and belief.</p>  |   |
| 14. NAME, RANK, AND TITLE OF CERTIFYING OFFICER   | 15. SIGNATURE   |
|   | 16. DATE (YYYYMMDD)   |

DA FORM 3337, MAY 1999

DA FORM 3337, MAR 80, IS OBSOLETE

USAPA V1 CG

ITEMS 8 THRU 12 (Continued)

**SAMPLE**

PAGE 2, DA FORM 3337, MAY 1999

USAPA V1 C0

## **Appendix C**

### **Management Control Evaluation Checklist**

#### **C-1. Function**

The function covered by this checklist is radiation safety.

#### **C-2. Purpose**

The purpose of this checklist is to assist commanders and radiation safety officers in evaluating the key management controls listed below. It is not intended to cover all controls.

#### **C-3. Instructions**

Answers must be based on the actual testing of key management controls (for example, document analysis, direct observation, sampling, simulation, other). Answers that indicate deficiencies must be explained and corrective action indicated in supporting documentation. These management controls must be evaluated at least once every five years. Certification that this evaluation has been conducted must be accomplished on DA Form 11 2 R (Management Control Evaluation Certification Statement).

#### **C-4. Test questions**

- a. If required (para 1-4k(1)), has a person been designated to be radiation safety officer?
- b. If required (para 1-4k(2)), has a written radiation safety SOP been established?
- c. Are all personnel occupationally exposed to radiation receiving appropriate radiation safety training?
- d. Are all radiation sources secured against unauthorized use and removal?
- e. If the unit possesses radioactive commodities, has a written SOP been established to assure compliance with radiation safety requirements of applicable technical publications?
- f. Are all controllable quantities of radioactive material and radiation-producing sources held by the unit under appropriate authority (for example, a Nuclear Regulatory Commission license, an Army radiation authorization, or as part of a radioactive commodity)?
- g. Is all radioactive waste disposed of properly?
- h. Are all radiation survey instruments used for health and safety appropriately calibrated?
- i. For Army laser ranges have all type-classified or commercial class IIIb or class IV lasers received appropriate evaluation before their use?
- j. Are all unwanted military-exempt lasers disposed of properly?
- k. Are all accidents and incidents involving excessive personnel radiation exposure or excessive radioactive contamination of facilities, equipment, or the environment promptly reported through appropriate channels?
- l. Do all personnel occupationally exposed to ionizing radiation or radioactive material above applicable levels (paras 5-2b(1) and c(1)) participate in an appropriate dosimetry or bioassay program?
- m. Is the dose in all unrestricted areas less than 2 millirems (0.02 millisieverts) in any one hour?

#### **C-5. Supersession**

This is a new checklist.

#### **C-6. Comments**

Help make this a better tool for evaluating management controls. Submit comments to HQDA (DACS-SF), WASH DC 20310-0200.

## **Glossary**

### **Section I**

#### **Abbreviations**

##### **ACGIH**

American Conference of Governmental Industrial Hygienists

##### **ACSIM**

Assistant Chief of Staff for Installation Management

##### **ADR**

automated dosimetry report

##### **AFB**

United States Air Force Base

##### **AIRDC**

Army Ionizing Radiation Dosimetry Center

##### **ALARA**

as low as is reasonably achievable

##### **ALI**

annual limit of intake

##### **ANSI**

American National Standards Institute

##### **AR**

Army Regulation

##### **ARA**

Army Radiation Authorization

##### **ARP**

Army Radiation Permit

##### **ARSC**

Army Radiation Safety Council

##### **ASA(I&E)**

Assistant Secretary of the Army (Installations and Environment)

##### **BEI™**

biological effectiveness index (ACGIH trademark)

##### **Bkd**

background

##### **CDRR**

Central Dosimetry Records Repository

##### **CECOM**

U.S. Army Communications-Electronics Command

##### **CEDE**

committed effective dose equivalent

##### **CFR**

Code of Federal Regulations

##### **CG**

Commanding General

**CHPPM**

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

**cm**

centimeter

**DA**

Department of the Army

**DAC**

derived air concentration

**DASAF**

Director of Army Safety

**DOD**

Department of Defense

**DODI**

Department of Defense Instruction

**DOE**

Department of Energy

**dpm**

disintegrations per minute

**DOT**

Department of Transportation

**DSN**

Defense Switching Network

**EMR**

electromagnetic radiation

**EPA**

U.S. Environmental Protection Agency

**eV**

electron volt

**FY**

fiscal year

**GHz**

gigahertz

**GOCO**

Government-owned contractor-operated

**Gy**

gray

**h**

hour

**HHA**

health hazard assessment

**HQDA**

Headquarters, Department of the Army

**Hz**

hertz

**IAEA**

International Atomic Energy Agency

**ICNIRP**

International Commission on Nonionizing Radiation Protection

**IEEE**

Institute of Electrical and Electronics Engineers

**IR**

infrared

**kBq**

kilobecquerel

**kHz**

kilohertz

**km**

kilometer

**LSO**

laser safety officer

**m**

meter

**MACOM**

major Army command

**MARKS**

Modern Army Recordkeeping System

**METL**

mission-essential task list

 **$\mu$ Ci**

microcurie

**mg**

milligram

**MIL-HDBK**

military handbook

 **$\mu$ m**

micrometer

**mm**

millimeter

**MOS**

military occupational specialty

**mrad**

millirad

**mSv**

millisievert

**MTF**

medical treatment facility

**NARM**

naturally occurring or accelerated produced radioactive material

**NBS**  
National Bureau of Standards (now named the National Institute of Standards and Technology)

**NCRP**  
National Council on Radiation Protection and Measurements

**NGB**  
National Guard Bureau

**NIST**  
National Institute of Standards and Technology

**nm**  
nanometer

**NORM**  
naturally occurring radioactive material

**NRC**  
U.S. Nuclear Regulatory Commission

**NSN**  
National stock number

**NVLAP**  
National Voluntary Laboratory Accreditation Program

**OSHA**  
Occupational Safety and Health Administration

**PHz**  
petahertz

**RAM**  
radioactive material

**RDTE**  
research, development, testing, and evaluation

**RF**  
radiofrequency

**RSC**  
radiation safety committee

**RSO**  
radiation safety officer

**RSSO**  
radiation safety staff officer

**SB**  
supply bulletin

**SI**  
Système Internationale (International System)

**SOFA**  
status of forces agreement

**SOP**  
standing operating procedure

**SSI**  
specialty skill identifier



**Sv**

sievert

**TACOM**

U.S. Army Tank-Automotive and Armaments Command

**TB**

technical bulletin

**TB MED**

technical bulletin (medical)

**TEDE**

total effective dose equivalent

**THz**

terahertz

**TLV™**

threshold limit value (ACGIH trademark)

**TM**

technical manual

**TMDE**

test, measurement, and diagnostic equipment

**TOE**

table of organization and equipment

**TSG**

The Surgeon General

**U.S.C.**

United States Code

**CHPPM**

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

**USAMC**

U.S. Army Materiel Command

**UV**

ultraviolet

**Section II****Terms****Absorbed dose**

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

**Administrative dose**

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

**Agreement State**

Any State with which the Atomic Energy Commission or the NRC has entered into an effective agreement in which the State assumes many of the NRC's functions.

**ALARA**

Acronym for "as low as is reasonably achievable" means making every reasonable effort to maintain exposures to radiation as far below applicable dose limits as is practical consistent with the purpose for which the activity is undertaken, taking into account the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations and in relation to utilization of nuclear energy, radioactive materials, and ionizing radiation in the public interest.

**Annual limit of intake (ALI)**

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

**Army regulation**

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

**Army Reserve facilities**

Pertains to those facilities normally employed for the administration and training of Army Reserve units, in any entire structure or part thereof, including any interest in land, Army Reserve Center, and storage and other use areas.

**Background radiation**

Radiation from cosmic sources; naturally occurring radioactive material, including radon (except as a decay product of source or special nuclear material); and global fallout as it exists in the environment from the testing of nuclear explosive devices or from past nuclear accidents such as Chernobyl that contribute to background radiation. Background radiation does not include radiation from source, by-product, or special nuclear materials that the NRC regulates or from NARM that the Army regulates.

**Becquerel (Bq)**

The SI unit of radioactivity equivalent to one nuclear transformation per second.

**Bioassay (radiobioassay)**

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

**Byproduct material**

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

**Committed dose equivalent**

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

**Committed effective dose equivalent**

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

**Commodity, radioactive**

See Radioactive commodity

**Condition**

The status of personnel and equipment (readiness) as they interact with the operational environment during mission planning and execution.

**Control**

Action taken to eliminate hazards or reduce their risk.

**Curie (Ci)**

A unit of radioactivity equal to 37 billion becquerels.

**Declared pregnant woman**

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

**Decommission**

To remove (as a facility) safely from service and 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.

**Deep-dose equivalent**

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

**Derived air concentration (DAC)**

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

**Develop the Force**

One of the Army's four core capabilities. This capability includes the processes of developing doctrine; developing requirements; acquiring, training and sustaining people; and identifying and developing leaders. This core capability encompasses the various functions that must be accomplished to create tactical units that comprise the Operational Force.

**Deviation**

A departure from the requirements of this regulation.

**Direct and Resource the Force**

One of the Army's four core capabilities comprised of four core processes: planning and policy development; direction and assessment; financial management; and information management. These processes have six functions: Leadership; Human Resource Management; Force Management; Military Strategy; Acquisition and Logistics Management; and Installations & Facilities Management.

**Dose equivalent**

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

**Effective dose equivalent**

The sum of the products of the dose equivalent to the organ or tissue and the weighting factors applicable to each of the body organs or tissues that are irradiated. The units of dose equivalent are the rem and sievert (Sv).

**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, radiofrequency radiation, and extremely low frequency electromagnetic radiation (see table 5-3).

**Electron volt (eV)**

A unit of energy equal to  $1.6 \cdot 10^{-19}$  joule.

**Exposure**

In risk management, the frequency and length of time subjected to a hazard.

**Extremely low frequency (ELF) electromagnetic radiation**

Electromagnetic radiation with a frequency less than 3 kHz.

**Eye dose equivalent**

Applies to the external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeter ( $300 \text{ mg cm}^{-2}$ ).

**Giga- (G)**

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

**Gray (Gy)**

The SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 joule/kilogram (100 rads).

**Hazard**

Any real or potential condition that can cause injury, illness, death of personnel, damage to or loss of equipment or property, or mission degradation.

**Hertz (Hz)**

The SI unit of frequency equivalent to one vibration (cycle) per second.

**High radiation area**

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

**Infrared (IR) electromagnetic radiation**

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

**Installation**

A grouping of facilities located in the same vicinity, which support particular functions. Installations may be elements of a base. Land and improvements permanently affixed thereto which are under the control of the Department of the Army and used by Army organizations. Where installations are located contiguously, the combined property is designated as one installation and the separate functions are designated as activities of that installation. In addition to those used primarily by troops, the term installation applies to real properties such as depots, arsenals, ammunition plants (both contractor and Government operated), hospitals, terminals, and other special mission installations. For the purposes of this regulation, United States Army Regional Support Commands are installations.

**Ionizing radiation**

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

**Kilo- (k)**

An SI unit prefix indicating a factor of 1000.

