

**BY ORDER OF THE COMMANDER    SCOTT AIR FORCE BASE INSTRUCTION 48-104**  
**SCOTT AIR FORCE BASE**



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*Aerospace Medicine*

***MAINTAINING EXPOSURES TO RADIATION  
AND RADIOACTIVE MATERIALS TO LEVELS  
THAT ARE AS LOW AS REASONABLY  
ACHIEVABLE (ALARA)***

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This instruction provides Scott AFB policy on a program that limits exposure of personnel to radiation sources including radioactive materials to levels As Low As Reasonably Achievable (ALARA); applies to Scott AFB tenants, civilian contractors, and other personnel who have been granted access to Scott AFB; summarizes and implements existing mandatory ALARA concepts found in federal, state, and Air Force Instructions and policies. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at <https://afrims.amc.af.mil/>. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional's chain of command.

***SUMMARY OF CHANGES***

This document has been revised to update the change in name from AFOSH (Air Force Occupational Safety and Health) to ESOH (Environmental, Safety, and Occupational Health) Council in 1.9.6., and change the ALARA investigation action levels for pregnant females to align with existing guidance ([Attachment 2](#)).

**1. Responsibilities and Procedures.**

1.1. The Installation Commander.

1.1.1. Issue and direct Scott AFB policy concerning ALARA procedures and the best management practices.

1.1.2. Appoints the Base Radiation Safety Officer (RSO) in writing.

1.2. **Other Agencies.** Includes the 375th Logistics Readiness Squadron (375 LRS), Aleut Facilities Support Services (AFSS), Base Supply Contractor, Director of Medical Logistics, and all other procurement agencies.

1.2.1. Ensure base RSO reviews any requests processed by their organization for procurement of radioactive materials and radiation-producing devices, including Class 3 and 4 lasers.

1.2.2. Ensure the base RSO is notified of proposed dates of shipment or receipt of radioactive materials as required by AFI 40-201, *Managing Radioactive Materials in the U.S. Air Force*.

1.2.3. Ensure the base RSO is notified immediately of any turn-in for disposal or reuse of suspected Radioactive Material (RAM).

1.3. **Squadron Commanders.**

1.3.1. Implement Scott AFB ALARA policies and actively promote ALARA concepts.

1.3.2. Issue and direct organizational policy concerning ALARA procedures and the best management practices.

1.3.3. If an organization is responsible for Radio Frequency (RF) emitters, appoint the organization's unit RSO for RF radiation in writing.

1.3.4. Appoint the permit RSO for the unit's RAM permits in writing.

1.3.5. Forward copies of these appointment letters to Bioenvironmental Engineering Flight (BEF).

1.4. **The 375th Contracting Squadron (375 CONS).**

1.4.1. Ensure all contract Statements of Work (SOW) have a clause preventing unauthorized RAM from being brought onto Scott AFB and will verify this clause is contained in the SOW prior to going out for bids.

1.4.2. Review functional activities requirements package to ensure the requirements have been reviewed by the base RSO when delivery or use of RAM is involved in contract performance.

1.4.3. Inform the base RSO of preconstruction meetings when attending contractors plan to use RAMs or other forms of radiation during contract execution. During administration of the contract, the 375 CONS will ensure contractor compliance with RAM requirements of the contract.

1.4.4. Ensure contractors using RAM on Air Force installations have base RSO approval in accordance with AFI 40-201, **paragraph 3.4.5** and all subparts of **paragraph 3.4.5** before bringing RAM or radiation-producing devices onto Air Force property. A written request should be submitted to the base contract administrator, through the contract

inspector, and to the base RSO 30 days prior to the intended use. No work involving RAM may proceed until the base RSO approves the request. The request will include:

1.4.4.1. A copy of the contractor's RAM permit and amendments along with the written request.

1.4.4.2. A brief description of the intended activities and a base diagram depicting the route and times the RAM will be on base.

1.4.4.3. The base RSO is responsible for overseeing the contractor's use of RAM.

1.4.5. Ensure the contractor contacts the base RSO at least 30 days prior to intended use so adequate time is provided to ensure proper licensing or permitting.

1.4.6. Ensure that all radioluminescent signs removed by the contractor and turned into the 375th Civil Engineer Squadron (CES) Operations Flight (CEO) for proper disposal. The 375 CES/CEO will coordinate disposition with the base RSO.

#### 1.5. **The 375 CES Construction Management.**

1.5.1. Ensure the base RSO has reviewed and signed off on all submittal requests by contractors to use RAM or x-ray equipment.

1.5.2. Ensure all contract SOW have a clause preventing unauthorized RAM from being brought on Scott AFB.

1.5.3. Ensure that contracts, which are executed via IMPAC card, address RAM authorization procedures and use.

1.5.4. Ensure contractors using RAM on Air Force installations have base RSO approval in accordance with AFI 40-201 [paragraph 3.4.5](#) and all subparts of [paragraph 3.4.5](#). before bringing RAM or radiation-producing devices onto Air Force property. The contractor must contact the base RSO at least 30 days prior to intended use so adequate time is provided to ensure proper licensing or permitting.

