

CHAPTER 14. RADIATION SAFETY PROGRAM

1400. GENERAL. All FAA employees shall be protected from exposure to hazardous electromagnetic radiation and fields in the workplace. This shall be accomplished through a comprehensive agency Radiation Safety Program (RSP). The FAA shall adopt the most current employee exposure safety criteria published by the American Conference of Government Industrial Hygienists (ACGIH) as well as criteria for Radiofrequency (RF) radiation published jointly by the American National Standards Institute (ANSI) and the Institute of Electrical and Electronic Engineers (IEEE). Key program elements and responsibilities are included in this chapter. Additional implementation guidance will be developed by responsible organizations to support this chapter, and shall be followed.

1401. BACKGROUND.

a. The existing OSHA regulation pertaining to nonionizing radiation, 29 CFR 1910.97, is based on outdated exposure safety standards. Therefore, for controlled environments (defined in paragraph 1405e), the FAA adopts current ACGIH consensus occupational exposure safety standards for nonionizing radiation (NIR) and fields (*1998 TLVs and BEIs-Threshold Limit Values for Chemical Substances and Physical Agents*), including: Radiofrequency (RF) and Microwave radiation; Sub-radiofrequency (SRF, 30 kHz and below), which includes the Extremely Low Frequency (ELF, 3-3000 Hz) and static electric and magnetic fields (EMF); and laser radiation.

b. The ACGIH employee exposure safety standards for RF and Microwave radiation referred to in paragraph 1401a are identical to the controlled environment maximum permissible exposure levels (MPE) published in ANSI/IEEE C95.1-1991, *Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz*. These standards will be applied to FAA employees who routinely work in, and are aware of, environments having potential for radiation hazards (controlled environments). To ensure the safety of all other workers, such as office workers and general maintenance personnel, the FAA adopts the more stringent ANSI/IEEE MPE's for *uncontrolled* environments. Uncontrolled environment exposure safety standards will be used as "action levels" (see paragraph 1405a) for any area with high power radiation emitters within the FAA, where individuals who are unaware of a potential radiation hazard might enter. Every effort shall be made to maintain RF and Microwave radiation from FAA sources to the lowest feasible level. See definitions in paragraph 1405 for additional clarification of controlled and uncontrolled environments.

c. The existing OSHA regulation for ionizing radiation, 29 CFR 1910.1096, is also outdated. For example, it does not specifically address protection of pregnant workers. Current ACGIH 1998 safety standards for ionizing radiation are adopted, including new ionizing radiation terminology, exposure units (dose and dose-rate), and exposure safety guidelines (Table 1, *ibid.*), as relevant to FAA workplace environments. However, OSHA's safety program elements for ionizing radiation (e.g., labeling, personal monitoring triggered by a certain radiation level, reporting, and recordkeeping) shall be preserved, as well as the ACGIH-endorsed ALARA (as low as reasonably achievable) principle to keep radiation exposure levels below the recommended guidelines in the workplace.

d. Commercial products and unintentional sources of workplace radiation (such as office computers and video display terminal (VDT) units, cellular and satellite telephones, microwave ovens, and personnel security screening systems) are not included in the RSP. These are covered by other applicable public safety and health radiation emissions standards and regulations of the Federal Communication Commission (FCC) and the Food and Drug Administration's (FDA) Center for Devices and Radiological Health (CDRH). However, radiation safety for FAA users of such devices shall be assured by requiring manufacturer data and proof of compliance with applicable safety standards (see paragraph 1410(d)(3)).