**Laser**

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

- a. Class I lasers emit at levels that are not hazardous under any viewing or maintenance conditions. They are exempt from control measures. (However, as a matter of good safety practice avoid intrabeam viewing in case the laser is mislabeled.)
- b. Class II lasers (low-power) emit in the visible light portion of the electromagnetic spectrum. They are a potential eye hazard only for prolonged intrabeam viewing. Eye protection is normally afforded by the aversion response including the blink reflex.
- c. Class III (medium-power) lasers emit in the infrared, visible, or ultraviolet portions of the electromagnetic spectrum. They are a hazard for direct intrabeam and specular reflection viewing. Diffuse reflection is not normally a hazard.
  - (1) Class IIIa lasers, even though they emit at class III power levels, have special beam characteristics that make them eye-safe except when viewed through magnifying optics.
  - (2) Class IIIb lasers are all other class III lasers.
- d. Class IV (high-power) lasers emit in the infrared, visible, or ultraviolet portions of the electromagnetic spectrum. They are hazardous for direct intrabeam exposure and sometimes diffuse reflection exposure to the eyes or skin. They may also produce fire, material damage, laser-generated air contaminants, and hazardous plasma radiation.

**Low-level radioactive waste**

See Radioactive waste, low-level.

**Materiel readiness command**

A major subordinate command of the U.S. Army Materiel Command responsible for National Inventory Control Point (NICP) and National Maintenance Point (NMP) functions for assigned items (AR 725-50).

**Member of the public**

Any individual except when that individual is receiving an occupational dose.

**Micro-( $\mu$ )**

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

**Military-exempt lasers**

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

**Milli- (m)**

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

**Naturally occurring or accelerator produced radioactive material (NARM)**

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

**Nonionizing 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 assigned duties involve exposure to radiation or to radioactive material from regulated and unregulated sources of radiation, whether in the possession of the employer or other person. Occupational dose does not include dose received from background radiation; from any medical administration the individual has received; from exposure to patients administered radioactive material and released in accordance with applicable regulations; from voluntary participation in medical research programs; or as a member of the public.

**Optical radiation**

See Visible light.

**Peta- (P)**

An SI unit prefix indicating a factor of one million billion ( $10^{15}$ ).

**Probability**

The likelihood that an event will occur.

**Project the force**

One of the Army's four core capabilities. This capability includes the processes of tailoring, mobilizing and projection of land power, and supporting organizational training. Recognized as the overriding capability by which the Army will be measured is the ability to rapidly deploy ready forces into a distant area of operations and keep them coming as dictated by the tempo of battle.

**Qualified expert**

A person who, by virtue of training and experience, can provide competent authoritative guidance about certain 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. Forward requests for determination of whether a certain individual is a qualified expert through command channels to the MACOM RSSO as necessary. Forward these requests to HQDA (DACS-SF), WASH DC 20310-0200, for further evaluation as necessary.

**Quality factor**

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

**Rad**

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

**Radiation**

For the purposes of this regulation, unless otherwise specified, radiation includes both ionizing and nonionizing 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 regulation, a scientific 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 *health physics and radiation protection*.

**Radiation safety committee**

An advisory committee for the commander to assess the adequacy of the command's radiation safety program. Same as *radiation control committee and radiation protection committee*.

**Radiation Safety Officer**

The person that the commander designates, in writing, as the executive agent for the command's radiation safety program. Same as *radiation protection officer or health physics officer*.

**Radiation safety program**

A program to implement the objective of radiation safety.

- a. The Army's radiation safety program includes all aspects of:
  - (1) Measurement and evaluation of radiation and radioactive material pertaining to protection of personnel and the environment.
  - (2) Army compliance with Federal and DOD radiation safety regulations.
  - (3) The Army's radiation dosimetry, radiation bioassay, radioactive waste disposal, radiation safety training, and radiation instrument TMDE and calibration programs.
- b. A command's radiation safety program includes all aspects of:
  - (1) Measurement and evaluation of radiation and radioactive material within the command as they pertain to protection of personnel and the environment.
  - (2) Compliance with Federal, DOD, and Army radiation safety regulations.

**Radioactive commodity**

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

**Radioactive waste**

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

**Radioactive waste, low-level**

Material the NRC classifies as low-level radioactive waste (see 10 CFR 62.2); waste not classified as high-level radioactive waste (spent nuclear fuel), as transuranic waste, or as uranium or thorium tailings and waste; material acceptable for burial in a land disposal facility (10 CFR 61).

**Radiobioassay**

See bioassay.

**Radiofrequency (RF) electromagnetic radiation**

Electromagnetic radiation with frequencies between 3 kHz and 300 GHz.

**Radiofrequency (RF) controlled environment**

Locations where RF exposure may be incurred by persons who are aware of the potential for occupational exposure, by other cognizant persons, or as the incidental result of transient passage through areas where analysis shows the exposure levels may be above those shown in DODI 6055.1, table 6-2-1, but do not exceed those shown in DODI 6055.1, table 6-1-1. Existing physical arrangements or areas, such as fences, perimeters, or weather deck(s) of a ship may be used in establishing a controlled environment.

**Radiofrequency (RF) uncontrolled environments**

Locations where RF exposures do not exceed permissible exposure levels in DODI 6055.1, table 6-2-1. Such locations generally represent living quarters, workplaces, or public access areas where personnel would not expect to encounter higher levels of RF energy.

**Recorder, RSC**

The person directly responsible for the accuracy and completeness of the RSC minutes. The recorder may designate someone else to take notes at RSC meetings (for example, an assistant or secretary). The recorder should be the RSO to help assure that the minutes meet regulatory requirements.

**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).

**Residual Risk**

The level of risk remaining after controls have been identified and selected for hazards that may result in loss of combat power. Controls are identified and selected until residual risk is at an acceptable level or until it cannot be practically reduced any further.

**Risk**

Chance of hazard or bad consequences; exposure of chance of injury or loss. Risk level is expressed in terms of hazard probability and severity.

**Risk assessment**

The identification and assessment of hazards (first two steps of the risk management process).

**Risk decision**

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

**Risk management**

A logical five step thought process, applicable to any situation or environment, for identifying and controlling hazards to protect the force.

**Risk management integration**

The process by which individuals or organizations develop plans to embed risk management into all that they do.

**Severity**

The expected consequence of an event in terms of degree of injury, property damage, or other mission impairing factors (loss of combat power, adverse publicity, and so on), that should occur.

**Shallow dose equivalent**

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

**Sievert (Sv)**

The SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sieverts is equal to the absorbed dose in grays multiplied by the quality factor ( $1 \text{ Sv} = 100 \text{ rem}$ ).

**Source material**

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

**Special nuclear material**

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

**Sustain the Force**

One of the Army's four core capabilities. This capability includes the processes of acquiring, maintaining and sustaining equipment; maintaining and sustaining land operations; acquiring and sustaining infrastructure and operating installations.

**Tera- (T)**

An SI unit prefix indicating a factor of one trillion ( $10^{12}$ ).

**Total effective dose equivalent**

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

**Type classification**

A designation the Army uses to indicate acceptability for service use (AR 70-61).

**Ultraviolet (UV) electromagnetic radiation**

Electromagnetic radiation with wavelengths between 100 nm and 380-400 nm.

**United States Army Reserve Center**

A home station facility, activity, or installation utilized for administration and training of United States Army Reserve units and personnel.

**Unrestricted area**

An area, access to which is neither limited nor controlled (for the purposes of ionizing radiation safety).

**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 grays) in 1 hour at 1 meter from a radiation source or from any surface that the radiation penetrates.

**Visible light**

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

**Weighting factor**

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



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**AMCOM  
Regulation 11-1**

**Radiation Safety**

**AMCOM  
Radiation Safety  
Program**

**Headquarters  
US Army Aviation and Missile Command  
Redstone Arsenal, AL 35898-5000  
25 February 2002**

**UNCLASSIFIED**

DEPARTMENT OF THE ARMY  
HEADQUARTERS, UNITED STATES ARMY AVIATION AND MISSILE COMMAND  
Redstone Arsenal, Alabama 35898-5000

AMCOM Regulation 11-1

25 February 2002

Radiation Safety  
AMCOM RADIATION SAFETY PROGRAM

FOR THE COMMANDER:

EDWARD L. STONE  
COL, OD  
Chief of Staff

OFFICIAL:

//s//

LINDA B. READUS  
Secretary of the General Staff

**HISTORY.** This document was first published as MICOM Regulation 385-20. This regulation reflects the current radiation safety program and the changes in the Federal regulations.

**SUMMARY.** This regulation provides policy, responsibilities, and safety requirements for personnel, facilities, and systems operating under the US Army Aviation and Missile Command Radiation Safety Program. The guidance implements the US Army Aviation and Missile Command Radiation Safety Program in accordance with the US Army Aviation and Missile Command Nuclear Regulatory Commission (NRC) licenses.

**APPLICABILITY.** This regulation is applicable to all organizational elements within the US Army Aviation and Missile Command. The regulation is also applicable to any organization that has been authorized to use radioactive material under the management control of the US Army Aviation and Missile Command Nuclear Regulatory Commission licenses.

**PROPONENT AND EXCEPTION AUTHORITY.** The proponent of the regulation is the US Army Aviation and Missile Command Safety Office (AMSAM-SF-A.) Only the proponent has the authority to approve exceptions to this regulation.

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**INTERNAL CONTROL SYSTEMS.** The regulation does not contain internal control provisions as outlined in the Management Control Evaluation Process.

**SUPPLEMENTATION.** Further supplementation is prohibited without prior approval of AMCOM, ATTN: AMSAM-SF-A, Redstone Arsenal, AL 35898-5000.

**SUGGESTED IMPROVEMENTS.** Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications) to Commander, US Army Aviation and Missile Command, ATTN: AMSAM-SF-A, Redstone Arsenal, AL 35898-5000.

**DISTRIBUTION.** This publication is approved for public release, distribution unlimited.

**SUPERSESSSION.** This regulation supersedes MICOM Regulation 385-20, 17 September 1993.

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1. **PURPOSE.** This regulation establishes responsibilities and procedures for the use of, licensing, control, storage and inventory, transportation, handling and disposal of radioactive materials and ionizing and nonionizing radiation sources.

2. **REFERENCES.** Required and related publications are listed in Appendix A.

3. **EXPLANATION OF TERMS.** Abbreviations and special terms used in this regulation are explained in Appendix E (Glossary.)

#### 4. POLICIES.

a. Radioactive sources and radiation-producing devices will be used only when it is determined they are necessary for the accomplishment of the assigned mission and practical substitutes do not exist.

b. Radiation Safety Programs will be established by each organization or activity to ensure adequate facilities, equipment, procedures, controls, and training are commensurate with the radioactive material or radiation-producing device used. These programs will be consistent with Federal, DA, and AMC regulations and directives and will ensure that exposures to ionizing radiation are maintained As Low As Reasonably Achievable (ALARA). Under the provisions of this regulation, the ALARA concept will be implemented by guidelines, written procedures, review and maintenance of program records, and a periodic review of the performance of the program as is specifically outlined in Title 10 Code of Federal Regulations (CFR) Part 20.

c. Government-owned, contractor-operated (GOCO) operations and contractors utilizing or possessing radioactive material or radiation-producing devices will maintain Radiation Safety Programs and/or policies consistent with this regulation as allowed by existing contract between the US Government and the installation contractor. This regulation in no way obligates the US Government for any liability to contractor personnel for any adverse health effects.