#### 1.6. **The 375 LRS AFSS Base Supply Contractor.**

1.6.1. Ensure a separate, properly posted, and secure area is set up for storage of RAM.

1.6.2. Secure approval from the base RSO prior to accepting RAM shipments. Upon receipt of RAM, ensures the base RSO or representative is notified so that monitoring of the item is accomplished in accordance with 10 CFR 20.1906, *Procedures for Receiving and Opening Packages*, prior to issuing RAM to the receiving sections.

1.6.3. Report discrepancies in packaging, etc., of all RAM received.

1.6.4. Ensure all personnel handling or storing RAM are trained in the safety and storage procedures of RAM.

#### 1.7. **The 375 LRS, Cargo Movement Operations.**

1.7.1. Ensure a separate, properly posted, and secure area is set up for inbound and outbound RAM; ensures area is approved by the base RSO.

1.7.2. Report discrepancies in packaging, etc., of all RAM received.

1.7.3. Ensure personnel handling or storing RAM are trained in the safety and storage procedures of RAM; ensure personnel are trained on 49 CFR requirements for shipping RAM.

1.7.4. When receiving RAM for shipment, contacts the BEF at commercial (618) 256-7307 or DSN 576-7307, to perform surveys of packages that are scheduled to be shipped.

1.7.5. Notify the base RSO and individual user or appropriate storage organization upon receipt of RAM for use on Scott AFB so preparations for storage and handling can be made. The base RSO can be reached at commercial (618) 256-7307 or DSN 576-7307. The BEF will monitor the radiation intensity on the external surface of the container and perform a visual inspection of the container to ensure seals have not been broken or tampered with and container has not been damaged in transit.

#### 1.8. Contractor's (Non-Air Force Organizations) use of RAM.

1.8.1. General. Procedures for control of RAM brought onto Scott AFB by contractors must be followed. Reference AFI 40-201 **paragraph 3.4.5.** and all subparts.

1.8.2. Contact the base RSO at (618) 256-7307 or DSN 576-7307, 30 days prior to the intended use of RAM. No work involving RAM may proceed until the base RSO approves the request.

1.8.3. Remove all radioluminescent signs and turns the signs over to the 375 CES Operations Flight for proper disposal.

#### 1.9. The Base RSO.

1.9.1. Manages the Personnel Dosimetry Program, performs radiation surveys, and reviews all plans for modifications of facilities that will use RAM or radiation-producing sources.

1.9.2. Reviews procedures for radioactive permitting, licensing, receiving, and shipping of RAM or radiation-producing sources.

1.9.3. Reviews Contractor's (Non-Air Force Organizations) use of RAM 30 days prior to use on base.

1.9.4. Ensures radiation safety training is conducted for all individuals working in or frequenting any portion of an area where RAM or radiation-producing sources are used.

1.9.5. Reviews, at least annually, the ALARA Program at Scott AFB including this instruction and each organization's ALARA Program.

1.9.6. Conducts an annual review of the personnel ionizing dosimetry. If the review identifies significant problems or if recommendations are made that have a base-wide impact, the base RSO should present the results of the review to the Scott AFB ESOH Council.

1.9.7. Establish personal ionizing radiation dosimetry levels, which are utilized as a guide in determining surveillance and control requirements. These action levels are provided in **Attachment 2, Table 1**, and are upgraded from 29 CFR 1910.1096, *Occupational Health Standard*, and 10 CFR 20.1201, *Occupational Dose Limits for Adults*.

1.9.8. If ALARA Action Level I (**Attachment 2**) is exceeded, conducts an investigation of the exposure and recommend any actions to reduce the exposure levels. A written report is not required.

1.9.9. If ALARA Action Level II (**Attachment 2**) is exceeded, conducts an investigation into the exposure and provides a written report to the individual and his supervisor. The report should recommend changes in procedures to reduce exposure levels.

1.9.10. If the occupational standard is exceeded, conducts a formal investigation and documentation are required in accordance with AFI 48-125, *Personnel Ionizing Radiation Dosimetry*.

1.9.11. Review personnel dosimeter results for pregnant workers monthly and maintains documentation on actions taken to ensure that the total dose to the fetus does not exceed 500 millirem (mrem) during the term pregnancy. Positive efforts will be made to limit the dose to no more than 50 mrem per month.

#### 1.10. **The Permit RSO.**

1.10.1. Ensures compliance with each requirement specified in the RAM permit.

1.10.2. Ensures each employee working with or around the permitted RAM is aware of the Scott AFB commitment to the ALARA concept.