e. FAA's adoption of ACGIH guidelines for human exposure safety in controlled environments and ANSI/IEEE MPE's for uncontrolled environments is consistent with Public Law 104-113, the *National Technology Transfer and Advancement Act of 1996*. This law directs Federal agencies to adopt or adapt technical and safety standards developed by voluntary consensus standards-setting organizations, such as ANSI/IEEE, as well as consult and participate with such bodies in the development of technical standards. (Note: ACGIH is not a consensus standards-setting organization, but a professional society whose membership includes occupational safety and health professionals from national and international government, academia, and industry. The ACGIH "Physical Agents TLV Committee" is dedicated to the control of workplace health hazards and annually reviews and adopts the most recent and best available consensus human exposure safety standards, such as the ANSI/IEEE, International and National Commissions for Radiation Protection (ICRP and NCRP) radiation safety guidelines.)

f. As shown in 29 CFR 1910.100, Standards Organizations, OSHA accepts, endorses, and recommends the use of ACGIH TLV's as safety guidelines. The FAA, through DOT/OST, notified OSHA of its intent to adopt current ACGIH and ANSI/IEEE radiation exposure safety guidelines, in accordance with the notification requirements of 29 CFR 1960. In August 1998, DOT and FAA received verbal approval of the RSP as contained in this chapter, and the specific adopted radiation safety exposure standards and guidelines. A formal, written endorsement from OSHA is shown in Figure 14-1, OSHA Response Concerning FAA's Adoption of Consensus Radiation Safety Standards. OSHA has indicated that it will use this RSP as the basis for future inspections.

1402. RELATED PUBLICATIONS.

a. The American Conference of Governmental Industrial Hygienists (ACGIH) 1998 *TLVs and BEIs - Threshold Limit Values for Chemical Substances and Physical Agents*. A current edition may be purchased from ACGIH, Kemper Woods Center, 1330 Kemper Meadow Drive, Cincinnati, OH 45240-1634. See also <http://www.acgih.org> for ordering information.

b. ANSI/IEEE C95.1-1991 *Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz*. A current edition may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036. See also <http://www.ansi.org> for ordering information.

1403. GOALS AND OBJECTIVES. The goal of the RSP is to safeguard employees' safety and health in the FAA workplace by: setting the agencywide policy framework based on adoption of the most recent, scientifically credible safety standards and guidelines, and by delineating a comprehensive radiation safety program with clear organizational roles and responsibilities for its timely implementation through communication, training, radiation environment characterization, exposure prevention and documentation, and oversight for safety assurance.

1404. SCOPE. This chapter applies to all FAA employees whose work duties and/or work environments may expose them to radiation and fields generated by FAA facilities. It is limited to the identification of the radiation exposure safety criteria that shall be used and to stating the RSP program elements and organizational responsibilities necessary for its successful implementation. The RSP will protect FAA workers from any unsafe radiation and fields emitted from FAA sources in FAA-owned or -leased Airway Facilities (including GSA-controlled buildings and/or facilities occupied by FAA).

1405. DEFINITIONS. To conserve space, definitions used here are limited to nontechnical or frequently used terms in this chapter. Please consult the resources listed in the ACGIH and ANSI/IEEE publications for definitions and explanations of other radiation terminology.

a. Action levels. Action levels are those employee exposure levels that trigger the implementation of this chapter and related program guidelines. When these levels are exceeded, protective steps will be initiated to ensure the safety of employees, such as: increased employee awareness of radiation hazards (through improved communications or updated training), additional radiation measurements, labeling and signage, and/or initiation of controls to reduce exposure to below the action levels. (For the purpose of this chapter, the ANSI/IEEE C95.1 uncontrolled environment MPE's will serve as action levels. See paragraph 1407b.)

b. Allied safety officer. An allied safety officer is an FAA employee who has been assigned full-time or collateral duty safety and health responsibilities, not including the regional or center program manager for environment and safety, regional or center occupational safety and health manager, or Washington headquarters safety and health staff. Examples include Safety and Environmental Compliance Managers (SECM), designated facility safety officers, and safety committee members.

c. American Conference of Governmental Industrial Hygienists (ACGIH). The American Conference of Governmental Industrial Hygienists is an organization devoted to developing and improving worker health protection standards. As a professional society, it includes members from Federal safety and health agencies, as well as public health experts from industry and academia and the international OSH community. It annually publishes up-to-date voluntary occupational safety standards for exposure to chemical and physical agents in the workplace in "*Threshold Limit Values for Chemical Substances and Physical Agents*," commonly referred to as the "TLV booklet" by OSH personnel.