#### 5. RESPONSIBILITIES.

a. Commander, US Army Aviation and Missile Command, will:

(1) Ensure adequate resources exist to maintain a formal Radiation Safety Program as required by Federal and Army regulations and directives.

(2) Ensure exposures to ionizing radiation are maintained as low as reasonably achievable (ALARA) and within current accepted radiation protection standards, laws, and regulations.

b. Tenant Commanders/Directors using radioactive materials or radiation-producing devices will:

(1) Develop and implement a Radiation Safety Program in accordance with applicable Federal and Army regulations and directives. Those programs operating independently of the AMCOM program as outlined and agreed to by Memorandum of Understanding (MOU) will assume responsibility for their programs. This agreement, however, does not relieve them of the responsibilities listed in paragraphs (2), (3), (4)(c), and (4)(f) below.

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(2) Appoint, on orders, a Radiation Safety Officer (RSO) and Alternate to manage the Radiation Safety Program.

(3) Appoint, on orders, a representative to the AMCOM Radiation Safety Committee (RSC).

(4) Furnish the AMCOM Safety Office, AMSAM-SF-A, the following:

(a) Copies of NRC licenses, Army Radiation Authorizations (ARA) and Army Radiation Permits (ARP) with updates when amended or renewed for operations on Redstone Arsenal.

(b) Copies of current appointment orders for the RSO and Alternate and representative to the AMCOM RSC.

(c) Copies of annual radioactive material/radiation-producing device inventory no later than 30 September of each year. Provide updated inventories as soon as changes occur.

(d) Copies of inspection reports/program evaluations of their Radiation Safety Programs by outside activities, e.g., Nuclear Regulatory Commission (NRC) and US Army Center for Health Promotion and Preventive Medicine (CHPPM), along with copies of responses to any discrepancies noted.

(e) Plans for construction/modifications to facilities where radioactive material or radiation-producing devices are used as early as is practicable in the planning stages.

(f) Notification of accidents, incidents, injuries, overexposure of personnel, or loss of radiation sources occurring on Redstone Arsenal immediately when response by AMCOM personnel is required or within 24 hours of their occurrence if response by AMCOM personnel is not required.

(g) Copies of all operational SOPs for approval.

c. Chief, AMCOM Safety Office, will:

(1) Develop and implement a Radiation Safety Program in accordance with applicable Federal and Army regulations and directives.

(2) Appoint, on orders, an AMCOM RSO and Alternate to manage the AMCOM Radiation Safety Program, to include ionizing and nonionizing radiation protection.

(3) Appoint, on orders, an AMCOM RSC to oversee the implementation of the Radiation Safety Program.

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(4) Appoint, on orders, a Custodian of Radiation Exposure Records (Automated Dosimetry Report (ADR)) to maintain and provide oversight to the radiation dosimetry program at AMCOM.

(5) Appoint, on orders, an AMCOM Safety Office representative to the AMCOM RSC.

(6) Serve as Chairperson of the AMCOM RSC, calling and presiding at yearly and special meetings.

(7) Ensure that adequate resources, equipment, and facilities are available to support the Radiation Safety Program.

(8) Provide policy guidance for review and evaluation of the use of radioactive materials in AMCOM systems to ensure procurement contracts adequately identify radioactive material, adequate NRC licensing and ARAs are obtained, and adequate warnings and instructions are provided in systems operational manuals and on equipment, where appropriate.

d. The AMCOM Radiation Safety Officer will:

(1) Implement and administer the AMCOM Radiation Safety Program.

(2) Advise the Commander, AMCOM, and RSC on the status of compliance with NRC licenses, ARAs, and ARPs.

(3) Provide technical guidance and assistance to ensure compliance with Federal and DA regulations and directives.

(4) Perform or cause to be performed, radiation surveys as required by NRC license, ARAs, ARPs, Federal and Army regulations, and directives.

(5) Ensure the proper issuance, usage, and evaluation of personnel dosimetry to monitor radiation exposures.

(6) Maintain copies of all NRC licenses, ARAs, and ARPs covering the possession, use, or storage of ionizing radiation sources on Redstone Arsenal.

(7) Ensure radiation workers receive radiation safety training commensurate with the hazards experienced in the work place.

(8) Maintain an inventory of radioactive material and radiation-producing devices at Redstone Arsenal. Obtain copies of tenant and contractor activities inventories and



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provide to AMCOM Security, Fire Department, and other appropriate AMCOM offices/directorates.

(9) Provide staff review and concurrence on local regulations, SOPs, and policies relating to radiation safety.

(10) Ensure radiation protection records are maintained in accordance with appropriate Federal, Army, and AMCOM regulations.

(11) Ensure accidents, incidents, injuries involving radiation (ionizing or nonionizing), overexposure of personnel, and loss of radiation sources are investigated, evaluated, documented, and reported in accordance with Federal, Army, AMC, and local regulations.

(12) Coordinate and prepare AMCOM applications, renewals, and amendments to NRC licenses and ARAs. Provide guidance and review in preparation and submission of contractor requests for ARPs.

(13) Ensure radioactive material movement, shipments, and receipt functions are conducted in accordance with Federal, Army, and AMCOM regulations.

(14) Coordinate the consolidation of radioactive waste disposal at Redstone Arsenal. Provide guidance to waste generators concerning packaging for storage pending disposal. Request disposal instructions from the Chief, Army Low Level Radioactive Waste Disposal Division, US Army Operations Support Command, Rock Island, IL.

(15) Provide annual report of radiation exposures to individual radiation workers.

(16) Provide information regarding the prenatal exposure risks and concerns to the developing embryo or fetus to females occupationally exposed to ionizing radiation (NRC Regulatory Guide 8.13).

(17) Serve as member of AMCOM RSC and representative to tenant RSCs as appropriate.

(18) Provide Radiation Safety Program support to tenant activities without health physics staff.

(19) Provide concurrence to Foreign Military Sales cases identifying radioactive material.

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(20) Maintain authority to order suspension of any activity involving radiation or radioactive material believed to be a potential threat to the health or safety of AMCOM personnel or property.

(21) Review and approve in writing the selection of each local Laser Safety Officer (LSO) as required.

(22) Monitor all AMCOM laser operations and provide guidance in matters pertaining to laser safety.

(23) Conduct periodic evaluations of laser safety programs to ensure compliance with regulations and SOPs.

e. The Alternate AMCOM Radiation Safety Officer will:

(1) Assist the RSO to ensure the safe conduct of radiation operations and compliance with this regulation.

(2) Perform the duties of the RSO in his absence or nonavailability.

(3) Serve as a member of the AMCOM RSC.

f. The AMCOM Radiation Safety Committee will:

(1) Consist of the following members and their alternates:

(a) Chairperson, Chief, AMCOM Safety Office.

(b) AMCOM Radiation Safety Officer.

(c) AMCOM Alternate Radiation Safety Officer.

(d) AMCOM Safety Office representative.

(e) Medical Department representative.

(f) Representative from each AMCOM activity using ionizing and nonionizing radiation sources.

(g) Radiation Safety Officers from the tenant activities having a Radiation Safety Program.

(h) AMCOM Environmental Office representative.

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(i) GOCO and civilian contractor representatives.

(j) Other persons as deemed necessary.

(2) Act as an advisory committee for the Commander, AMCOM, concerning all matters pertaining to the AMCOM Radiation Safety Program. Personnel appointed to the committee shall be knowledgeable, either through training or experience, in the safe use of radioactive materials and radiation-producing devices (ionizing and nonionizing).

(3) Perform the following duties:

(a) Recommend to the Commander, AMCOM, policies on the safe use, handling, storage, transport, receipt, shipment, and disposal of sources of ionizing and non-ionizing radiation.

(b) Review applications for all NRC licenses, ARAs, and ARPs submitted by AMCOM, tenant activities and contractors. Monitor programs, as necessary, to ensure compliance with applicable regulations. Ensure radiological operations and activities of tenant activities and contractors do not endanger personnel, facilities, or the environment for which the Commander, AMCOM is responsible. The RSO and Chairperson may perform review for the committee.

(c) Review the radiation safety aspects of proposals for the procurement and use of sources of radiation, to include modifications to existing radiological operations, radiological permit applications, and operating procedures. The RSO and Chairperson may perform review for the committee.

(5) Meet at least once each calendar year and as called by the Chairman. Minutes of the meetings will be provided to the Chief of Staff, AMCOM, for review and will be maintained in accordance with AR 25-400-2. At least three committee members shall constitute a quorum empowered to act for the full committee. These members will be the Chairperson, or Alternate, the AMCOM RSO, and an AMCOM Safety Office member.

g. AMCOM radiation safety supervisors will:

(1) Prepare and implement Standing Operating Procedures (SOPs) for all operations that use radioactive material or radiation-producing devices.

(2) Enforce the provisions of this regulation, SOPs and special precautions applicable to their operations.

(3) Ensure personnel working with radiation wear appropriate dosimetry devices to monitor radiation exposure when deemed necessary.

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(4) Ensure personnel working with radioactive material or radiation producing devices receive required training before any potential exposure.

(5) Maintain a current inventory of all radioactive materials and radiation devices used within their area.

(6) Secure all radioactive materials and sources of radiation against loss or unauthorized use.

(7) Not allow personnel to eat, drink, smoke, chew tobacco or gum, or apply cosmetics in an area where radioactive materials are used or stored.

(8) Notify the AMCOM RSO immediately in the event of an accident, incident, injury involving radiation, overexposure of personnel, or loss of a radiation source.

(9) Ensure transients in radiation areas comply with applicable requirements of this regulation and SOPs and are aware of the potential hazard to which they may be exposed.

(10) Ensure radiation detection instrumentation used is properly maintained and calibrated in accordance with NRC, DA, and AMC regulations and directives.

### h. AMCOM radiation workers will:

(1) Know and comply with the requirements of this regulation, SOPs, and special instructions, written or verbal, applicable to their work with radioactive material or radiation-producing devices.

(2) Wear the appropriate dosimetry device(s) (thermoluminescent dosimeter (TLD), pocket dosimeter) and report promptly, in writing, circumstances incident to the loss of a TLD device to their supervisor and the AMCOM RSO.

(3) Not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in an area where radioactive materials are used or stored.

(4) Immediately report to their supervisor any discrepancies in radiation safety procedures, accidents, incidents involving radiation, cases of suspected overexposure, or loss of radiation sources.

(5) Prevent the spread of contamination by the use of protective clothing, such as gloves, where appropriate.

### i. The AMCOM Environmental Coordinator will:

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(1) Provide guidance in the development of environmental documentation in support of the use of radioactive material.

(2) Provide a representative to the AMCOM RSC.

j. Commander, US Army Medical Activity (MEDDAC), will:

(1) Maintain capability to provide on-site radiation safety support following radioactive material contamination accidents and incidents.

(2) Provide medical care for all Army personnel who are injured due to overexposure to ionizing or nonionizing radiation.

(3) Provide a representative to the AMCOM RSC.

k. Director, Security Assistance Management Directorate, will:

(1) Request assistance from the AMCOM RSO in the identification of items containing radioactive material offered for foreign military sales.