1.10.3. Ensures each employee working with or around the permitted RAM is properly trained.

1.10.4. Examines operational procedures and practices concerning the permitted material to ensure their compatibility with the ALARA concepts.

1.10.5. Delegates some responsibilities to the trained unit RSO.

#### 1.11. **The Unit RSO.**

1.11.1. Call the BEF at commercial (618) 256-7307 or DSN 576-7307 immediately if there is suspected overexposure to ionizing radiation or RF energy.

1.11.2. Examines operational procedures and practices within the organization to ensure their compatibility with the ALARA concepts.

1.11.3. Notifies the BEF when procedures change or new emitters are procured.

1.12. **The Supervisor.** Ensures each employee under his or her responsibility is aware of the Scott AFB commitment to the ALARA concept.

1.13. **Employees.** Comply with shop ALARA concept procedures and suggests to the supervisor any improvements in practices and procedures that would support the ALARA concept.

GARY P. GOLDSTONE, Col, USAF  
Commander

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

10 Code of Federal Regulations (CFR) 20.1201, *Occupational Dose Limits for Adults*

29 CFR 1910.1096, *Ionizing Radiation*

29 CFR 1926, *Safety and Health Regulations for Construction*

10 CFR 20, *Standards for Protection Against Radiation*

49 CFR, *Transportation*

AFI 40-201, *Managing Radioactive Materials in the U.S. Air Force*

AFI 48-125, *Personnel Ionizing Radiation Dosimetry*

AFI 48-148, *Ionizing Radiation Protection*

AFOSHSTD 48-9, *Radio Frequency Radiation (RFR) Safety Program*

***Abbreviations and Acronyms***

**AFOSH**—Air Force Occupational Safety and Health

**AFSS**—Aleut Facilities Support Services

**BEF**—Bioenvironmental Engineering Flight

**CEO**—Operations Flight

**CES**—Civil Engineering Squadron

**CONS**—Contracting Squadron

**ESOH**—Environmental, Safety, and Occupational Health

**LRS**—Logistics Readiness Squadron

**MREM**—Millirem

**PRECON**—Pre-Construction Meeting

**RAM**—Radioactive Material

**RF**—Radio Frequency

**RSO**—Radiation Safety Officer

**SOW**—Statement of Work

***Terms***

**ALARA Concept**—Concept based on the philosophy that all exposures to radioactive materials and radiation-producing sources must be limited to the lowest possible levels. This statement presupposes that no exposures to radiation should occur without a positive net benefit. Implicit in this assumption is that an exposure to radiation, however small, carries with it some detriment or probability of risk that should be balanced by an offsetting benefit. While the established

maximum permissible exposure levels are conservative and offer a low risk of adverse health effects compared to other hazards of life and occupation, it is prudent that every effort be made to reduce exposures to the lowest level possible. The ALARA approach appears to best satisfy the need for a practical, yet conservative goal to limit personnel exposure to radiation.

**Base Radiation Safety Officer (RSO)**—An individual appointed in writing by the installation commander to manage the Radiation Safety Program.

**Permit RSO**—An individual designated by the unit commander and approved by the USAF Radioisotope Committee to manage the radiation protection aspects associated with the use of RAMs for which a specific USAF Radioactive Material Permit has been issued. Notification should be given to the BEF of the designation of a permit RSO and any subsequent changes.

**Unit RSO**—An individual appointed by the organizational commander, who manages RAM covered under a permit and/or RF emitters, in accordance with AFI 48-148, *Ionizing Radiation Protection*. The unit RSO may manage other ionizing or non-ionizing radiation sources in accordance with applicable regulations. The unit RSO should be appointed, in writing, and notification given to the BEF of appointment and subsequent changes.

## Attachment 2

**OCCUPATIONAL STANDARDS AND ALARA INVESTIGATION ACTIONS LEVELS  
(UNITS IN MILLIREM)**

**Table A2.1. Occupational Standards And Alara Investigation Actions Levels (Units In Millirem).**

<u>TYPE OF EXPOSURE</u>	<u>Occupational Standard</u>	<u>*Level I</u>	<u>**Level II</u>
Eye Dose Equivalent (LDE)	3,750/qtr 1,250/mo	938/qtr 313/mo	1,875/qtr 625/mo
Deep Dose Equivalent (DDE) (External Whole Body)	1,250/qtr 417/mo	313/qtr 104/mo	625/qtr 208/mo
Shallow Dose Equivalent (SDE) (Skin of the Whole Body or Extremities)	12,500/qtr 4,167/mo	3,125/qtr 1,042/mo	6,250/qtr 2,084/mo
Total Effective Dose Equivalent (TEDE)	1,250/qtr 417/mo	313/qtr 104/mo	625/qtr 208/mo
*Pregnant Females	***500	12.5/mo	25/mo

\* 25% of the occupational limit

\*\* 50% of the occupational limit

\*\*\* total over gestation period