d. American National Standards Institute (ANSI) and the Institute of Electrical and Electronic Engineers (IEEE). These two voluntary standards-setting organizations came together after 1988 when the ANSI accredited standards committee C95 was converted to standards coordinating committee (SSC) 28 under the sponsorship of the IEEE standards board. Future C95 standards will be developed and issued by IEEE, who will submit them to ANSI for recognition. The scope of the SSC 28 is to develop standards "for the safe use of electromagnetic energy in the range of 0 Hz to 300 GHz relative to the potential hazards of exposure to man, volatile materials, and explosive devices to such energy." ANSI/IEEE C95.1-1991 *Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz* (or most recent update) provides the rationale for using controlled and uncontrolled environment MPE's for controlling FAA employee exposures to nonionizing (RF and microwave) radiation.

e. Controlled environment. ANSI/IEEE defines controlled environments as locations where access is restricted and that are occupied only by individuals who are aware of the potential for exposure as a concomitant of employment. In the FAA, such individuals may include the following personnel trained in, or cognizant of, the presence of radiation hazards and exposure prevention and controls: radar and/or environmental technicians, certain members of the FAA Academy and the FAA Technical Center, safety professionals and allied safety officers, and other cognizant individuals. The MPE's for controlled environments were adopted by ACGIH as TLV's for workers and carry a smaller protection factor than MPE's for uncontrolled environments.

f. Electromagnetic Radiation. Electromagnetic (EM) radiation is the radiant electromagnetic energy characterized by its power density (energy radiated per unit area per second), and frequency (or wavelength). The EM spectrum ranges from nonionizing radiation (NIR)- that includes sub-radiofrequency (SRF), radiofrequency (RF) and microwave (MW) radiation through infrared, visible and ultraviolet frequencies, and extends into the ionizing radiation range (including x-rays and gamma rays). This EM spectrum and related TLV's addressed by ACGIH for workplace exposure safety are depicted in the TLV booklet (1998, p. 143).

g. Ionizing radiation. Ionizing radiation is either particulate or electromagnetic radiation that is sufficiently energetic (more than 12.4 electron-volts (eV)) to ionize the matter absorbing it. It includes subatomic particles (such as electrons, protons, neutrons, or energetic alpha particles and heavier ions), and electromagnetic radiation (x-rays and gamma rays).

h. Maximum Permissible Exposure (MPE). The term maximum permissible exposure is the ANSI/IEEE designation for a human safety exposure limit to RF radiation. MPE's are provided in ANSI/IEEE C95.1-1991 for both controlled and uncontrolled environments (see definitions in this chapter and original reference). Note: When ACGIH adopted the controlled environment MPE's, the MPE's were redesignated as TLV's. Because ACGIH did not adopt the uncontrolled environment MPE's, these standards should continue to be called MPE's in the RSP.

i. Nonionizing radiation (NIR). Nonionizing radiation applies to electromagnetic radiation with photon energies less than 12.4 eV, which cannot ionize atoms and molecules. It includes all frequencies at and below the ultraviolet (UV) portion of the spectrum, namely:

(1) Sub-radiofrequency (SRF) radiation, defined by ACGIH-98 as radiation with frequencies below 30 kHz. SRF limits (TLV's) on magnetic and electric fields include the extremely low frequencies (ELF) electromagnetic fields (EMF) $3 \text{ Hz} < f < 3 \text{ kHz}$. ELF/EMF also include magnetic fields at power frequency (60 Hz) and its harmonics (up to 300 Hz), whose potentially adverse health effects are still under active investigation.

(2) Static magnetic and static electric fields, which may pose electromagnetic interference (EMI) hazards to medical device wearers and may also be of concern in the proper operation of tools and instrumentation.