(2) Provide Foreign Military sales (FMS) cases offering radioactive material to the AMCOM RSO for review and concurrence.

l. AMCOM Contracting Officers will: Notify the AMCOM RSO before processing acquisitions of items containing radioactive material or devices capable of producing radiation.

m. Project/Systems offices will:

(1) Coordinate plans for the use of radioactive material with the AMCOM Safety Office/RSO and initiate action for securing the appropriate NRC license or ARA.

(2) Ensure specifications and drawings for radioactive commodities and components comply with 10 CFR Part 20.1901, 1904, 1905 for marking and labeling requirements and quality assurance provisions specified in current NRC licenses where applicable.

(3) Ensure all contracts and leases contain the requirement to restore installation property to NRC criteria for unrestricted use.

n. Acquisition Center and Research, Development and Engineering Center (RDEC) Contracting Offices will:

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(1) Ensure the appropriate Federal Acquisition Regulation (FAR) and Defense Acquisition Regulation (DAR) clauses and requirements are included in all contracts.

(2) Ensure appropriate NRC licenses or ARAs have been obtained prior to contract award.

o. Integrated Materiel Management Center (IMMC) will:

(1) Coordinate supply management actions as necessary to ensure the same national stock numbers will not apply to radioactive and nonradioactive items in the Federal Supply System, or to radioactive items having the same functional task but possessing different radionuclides.

(2) Establish and maintain appropriate data to identify applicable items as radioactive. Incorporate radioactive identification data, such as Special Control Item and Demilitarization codes, with item management data and disseminate through the supply cataloging system.

(3) Issue instructions for maintenance, rebuild, rework, demilitarization and disposal of unwanted radioactive items of issue.

(4) Ensure adherence to 10 CFR Part 20.1901, 1904, 1905 for marking and labeling requirements in changes to specifications and drawings for radioactive commodities and components.

(5) Maintain accountability of AMCOM managed radioactive items of issue to include annual inventories to ensure that possession limits prescribed by NRC license and ARAs are not exceeded in CONUS supply.

(6) Ensure specific instructions, procedures, and warnings on handling, storing, and disposal of radioactive commodities are incorporated into technical publications and other appropriate publications.

## 6. IONIZING RADIATION PROCEDURES.

a. Use:

(1) Operations that have been approved to use and possess radioactive material or radiation-producing devices under an AMCOM NRC License, an ARA (Army Radiation Authorization), or an ARP (Army Radiation Permit) will comply with all conditions of the appropriate license, authorization, or permit, as appropriate.

(2) Refer to AR 11-9, The Army Radiation Safety Program (28 May 1999), Chapters 2-2, 2-3 and 2-4, for specific instructions on NRC licenses, ARAs, and ARPs.

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### b. Receipt, Shipment, Transfer and Turn-In of Radioactive Material and Radioactive Waste:

(1) The AMCOM RSO or his designee will maintain supervisory control for monitoring radioactive material packages IAW Department of Transportation (DOT), NRC and other appropriate regulations and directives.

(2) The Director of Logistics, Redstone Arsenal Support Activity (RASA) will notify the AMCOM RSO in advance of anticipated shipments and receipts of radioactive material.

(3) Incoming radioactive material/devices will be checked for damage prior to storage or use. Damaged and/or leaking shipments will be reported to the AMCOM RSO. Individuals receiving radioactive packages will contact the AMCOM RSO for instructions when the package is to be opened. The AMCOM RSO or his designee will:

- (a) Conduct a radiation survey and wipe test on the package as appropriate.
- (b) Complete a radioactive material receipt document.

(4) Those activities having dedicated RSOs, i.e., US Army Test Measurement and Diagnostic Equipment Activity, Defense Logistics Agency, Missile and Space Intelligence Center, will be notified for specific guidance for disposition of packages.

(5) A Radioactive Material Movement Form completed by the AMCOM RSO or his designee will normally accompany a shipment of radioactive material. This form will contain radiation survey information, packaging and labeling instructions, and will be part of the shipping record.

(6) A Radioactive Material Movement Form completed by the AMCOM RSO or his designee will accompany turn-in of radioactive material and radioactive waste. The AMCOM RSO or his designee will inspect all radioactive material and radioactive waste and provide specific handling and/or packaging instructions as appropriate.

(7) On-post movement of radioactive material will normally be accomplished by government vehicle. The radiation dose rate will be less than 2 milliroentgen per hour in any occupied area of a vehicle.

(8) Unless prohibited by an NRC license, radioactive material may be moved in packages not approved by DOT if the move is within installation boundaries and under the immediate supervision of the AMCOM RSO or his designee.


(9) The Defense Reutilization and Marketing Office (DRMO) will be surveyed quarterly by the AMCOM RSO or his designee.

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### c. Radioactive Waste.

(1) A central storage and collection area will be designated for radioactive waste. This area should be selected to minimize the risk to personnel and property. The AMCOM RSO will approve the collection area and waste container.

(2) The use of radioactive material shall be well planned and efforts taken to generate a minimum of radioactive waste.

(3) The selection of a waste collection container should be based upon the rate the waste is generated in the work area and should be no larger than what would accumulate in a reasonable collection period. The collection period will be determined by usage/generation rates to limit the amount of waste stored in the work area. Containers should be painted yellow, have a magenta or black radiation tre-foil symbol (  ) and be marked "Caution: Radioactive Material."

(4) The contents of the waste collection container must be identified by isotope, level of radioactivity, and date measurements were taken. This information shall be recorded as the waste is deposited in the collection container, both on the item or package of waste and a log or list of the contents of the container. This monitoring is in addition to the container and storage area monitoring.

(5) Areas where radioactive waste collection containers are stored should be monitored periodically for radiation levels, outside surface area contamination and container integrity.

(6) As the waste collection container is filled near its capacity, a request for turn-in should be initiated and the AMCOM RSO or his designee contacted for inspection of the contents and container. Instructions for the movement of the container will be provided at that time.

(7) Radioactive waste will be collected and consolidated at a central storage location at AMCOM. The AMCOM RSO will coordinate the disposal and requests for disposal instructions through the US Army Operation Support Command, Rock Island, IL.

### d. Surveys and Leak Tests:

(1) The AMCOM RSO or his designee will conduct routine surveys of radiation operations under representative conditions.

(2) Surveys will be performed using an "ACTIVE" survey meter, leak/swipe testing and/or air sampling, as appropriate, to assess radiation and contamination levels. Survey instruments will be calibrated in accordance with TB 43-180.



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(3) Leak tests on sealed radioactive sources will be conducted annually or semi-annually as required by NRC licensing, or federal regulations if there is no applicable NRC license.

(4) Leaking sources will be removed from use and be subject to repair or disposal. Leaking sources will be double-bagged and placed in an appropriate storage location until repair or disposal can be accomplished. Contamination of 0.005 microcuries or more will be considered evidence of a leaking source. The AMCOM RSO will take appropriate action concerning notification of the NRC, if required.

### e. Reporting Noncompliance/Safety Defects under 10 CFR 21.

(1) The provisions of 10 CFR 21 will be followed by all NRC licenses activities in defining and reporting noncompliance with NRC requirements and safety defects. 10 CFR 21 applies to the following:

(a) NRC Byproduct Material Licenses.

(b) NRC Source Material Licenses.

(c) NRC Special Nuclear Material Licenses.

(d) Organizations authorized by specific licenses to package and offer to carrier licensed radioactive material for transport.

(e) Elements that receive, store, use, distribute, or dispose of radioactive commodities authorized by another organization's specific NRC license.

(f) Activities involved in contracting for NRC licensed commodities or suppliers of safety-related parts, services, or consultation for NRC licenses activities.

(g) Organizations that evaluate radiation safety defects, hazards, or noncompliance.

(2) The determination of whether a substantial safety hazard exists will be based on an evaluation using the criteria in NUREG-0303 (Rev 1) and coordination with the AMCOM RSO and the NRC license manager where appropriate. A substantial safety hazard means the loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety for any licensed facility or activity. The term "public health and safety" includes both members of the public as well as license worker/employees. This hazard may present itself in the form of a defect, deviation, or condition of noncompliance.

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(3) Contracts for NRC licensed materials or for safety-related services, hardware or consultation will contain the statement that 10 CFR 21 applies to alert the contractors to their responsibilities.

(4) The following items will be posted in a conspicuous location in the work area where NRC licensed material is used.

(a) Copies of 10 CFR 19, 10 CFR 20, and 10 CFR 21.

(b) NRC Form 3.

(c) The Energy Reorganization Act of 1974, Section 206.

(d) Written procedures containing notification procedures implementing the requirements of this section.

(e) If posting the documents indicated in 4(a) and 4(d) above is not practical, a notice may be posted indicating where these documents may be reviewed.

(5) A suspected defect or noncompliance to 10 CFR 21 must be promptly evaluated to determine if a substantial safety hazard exists. The following reporting procedures are to be followed:

(a) The individual who discovers a defect or becomes aware of a condition of non-compliance involving NRC licensed material will immediately notify his immediate supervisor, or, in the supervisor's absence, his next line supervisor.

(b) The supervisor receiving the notification of the defect, deviation, or condition of noncompliance will immediately provide the following information to the AMCOM RSO:

(1) Name, organization, and phone number of the individual who made the initial report.

(2) The nature of the defect, deviation, or condition of noncompliance.

(3) The date and time the defect, deviation, or condition of noncompliance was identified.

(4) The nature of the operation being conducted at the time of the defect, deviation, or condition of noncompliance was identified.

(5) Any action taken to correct the defect, deviation or condition of noncompliance

(6) Any suspected or actual exposure of personnel to excess levels of radiation.

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(7) The AMCOM RSO will request any additional information deemed necessary and will provide the Commander, AMCOM, with all data needed for analysis of the potential for a substantial safety hazard and submission of a report in accordance with 10 CFR 21. A report will be submitted within two days of the determination that 10 CFR 21 applies to the Regional Office of Inspection and Enforcement, NRC, as listed in 10 CFR 20. AMCOM users of items licensed to other MACOMs will immediately report 10 CFR 21 issues to the AMCOM RSO for evaluation and potential notification to the licensee, who will initiate reporting to the NRC.

### f. Emergency Procedures.

(1) Radiation incidents/accidents as defined by AR 385-10 and AR 385-40 will be reported to the AMCOM RSO and followed by the appropriate investigation and reporting procedures.

(2) The following will apply to any event where a radioactive source is damaged or is suspected of leaking:

(a) Evacuate all personnel not directly involved in control of contamination and clean up of the area.

(b) Turn off all radiation producing devices and ventilation equipment if airborne contamination is known or suspected.

(c) Secure the area to prevent unauthorized entry.

(d) Contact the AMCOM RSO and emergency response personnel immediately.

(e) Personnel with minor wounds will be decontaminated prior to leaving the controlled area. In the event the individual must be transported immediately for medical treatment, the person will be accompanied by the AMCOM RSO or other designated individual to provide continued monitoring and decontamination.

(f) Decontamination of personnel and property will be accomplished under the supervision of the AMCOM RSO or other designated individual prior to release in accordance with current established permissible contamination limits.

(3) In the event of a fire or explosion, paragraph (2)(a) through (f) applies in addition to the following:

(a) Personnel at the scene will be moved up wind from the source taking all necessary precautions to avoid exposure to potential airborne contaminants.

(b) If possible, remove all radioactive sources and devices from the area.

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### (4) Exposure of Personnel.

(a) The AMCOM RSO will be notified immediately of any known or suspected overexposure, either external or internal, that is in excess of current radiation exposure criteria. The AMCOM RSO will investigate reports of overexposure and the individual referred to the appropriate medical facility for evaluation.

(b) Any known ingestion, inhalation, or absorption of radioactive materials will be treated as an emergency. The MEDDAC will be notified for immediate investigation of the incident. Radiological first aid will be administered as necessary. Arrangement for bioassay will be made by the MEDDAC in consultation with the AMCOM RSO. Upon evaluation, the AMCOM RSO will provide consultative services to medical personnel.

(c) Clinical management of overexposures will be the responsibility of the MEDDAC. The AMCOM RSO will provide consultative services to medical personnel.

### g. Industrial X-Ray Facilities.

(1) Industrial radiation operations will not be installed or modified without prior approval of the AMCOM RSC. Requests for approval of proposed facilities or modifications to existing facilities will be provided to the AMCOM RSO and include the following:

(a) Location and proposed facility drawings showing wall thickness, construction materials, etc.

(b) Tube voltage and current of equipment.

(c) Projected workload, i.e., number of exposures per week, exposure duration and number and type of people (occupational radiation workers, office workers, etc.) potentially exposed to the x-rays.

(d) Interim standing operating procedures.

(e) Data required for new radiation workers.

(f) Qualifications of each person who will operate or supervise the operation of the x-ray equipment.

(g) Any further information deemed necessary by the AMCOM RSO.

(2) Proposals for new or modified facilities will be reviewed by the AMCOM RSC and provided to the appropriate authorities for review and approval as required by

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AMCR 385-100. Approval must be obtained prior to commencing construction or modification.

(3) Industrial x-ray facilities will be classified and governed by procedures and conditions of the facility's NRC license, ARA, and NBS Handbook 107, 111 or applicable ANSI standards as appropriate.

(4) Radiation protection surveys by a qualified expert must be performed on all new or modified facilities before being placed into operation. Operating supervisors will notify the AMCOM RSO to coordinate scheduling of the survey.

(5) Surveys of permanent industrial facilities should be performed in the initial activation of the facility, any time there is a change or modification of x-ray producing equipment. Operation surveys will be performed on a monthly basis. Radiation surveys of nonpermanent field operations will be performed at each new field setup.

(6) Operations will not be conducted if radiological safety devices are not functioning.

(7) All radiation workers and transients, where appropriate, will wear personnel monitoring devices.

(8) Supervisors will ensure personnel do not receive radiation exposures in excess of the applicable standards. Overexposures will be reported to the AMCOM RSO.

(9) An approved SOP covering all phases of the operation will be available and all personnel will be familiar with its contents.

(10) X-rays may also be a potential hazard where operating voltages may exceed 15,000 volts on some equipment not intentionally designed or adequately shielded for that purpose. All such equipment should be identified to the AMCOM RSO for evaluation.

### h. Personnel Monitoring and Dosimetry Records.

(1) Occupational exposure to radiation will be maintained as low as reasonably achievable (ALARA) in accordance with NRC Regulatory Guide 8.10.

(2) An appropriate personnel monitoring device will be used in accordance with DA PAM 40-18 to monitor the exposure of each individual who is occupationally exposed to sources of ionizing radiation or who receives an accumulated dose equivalent of radiation in excess of five percent (5%) of the applicable basic radiation protection standard.

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(3) Bioassay will be used to monitor internal exposures when the potential exists for exposure to radiation from inhalation, ingestion, or absorption through the skin.

(4) The following dosimetry devices are currently used at AMCOM:

(a) Thermoluminescent dosimeter (TLD), whole body, wrist and ring.

(b) Pocket dosimeter (self-reading).

(5) TLDs will be used to obtain a permanent record of radiation exposure to the individual and will be maintained as part of the individual's permanent medical records.

(6) Pocket dosimeters permit the individual to monitor gamma or x-ray radiation exposure on a daily basis as a supplement to the TLD.

(7) Procedures for the use of TLD:

(a) TLDs are issued to individual workers and will be worn only by the individual to whom it is assigned.

(b) Persons who tamper with or intentionally expose dosimetry devices will be subject to disciplinary action.

(c) TLDs will be stored in an approved and designated storage area when not in use and during nonduty hours. A control badge will be maintained at this storage location throughout the wearing period.

(d) Lost or misplaced dosimeters will be reported immediately to the AMCOM RSO for issue of a replacement.

(e) Whole body personnel monitoring devices will be normally worn below the shoulder in the chest area, above the hips, and on the outside of clothing. The front of the TLD must be facing outward.

(f) Whole body TLDs, wrist and ring dosimeters will be worn in the proximity of the greatest potential for exposure.

(g) Dosimeters will be protected from environmental exposure such as excessive heat, moisture, direct sunlight, immersion in liquid, etc.

(8) Supervisors will, prior to assigning an individual to work in a radiation area:

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(a) Request dosimetry service by having the individual complete a DD 1952 Request for Dosimetry Service to include information pertaining to prior occupational radiation exposure for submission to the AMCOM RSO.

(b) Coordinate radiation worker training with the AMCOM RSO.

(c) Provide on-site, operation-specific orientation to the worker.

(d) Provide information to female radiation workers regarding the potential effects of radiation on an unborn fetus, including dose restrictions for declared pregnant female radiation workers. Regulatory Guide 8.13 will be made available to all female radiation workers.

Upon completion of these requirements, a dosimeter will be issued to the individual.

(9) At the end of each wearing period, dosimeters will be collected and replacements provided by the AMCOM RSO.

(10) Dosimeters will be forwarded to the US Army Ionizing Radiation Dosimetry Branch (USAIRDB) for analysis.

(11) Routine reports are provided in the form of Automated Dosimetry Reports (ADR). These records are reviewed and annotated by the AMCOM RSO on a quarterly basis and maintained for each individual radiation worker. Records for visitors and occasionally exposed individuals will be provided to the individual for inclusion in permanent medical records. Contractor employee records will be provided to the contractor through the contracting officer upon termination of employment as a radiation worker.

(12) Records for AMCOM radiation workers will be provided to MEDDAC for inclusion in the individual's permanent medical records.

(13) Each individual will be provided a copy of his exposure record on an annual basis.

(14) In the event of an overexposure, the USAIRDB will notify the AMCOM RSO by telephone or electronic means immediately upon identification. The supervisor and individual involved in the overexposure will be notified. The individual will then be reassigned outside the radiation area and referred to MEDDAC for evaluation. An investigation and evaluation of the overexposure will be conducted in accordance with AR 11-9.

i. Radioactive Material and Radiation Producing Device Inventory.

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(1) Users of radioactive material will identify and maintain an inventory of all radioactive material and radiation producing devices in their area.

(2) Completed inventories will be provided to the AMCOM RSO on an annual basis and provided no later than 30 September of each year. Additions and deletions will be provided as they occur. A compiled inventory of AMCOM and tenant activities will be provided to the Security Directorate, Fire Department, and other applicable directorates or activities.

### j. Standing Operating Procedures.

(1) Each licensee and supervisor responsible for operations involving the use of radioactive material and/or radiation producing devices will implement this regulation by enforcement of a Standing Operating Procedure outlining all precautions necessary to protect personnel and the environment from unnecessary exposure to ionizing radiation.

(2) Draft SOPs will be provided to the AMCOM RSO for review and comment and final approval prior to staffing. The draft SOP will be provided to the AMCOM RSC for review as appropriate.

(3) SOPs will be reviewed by the area supervisor every two years and revised as necessary.

(4) Area supervisors will ensure SOPs are conspicuously posted and/or available at the site of operation.

(5) NRC Form 3 and The Energy Reorganization Act of 1974 Section 206 must be posted in a conspicuous location at each radiation operation. In addition, the applicable SOP, this regulation, 10 CFR 19, 20, and 21, and copies of NRC licenses, ARAs, or ARPs must either be posted or a notice identifying the location where these items can be reviewed.

### k. Radioactive Materials in AMCOM Managed Weapons Systems/Commodities.

(1) Radioactive sources and/or radiation producing devices will be used only when it is determined that practical substitutes do not exist and they are necessary for the accomplishment of the assigned mission. The use of radioactive material will be evaluated to the extent that all nonradioactive materials are eliminated as replacement and the use of radioactive material is justified.

(2) Requests for the use of radioactive material in new items of issue and the modification of existing radioactive items of issue will be forwarded through the AMCOM Safety Office for review.



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(3) NRC licensing and/or ARAs for the use of radioactive materials will be obtained prior to procurement and testing. The appropriate transportation, marking and labeling, safety, control, storage, handling, disposal, and maintenance procedures will be established and incorporated into the applicable technical manuals, technical bulletins, and other pertinent publications. As a minimum, the warnings provided in these publications will include:

(a) A description of the radioactive item by NSN, type number, and nomenclature, including the radioisotope, chemical, and physical form, and the quantity of the radioactive material used in microcuries or curies (or becquerels or megabecquerels) and the radiation level in millirem/hr at surface and at one meter.

(b) Recommended procedures during installation, normal use, maintenance, storage, and shipment to protect personnel from excessive radiation.

(c) Recommended procedures in case of accident or incident, to minimize radiation hazards to personnel and prevent contamination of facilities.

(d) Requirements for recording radiation exposure of personnel and the use of personnel dosimetry.

(e) Instructions for disposal.

(4) Applications for NRC licensing and ARA for the use of radioactive material in items of issue will be coordinated with the AMCOM RSO as soon as practicable upon identification of its use.

### I. Facility Decommissioning.

(1) All AMCOM tenant activities and AMCOM license approved users will notify the AMCOM RSO prior to termination of operations. The AMCOM RSO will provide specific instructions for decommissioning a facility prior to releasing the building to the general public. Generally, the procedure will be as follows:

(a) A detailed report of the facility operational history will be prepared. The report will include copies of leak tests, radiation surveys, and an inventory of radioactive sources and devices used and/or stored at the facility.

(b) All radioactive material will be turned in or transferred prior to starting the survey. Equipment, worktables, and storage cabinets will be surveyed to determine the absence of residual and removable contamination prior to their removal from the controlled area.

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(c) The storage and use area(s) will be laid out in a grid format prior to starting the surveys. The survey will consist of an instrument survey and area wipe test. The number of area wipes will depend on the size of the facility.

(d) A diagram of the facility showing where survey measurements were taken shall be developed. Ensure all survey and area wipe locations are identified on the diagram.

(e) The survey package should be a stand-alone document. It is acceptable to refer to leak tests and dosimetry information that is maintained on file elsewhere, but this record should be as complete as possible.

(f) A complete copy of the survey will be submitted to Commander, US Army AMCOM, (AMSAM-SF-A), Redstone Arsenal, AL 35898-5000, for final review and approval. The AMCOM RSO will be the final approving authority for releasing a facility to the public for general use.

(2) Decommissioning Records. Each tenant facility shall maintain a decommissioning file for records that would be relevant to the decommissioning of the facility. The file should contain copies of the following records:

(a) Documentation of incidents or unusual occurrences involving the spread of contamination. The records should include any known information concerning the incident, such as the nuclide, quantity, form, concentration, and decontamination results.

(b) Copies of building diagrams and any modifications of structure and equipment in the restricted area.

(c) A list of the leak test results of sources located in the facility. The list should be updated every two years.

(d) A list describing the results of area surveys. The list should be updated every two years.

## 7. LASER RADIATION PROTECTION PROCEDURES.

a. Requirements. Fundamental safety requirements for laser systems, facilities, and operations are based on hazard classifications as defined in ANSI A136.1-1993, American National Standard for the Safe Use of Lasers. The full extent of control measures required must be determined on a case-by-case basis with consideration given to the hazard classification of the device, the environment in which it will be used, and the personnel associated with the laser operation.

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b. **Laser Classifications.** The ANSI Z136.1-1993 American National Standard for the Safe Use of Lasers will be used to derive the classification for Class 1, Class 2, Class 3 and Class 4 lasers.

c. **Laser Personnel Categories.**

(1) **Incidental Personnel.** Incidental personnel are those individuals working in an area whose work makes it unlikely they will be exposed to laser energy sufficient to damage the eyes. The local LSO will be responsible for identifying and placing personnel in this category.

(2) **Laser Personnel.** Laser personnel are those individuals who work routinely in laser environments and are identified as authorized operators. Engineering controls or administrative procedures, or both, ordinarily protect these individuals.

d. **Medical Surveillance Program.**

(1) Vision/ocular assessments are not required for personnel using Class 1, Class 2, Class 2a, or Class 3a lasers and laser systems. Routine vision screening for employment purposes may be required in accordance with Occupational Health guidelines.

(2) Vision/ocular assessments for personnel using Class 3b or Class 4 lasers and laser systems will be implemented using Personnel Categories and their specific requirements as follows:

(a) **Laser Workers** – Individuals who routinely work in laser environments and are identified as authorized operators by SOP for Class 3b or Class 4 laser operations will receive preplacement and termination employment assessments. Preplacement and termination assessments will follow protocol as determined by Occupational Health guidelines.

(b) **Incidental Workers** – Personnel working in an area whose work makes it unlikely that they will be overexposed to laser energy sufficient to damage their eyes or skin. Authorization for placing personnel in this category will be identified in the unit's SOP. These individuals will receive preplacement and termination of employment assessments following Occupational Health guidelines.

(3) In the event of a known or suspected laser overexposure for any class of laser, immediate medical examination is required.

e. **Laser Operations.**

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(1) Each organizational element having laser operations/devices Class 3 and above will maintain a current laser inventory within their area. The inventory will contain the information listed below. Copies of these inventories shall be provided to the AMCOM LSO NLT 30 Sep, who will use them to establish a consolidated inventory.

- (a) Location.
- (b) The manufacturer, model number, and serial number.
- (c) Responsible person and phone number.
- (d) Active medium and hazard classification.
- (e) The type of device (continuous wave or pulse).
- (f) Principle wavelength and optical density.
- (g) Beam Diameter (mm).
- (h) Beam divergence (mrad).
- (i) Avg. power output (W or mR).
- (j) Energy pulse (J).
- (k) PRF (HZ).
- (l) Pulse time.
- (m) Beam intensity ( $\text{W}/\text{cm}^2$  or  $\text{J}/\text{cm}^2$ ).
- (n) Laser application.

(2) The SOPs will govern the operation and maintenance of lasers. The SOP will address, in addition to safety precautions to avoid injury by laser light, any associated hazards such as chemical, electrical, cryogenic, fire, noise, and explosion hazards. The SOP will contain first aid instructions regarding injuries that could result from these hazards. First aid procedures will be developed in coordination with the local medical authority. First aid should not be attempted for damage produced by laser energy to human eye tissue.

(3) Personnel assigned to work with Class 3b or Class 4 lasers shall wear clothing which is free of highly reflective buttons, badges, emblems, or similar adornments.

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Rings, metal spectacle frames, and watches will not be worn if the possibility exists that they will inadvertently reflect the laser beam.

(4) Personnel working with potentially hazardous levels of laser radiation shall be furnished suitable laser goggles for the specific wavelength and optical density for the laser energy involved.

(5) Prior to using laser safety goggles, examine the goggles for visible defects. Any cracks, holes, or damage would indicate defects. Defective goggles will be discarded. If the goggles are designed to serve as impact resistant safety spectacles, replacement filter lenses should meet the requirement of the American National Standards Institute (ANSI Z87.1).

(6) Prior to working with lasers for the first time, all employees will receive full instructions on the proper use of the equipment and on the hazards associated with the equipment and the laser beam. A roster of authorized personnel for Class 3 and 4 lasers will be maintained at each laser.

(7) Electrical equipment operating at potentials in excess of the range of 10,000 to 15,000 volts may produce X-rays. The LOCAL RSO will be requested to determine if X-rays are produced. Personnel dosimeters will be worn in accordance with AR11-9, if required.

(8) An activated laser will not be left unattended except when required by a test and when precautions have been provided to prevent exposure to personnel.

(9) Personnel working with Class 3b and Class 4 lasers shall work with, or under the direct visual observation of, another person at all times while actively working with the laser. The two-man safety rule is indicated because these lasers present hazards (electrical, chemical, and explosive) which could cause unconsciousness.

(10) Additional practices and procedures for maintenance operations are as follows:

(a) Maintenance personnel should adhere strictly to the precautions outlined in TB 385-4.

(b) Only specially trained maintenance personnel will be permitted to work on laser systems.

(c) No maintenance should be performed on laser systems until the power is off and the residual charge in any power supply capacitor has been "bled-off." When maintenance must be performed on a "live" laser system, the laser output must be blocked or enclosed.

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### f. Laser Facilities.

(1) Questions concerning facility design should be referred to the AMCOM RSO. Drawings for the new facilities and/or facility modification should be forwarded to the AMCOM RSO at least 60 days prior to construction for safety evaluation and approval.

(2) All windows in a Class 4 laser facility should be covered to prevent passage of a hazardous beam into an uncontrolled area and to reduce reflective surfaces.

(3) Class 4 lasers whose beams are not totally enclosed should be operated in areas free from polished and reflective surfaces. Walls and ceilings will be finished with diffuse, nongloss material.

(4) Safety interlocks shall be provided at the entrances of Class 4 laser facilities to deny access to unauthorized personnel while the laser power supply is energized and the laser is capable of firing. A warning light with an explanatory sign shall be conspicuously placed on the outside wall of a closed room to alert personnel that the laser is in operation.

(5) Mechanical/electrical blocks or physical barriers shall be installed to prevent directing the beam of a Class 3b or Class 4 laser at an angle that could endanger personnel.

(6) The beam of a Class 3b or Class 4 laser shall be terminated by a material which is not highly reflective and which is fire resistant. The composition and thickness of the material will be determined for each laser prior to initial operation to ensure the target will not be penetrated. Asbestos shall not be used to terminate the beam.

(7) Adequate ventilation will be provided for laser operations which can produce accumulations of toxic or flammable gases or infectious fumes or which, in the event of an accidental discharge of coolant from a cryogenic system, can produce an oxygen deficiency.

### g. Laser Safety Training.

(1) The individual assigned as the LSO shall be provided training on the potential hazards (including bioeffects), control measures, applicable standards, medical surveillance (if applicable), and other pertinent information pertaining to laser safety. The training shall be commensurate with the highest class of laser under the control of the LSO.

(2) Safety training shall be provided to laser personnel who use Class 3a, Class 3b, or Class 4 lasers and laser systems.

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(3) Topics for inclusion in a laser safety-training program shall include, but not necessarily be limited to, the following:

(a) Fundamentals of laser operation, physical principles, construction, etc.

(b) Bioeffects of laser radiation on the skin and eyes.

(d) Nonradiation hazards of lasers (electrical, chemical, etc.).

(e) Relations of specula and diffuse reflections.

(f) Laser and laser system classification.

(g) Control measures.

(h) Overall management and employee responsibilities.

(i) Medical surveillance practices (if applicable).

(j) Required CPR for personnel servicing or working on lasers with exposed high voltages and/or the capability of producing potentially lethal electrical currents.

### h. Warning Signs and Labels.

(1) The word "Caution" shall be used with all signs and labels associated with Class 2 lasers and laser systems and all Class 3a lasers and laser systems that do not exceed the appropriate maximum permissible exposure (MPE) for irradiance. The word "Danger" shall be used with all other Class 3a and all Class 3b and Class 4 lasers and laser systems.

(2) A Class 2a laser or laser system shall have a label affixed with the following instructions: "Avoid Long-term Viewing of Direct Laser Radiation." The label does not require a warning symbol but must have the designation "Class 2a Laser" clearly visible during operation.

(3) The word "Radiation" on signs and labels may be replaced by the word "Light" for lasers operating in the visible range at wavelengths greater than 400 nm and equal to or less than 700 nm.

(4) Pertinent safety information may be included during the printing of a sign or label or may be handwritten in a legible manner and shall include the following:

(a) At position 1 above the tail of the sunburst, include all special precautionary instructions such as: Invisible Laser Radiation, Knock Before Entering, Do Not Enter

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When Light Is On, Restricted Area, etc. Additionally, protective actions that the reader should know will also appear in position 1. These actions include:

1 For Class 2 and Class 3a lasers and laser systems where the accessible irradiance does not exceed the approximate MPE bases on a 0.25 second exposure, the statement "Laser Radiation – Do Not Stare Into Beam or View With Optical Instruments."

2 For all other class 3a lasers and laser systems, "Laser Radiation – Avoid Direct Eye Exposure."

3 For all Class 3b lasers and laser systems, "Laser Radiation – Avoid Direct Exposure To Beam."

4 For Class 4 lasers and laser systems, "Laser Radiation – Avoid Eye or Skin Exposure To Direct Or Scatter Radiation."

(b) At position 2 below the tail of the sunburst, the type of laser (Ruby, Helium-Neon, etc.) or the wavelength, the pulse duration (if appropriate), and the maximum output should be listed.

(c) At position 3, list the class of the laser or laser system.

i. Disposal. Laser devices should not be sold to individuals not qualified to safely operate these devices. Local, state, and Federal laws restricting possession or transfer of lasers shall be followed when lasers are disposed. MILITARY EXEMPT LASERS CANNOT BE TRANSFERRED OUTSIDE OF DOD WITHOUT SPECIAL PERMISSION THROUGH THE DEPUTY UNDERSECRETARY OF DEFENSE (DOD 4160.21-M-1). Disposal of all lasers and laser systems shall be coordinated through the AMCOM RSO.

## 8. MICROWAVE AND RADIO FREQUENCY ELECTROMAGNETIC RADIATION SAFETY.

### a. Hazard Evaluation and Exposure Control.

(1) The Permissible Exposure Limit (PEL) for all personnel is 0.4 watts per kilogram (W/kg) whole body specific absorption rate (SAR) as averaged over any 6-minute period. Averaging is used to obtain the maximum exposure potential. Exposures separated by more than 6 minutes are considered separate physiological events under ANSI Standard C95.1 (1999).

(2) Derived equivalent PELs for restricted and unrestricted areas can be found in tables 1 and 2 of US Army Environmental Hygiene Agency Technical Guide No. 153.



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(3) Significant evidence has shown that a fetus is at no greater risk than the mother during a pregnancy: therefore, a fetus will not receive any greater exposure than the mother.

(4) The RFR equipment that radiates at frequencies below 1000 MHz and delivers less than 7 watts of radio frequency power to the radiating device is considered non-hazardous.

b. Medical Surveillance. There is no requirement for a medical surveillance program for RFR workers because there is no scientific basis or epidemiological evidence to suggest ocular surveillance is necessary.

### c. Investigation of Incidents.

(1) All incidents involving alleged or actual overexposure to RFR must be investigated and documented (refer to AR 40-400 and AR 385-40.)

(2) Investigations of incidents involving alleged or actual exposures of five times the PEL or greater must include, as a minimum, measurements of exposure levels, appropriate medical examination, a detailed description of the circumstances surrounding the incident, recommendations for medical follow-up, if necessary, and recommendations to prevent recurrence of the incident.

(3) If a known or suspected overexposure occurs, notify the AMCOM RSO by telephone as soon as possible after the incident or accident occurs.

(4) A copy of all investigations shall be forwarded to the AMCOM RSO no later than 20 days after the initial telephone notification.

d. The RFR Hazard Training. All occupational workers will receive RFR hazard training. Training will be conducted during basic technical training or before assignment to work areas involving RFR exposure. Personnel will be given annual refresher training to reemphasize training objectives. All training will be documented.

### e. RFR Hazard Warning Signs.

(1) The format for RFR hazard warning signs can be found in ANSI C95.1 (1999). Subdued signs are authorized for tactical use provided the general wording and layout of the sign adhere to ANSI C95.1 (1999).

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(2) The RFR hazard warning signs are required at all access points to areas in which RFR levels may exceed the PEL or derived equivalent PELs. Appropriate information will be inserted on the signs. Competent safety and occupational health professionals may waive this requirement when military operational considerations prevent posting of such signs.

(3) In areas where access to RFR levels greater than 10 times the PEL may exist, warning signs alone will not provide adequate protection. Other warning devices and controls, such as flashing lights, audible signals, fences, or interlocks, will be required depending on the potential risk of exposure.

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## APPENDIX A

### REFERENCES

1. AR 40-5 Preventative Medicine, 15 Oct 90
2. AR 11-9 The Army Radiation Safety Program, 28 May 99
3. AR 40-66 Medical Record Administration and Health Care Documentation, 03 May 99
4. AR 40-68 Quality Assurance Administration, 20 Dec 89
5. AR 40-400 Patient Administration, 12 Mar 01
7. AR 25-400-2 The Modern Army Recordkeeping System (MARKS), 26 Feb 93
8. AR 200-1 Environmental Protection and Enhancement, 21 Feb 97
9. AR 200-2 Environmental Effects of Army Actions, 23 Dec 88
10. AR 385-10 with AMC Supplement, Army Safety Program, 29 Feb 00
11. AR 385-16 System Safety Engineering and Management, 03 May 90
12. DA Pam 385-3 Protective Clothing and Equipment, 05 Mar 76
13. AR 385-40 with AMC Supplement, Accident Reporting and Records, 1 Nov 94
15. AMCR 385-25 Radiation Safety, 21 Jun 99
16. AMCR 385-100 Safety Manual, 26 Sep 95
17. AMC Pam 385-1 Fundamentals of Health Physics for the Radiation Safety Officer, 18 April 84
18. TB 43-180 Calibration and Repair Requirements for the Maintenance of Army Materiel, 1 Nov 98
19. TB 43-0116 Identification of Radioactive Items in the Army Supply System, 01 April 98
20. TB 43-0197 Instructions for Safe Handling, Maintenance, Storage and Disposal of Items Managed by US Army Armament Materiel Readiness Command

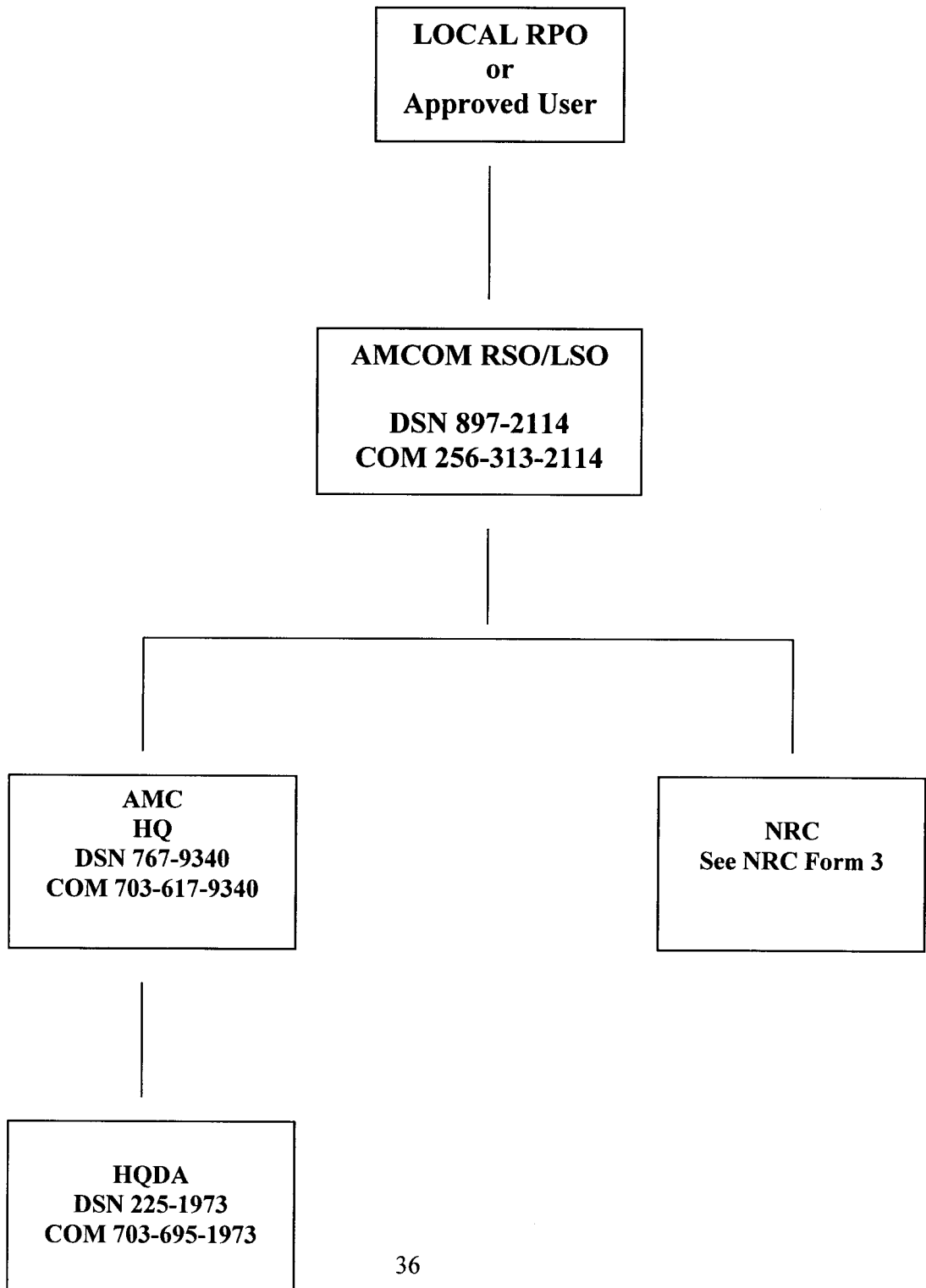
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21. TB 43-0108 Handling, Storage and Disposal of Army Aircraft Components Containing Radioactive Material
22. TB 385-4 Safety Precautions for Maintenance of Electrical/Electronic Equipment, 1 Aug 92
23. TB MED 523, Controls of Hazards to Health from Microwave and Radio Frequency Radiation and Ultrasound, 15 Jul 80.
24. MIL-STD 129J Military Standard, Marking for Shipping and Storage
25. SB 11-206 Personnel Dosimetry Supply and Service for Technical Ionizing Radiation Exposure Control, 31 May 80
26. TM 3-261 Handling and Disposal of Unwanted Radioactive Material
27. AMCOM Supplement to AR 385-16 Army Safety Program
28. AMCOMR 75-3 Control of Hazardous Type Materials Incident to Transportation, 31 July 2001
29. AMCOMR 200-2 Hazardous Waste Management Program, 16 Feb 94
30. AMCOMR 385-19 Processing Standing Operating Procedures for Hazardous Operations
31. AMCOM Pam 725-1 Installation Supply Accounting System Handbook
32. National Bureau of Standards Handbook 107 Radiological Safety in the Design of Particle Accelerators
33. National Bureau of Standards Handbook 111 Radiation Safety for X-ray Diffraction and Fluorescence Analysis Equipment
34. National Bureau of Standards Handbook 114 General Safety Standards for Installations Using Non-Medical X-ray and Sealed Gamma Sources, Energies up to 10 MeV.
35. Title 10 Code of Federal Regulations (CFR) Part 19, Notices, Instructions, and Reports to Workers: Inspection
36. Title 10 CFR Part 20, Standards for Protection Against Radiation
37. Title 10 CFR Part 21, Reporting of Defects and Noncompliance

AMCOMR 11-1 (APPENDIX A CONTINUED)

- 38. Title 29 CFR, Part 1910
- 39. Title 49 CFR Parts 170-189 Inclusively
- 40. NUREG-0303 (Rev 1) Reporting Noncompliance/Safety Defects Under Title 10 Code of Federal Regulations, Part 21
- 41. NRC Regulatory Guide 8.10, Operating Philosophy for Maintaining Occupational Radiation Exposure As Low As Reasonable Achievable.
- 42. NRC Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure.
- 43. NRC Regulatory Guide 8.29, Instruction Concerning Risks from Occupational Radiation Exposure.
- 44. USAEHA TG No. 153, Guidelines for Controlling Potential Health Hazards from Radio Frequency Radiation.
- 45. ANSI C95.1 (1999), Control of Hazards to Health from Microwave and Radio Frequency Electromagnetic Fields.
- 46. ANSI C95.3 (1991), Techniques and Instrumentation for the Measurement of Potentially Hazardous Electromagnetic Radiation at Microwave Frequencies.
- 47. ANSI Z136.1-1993, American National Standard for the Safe Use of Lasers.
- 48. DODI 6055.11 Protection of DOD Personnel from Exposure to Radiofrequency Radiation and Military Exempt Lasers, 06 May 1996.
- 49. ANSI Z87.1, American National Standard Practices for Occupational and Educational Eye and Face Protection.

APPENDIX B  
RADIATION INCIDENT NOTIFICATION TREE  
(MINIMUM KEY CONTACTS)



APPENDIX C  
INTERNAL RADIATION SAFETY AUDIT WORKSHEET

1. Date

2. Location(s)      Building No. \_\_\_\_\_

Room No. \_\_\_\_\_

3. Authorized User(s)

|  |  |
|--|--|
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

4. Describe scope of lab use (Nuclide, form, frequency, purpose, etc.)

|  |
|--|
|  |
|  |
|  |
|  |
|  |

5. Training

a. Frequency: \_\_\_\_\_ Conducted By: \_\_\_\_\_

b. Does each radiation worker understand safety practices?      ( ) Y    ( ) N

6. Do you have an AMCOM RSO approved SOP?      ( ) Y    ( ) N

7. Is the date on your SOP greater than 5 years?      ( ) Y    ( ) N

AMCOMR 11-1 (APPENDIX C CONTINUED)

Remarks:

8. Surveys

a. Types of surveys performed. Circle appropriate survey (daily, weekly, monthly, etc.).

b. Is instrumentation properly calibrated and used? ( ) Y ( ) N

c. Are records maintained: trigger levels established, area diagram, instrument used, individual performing survey, results in proper units, decontamination performed as necessary, etc. ( ) Y ( ) N

Remarks:

9. Receipt and Transfer

a. Are incoming packages properly surveyed? ( ) Y ( ) N

Is there a radioactive material movement form for each shipment and receipt?  
( ) Y ( ) N

b. Are shipment records maintained? ( ) Y ( ) N

Remarks:

10. Personnel Dosimetry.

a. Is appropriate dosimetry assigned and worn? ( ) Y ( ) N

b. Are annual results provided to radiation workers? ( ) Y ( ) N

11. Handling Waste

a. Are procedures followed? ( ) Y ( ) N



AMCOMR 11-1 (APPENDIX C CONTINUED)

- b. Proper storage (area, containers, labeling, etc.)? ☐ Y ☐ N
- c. Do you generate liquid waste disposal? ☐ Y ☐ N  
Do you generate solid waste disposal? ☐ Y ☐ N
- d. Do you compact waste? ☐ Y ☐ N
- e. Do you discharge liquid waste in the sanitary sewer? ☐ Y ☐ N
- f. Are records maintained? ☐ Y ☐ N

Remarks:

12. Have you conducted a semiannual inventory? ☐ Y ☐ N
13. Have you submitted a copy of your inventory to AMCOM RSO? ☐ Y ☐ N
14. Do you maintain copies of your records? ☐ Y ☐ N

Remarks:

15. Storage and use of Radioactive Material (RAM)

- a. Adequate method to prevent unauthorized access? ☐ Y ☐ N
- b. Are all keys to rooms and sources under the control of the RPO? ☐ Y ☐ N
- c. Condition of area acceptable? ☐ Y ☐ N
- d. No eating, drinking, or smoking in use/storage areas? ☐ Y ☐ N
- e. No food, drink, or personal items stored in use/storage areas? ☐ Y ☐ N
- f. Use of shielding/distance while using/storing material? ☐ Y ☐ N
- g. RAM is under surveillance and control when not in storage in an unrestricted area? ☐ Y ☐ N

AMCOMR 11-1 (APPENDIX C CONTINUED)

Remarks:

16. Posting and labeling

- a. NRC-3 "Notice to Workers" ( ) Y ( ) N
- b. Parts 19, 20, 21, section 206 of Energy Reorganization Act, procedures for part 21, and license documents or a notice indicating where documents can be examined? ( ) Y ( ) N
- c. Other posting and labeling requirements met? ( ) Y ( ) N

APPENDIX D  
FORMAT FOR LASER OR HIGH INTENSITY OPTICAL SOURCE SOP

This appendix is intended to suggest areas that should be included in unit SOPs. This list is not necessarily complete, but will serve as an aid to ensure all requirements for safe laser operations are included in the SOP.

- a. Purpose.
- b. Scope: Laser(s) or high intensity optical sources covered by the SOP.
- c. Responsibilities.
- d. Description of laser(s). Includes information specified in Laser/High Intensity Optical Source inventory.
- e. Description of facilities: ambient light conditions; target area (including buffer zones, beam backstop, enclosures); ventilation; warning signs and lights; interlocks; and associated hazards, such as electrical, mechanical, hydraulic, pneumatic, ionizing radiation, noise, toxic materials, cryogenics, asphyxiants, etc.
- f. Preoperational procedures; personnel control including authorized users and exclusion of unauthorized personnel and interlock description and checkout.
- g. Shutdown procedures.
- h. Maintenance procedures.
- i. Additional information: Required laser eye wear (optical density for specific wavelength), skin protection, safe viewing distance of beam and of diffuse reflection, and first aid procedures.

## APPENDIX E GLOSSARY

Except as indicated, definitions of technical terms in Glossary: Title 10, Parts 19 and 20, Code of Federal Regulations; Title 21, Food and Drugs, Chapter 1, Subchapter J, Radiological Health, Part 1040; Performance Standards for Light-Emitting Products (Federal Standards), Technical Bulletin Medical (TB MED) 524, TB MED 523, and USAEHA Technical Guide No. 153 will be used in the interpretation of this directive.

1. Activity (Radioactivity) – The number of nuclear transformations occurring in a given quantity of material per unit time. The unit of measurement is the curie (Ci) or becquerel (Bq).
2. ADR – Automated Dosimetry Report – The computerized report provided by the AIRDC that shows a record of individual radiation exposure.
3. AIRDB – US Army Ionizing Radiation Dosimetry Branch.
4. ALARA – An acronym for “As Low As Reasonably Achievable” refers to an operating philosophy in which occupational radiation exposures are reduced as far below specified limits as is reasonably achievable.
5. Bioassay – The analysis of excreta, urine, blood samples, whole body counting or other means of collecting biological data to determine internal radiation exposures.
6. Byproduct Material – Any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material.
7. Calibration – The determination of a measuring instruments variation from a standard which is traceable to the National Bureau of Standards to ascertain necessary correction factors or acceptability of detection capability within a specified error range.
8. Commodity (Radioactive) – An item of government property composed in whole or in part of a radioactive material to which a National Stock Number (NSN) or part number has been assigned. A radioactive commodity is any item in the DOD Supply System that contains radioactivity equal to or greater than quantities listed in 10 CFR 20, or contains a specific activity greater than 0.002 microcuries per gram of radioactive material (49 CFR) and is license exempt.
9. ARA – Army Radiation Authorization
10. ARP – Army Radiation Permit

## AMCOMR 11-1 (APPENDIX E CONTINUED)

11. Decontamination – The reduction or removal of radioactive contamination from any given surface.

12. Dose – A general term denoting the quantity of radiation or energy absorbed.

13. Dose Equivalent – The product of absorbed dose, quality factor, and other necessary modifying factors used to obtain an evaluation of the effects of radiation received by exposed persons so that the different characteristics of the exposure are taken into account.

14. Dosimeter – A device used to detect and measure an accumulated dose of radiation, e.g., personnel dosimetry badge or self-reading pocket dosimeter.

15. Exposure (Occupational) – Exposure to ionizing radiation incurred by an employee whose duties may result in such exposure. It does not include exposures that are incident to medical diagnosis, therapy, or background radiation.

16. Internal Radiation Hazard – Exposure resulting from deposition of radioactive material within the body through inhalation, ingestion, or absorption through the skin.

17. Ionizing Radiation – Electromagnetic or particulate radiation capable of producing ions, directly or indirectly in its passage through matter. For the purpose of the regulation, alpha and beta particles, gamma rays, x-rays, and neutrons are examples of ionizing radiation. This type of radiation does not include radio waves, infrared, visible, or ultraviolet light, or lasers.

18. Leak Test – A determination of the integrity of a sealed source encapsulation by measurement of the amount of radioactive material escaping the encapsulation.

19. Rad – The unit of absorbed dose equivalent to 0.01 J/Kg in any medium.

20. Radioactive Material – Any material or combination of materials that emit ionizing radiation. This includes natural elements such as radium and accelerator-produced radionuclides.

21. Radiation Producing Device – Materials, equipment, or devices which generate or are capable of generating ionizing radiation including (1) naturally occurring radioactive material, (2) by-product materials, (3) source materials, (4) special nuclear materials, (5) nuclear reactors, (6) radiographic and fluoroscopic equipment, (7) particle generators and accelerators, and (8) radiofrequency generators such as klystrons and magnetrons which produce x-rays.

22. Rem – The special unit of dose equivalent numerically equal to the absorbed dose in rad multiplied by the quality factor and any other necessary modifying factors.

AMCOMR 11-1 (APPENDIX E CONTINUED)

23. Sealed Source – Any radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent the release or dispersal of such radioactive material under the most severe conditions that may be encountered in normal use and handling.

24. Source Material – Uranium or thorium, or any combination thereof, in any physical or chemical form. It also includes any ore that contains by weight one-twentieth of one percent (0.05%) or more of uranium, thorium, or any combinations thereof. Source material does not include special nuclear material.

25. Special Nuclear Material – Plutonium, Uranium 233, uranium enriched in the isotope 235, and other material the NRC determines to be special nuclear material, or any material (except source material) artificially enriched by and of the foregoing.

26. TLD – Thermoluminescent Dosimeter

27. LASER – Light Amplification by Stimulated Emission of Radiation.

28. Laser System (LS) – An assembly of electrical, mechanical, and optical components that include one or more lasers. This definition includes weapon systems for which there are individual development or acquisition efforts by separate developers to produce component laser devices. For example, a tank equipped with a laser range finder is a “laser system.”

29. Exempt Laser System (ELS) – A laser system that has been given an exemption from the Federal standard by an agency of the Department of Defense whose use and disposal are strictly controlled. See AR 11-9.

30. Laser Safety Officer (LSO) – An individual designated by the major subordinate commander/chief and approved by the AMCOM RSO; who is qualified by virtue of education and/or experience to make informed judgments regarding safety control measures needed for laser operations. An LSO will be appointed when a facility possesses a Class 3 or Class 4 laser or a Class 1 enclosed laser or laser system. The LSO can be the Local RSO if so designated in writing.

31. Nominal Ocular Hazard Distance (NOHD) – The NOHD for direct intrabeam viewing is the minimum distance beyond which an unprotected individual may stand and view the beam and can be exposed repeatedly without injury, provided that one does not look at the laser with unfiltered optical devices. When viewing the collimated beam with a telescope or any other optically magnifying device, the hazardous range is greatly increased.

AMCOMR 11-1 (APPENDIX E CONTINUED)

32. Maximum Permissible Exposure (MPE) – The level of laser radiation to which a person may be exposed without hazardous effect or adverse biological changes in the eye or skin.

33. Accessible Emission Limit (AEL) – The maximum accessible emission level permitted within a particular laser class.

$$\text{AEL} = \text{MPE} \times (\text{area of limiting aperture})$$

34. Permissible Exposure Limit (PEL) – The maximum level expressed in absorption rate or derived equivalent power density, electric field strength, or magnetic field strength to which an individual may be exposed that will not cause detectable bodily injury according to present medical knowledge.

35. Specific Absorption Rate (SAR) – The time rate at which RFR energy is imparted to an element of biological body mass. It is usually measured in W/kg or normalized to incident power density in W/kg/mW/cm<sup>2</sup>.

36. Power Density – The amount of power per unit area in an electromagnetic field, usually expressed in mW/cm<sup>2</sup>

This is to acknowledge the receipt of your letter/application dated

6/29/2007, and to inform you that the initial processing which includes an administrative review has been performed.

*RENEWAL 578-1579*

☒ There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

☐ Please provide to this office within 30 days of your receipt of this card

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A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 140747.  
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You may call us on (610) 337-5398, or 337-5260.