(3) RF (30 kHz - 300 MHz) and microwaves (MW, 300 MHz - 300 GHz) radiation where the specified TLV's limit either the radiation power density or the corresponding electric or magnetic field components. Radiation might be emitted as periodic pulse trains (pulsed) or as continuous waves (CW). The quantity of interest to exposure safety is the time-averaged power density, or corresponding magnetic and /or electric field strengths, as specified in the standards as a function of frequency.

(4) Optical radiation, with wavelengths longer than 100 nm and shorter than 1 mm, including infrared, visible, and ultraviolet ranges. Of special concern for the workplace are the laser safety standards, given the growing use of lasers (both pulsed and CW) by the FAA.

j. Radiation Protection Officer (RPO). The Radiation Protection Officer is the FAA official charged with serving as the principal point of contact and coordinator for employee ionizing and nonionizing radiation exposure issues. This individual is qualified by education, training, and/or experience to evaluate the potential for short- or long-term health effects associated with use of components generating NIR and ionizing radiation in FAA workplaces (see para. 1410b(3) for RPO responsibilities).

k. Threshold Limit Value (TLV). A Threshold Limit Value is an ACGIH term for occupational exposure limits adopted following extensive review of supporting documentation from standard-setting consensus organizations, research laboratories, and epidemiological data in the published literature. TLV's represent the level of exposure ACGIH has determined to which workers may be exposed during a normal 8-hour workday in a 40-hour work week over a working lifetime without adverse effect.

l. Uncontrolled environment. ANSI/IEEE defines uncontrolled environments as locations where individuals may be exposed to radiation who have no knowledge, control, or expectation of potential for radiation exposure. In the FAA, this would include any location with high power emitters where there is a possibility of access by persons unaware of the radiation hazard. ANSI/IEEE C95.1 provides MPE's for uncontrolled environments and states that individuals may be exposed to these levels without harmful effect and with an acceptably high safety factor. See definition for *action level*.

1406. KEY RADIATION SAFETY PROGRAM ELEMENTS. FAA shall:

- a.** Adopt the most current ACGIH (1998 or as applicable) occupational exposure safety guidelines for physical agents, specifically the sections identified as Ionizing Radiation; Lasers; and Nonionizing Radiation and Fields. Also adopt the most current ANSI/IEEE C95.1 recommended RF radiation exposure safety standards for uncontrolled environments as “action levels” (see 1405a and 1407b(1) for definition). *(Note: ACGIH 1998 TLVs and BEIs and ANSI/IEEE C95.1-1991 shall serve as the baseline for 1998, the year of this chapter's initial issue.)*
- b.** Ensure that timely and specific implementation guidance of the RSP is developed and issued by the responsible FAA organizations. (See paragraph 1410.)
- c.** Ensure that appropriate radiation safety training materials are developed in a timely manner, in coordination with current and documented RSP guidance and safety information; and that responsible FAA staff (e.g., safety and health managers and allied safety officers, appropriate spectrum engineering, and technical maintenance and operations staff) receive appropriate initial and continuing training needed to prevent, evaluate, measure, control, and mitigate potential radiation exposure hazards in the FAA workplace.
- d.** Ensure that baseline radiation surveys, commissioning, modifications, and other radiation safety assessments are conducted as needed, or as requested, in a timely manner. The goal is to document, evaluate, control, and mark, by posted warnings or restricted access to, areas where employee exposures could exceed recommended exposure limits from a single source or multiple radiation sources. (Baseline surveys of ELF/EMF and static magnetic and electric fields will be performed only on an as-needed basis.)
- e.** Ensure that no FAA employee shall handle, maintain, test, and operate radiation emitting components, or perform duties in areas where there is a potential radiation hazard, without first being made aware of the radiation hazard potential, and receiving information or appropriate training in radiation hazards prevention and control appropriate to his/her job tasks. The employee shall be made aware of radiation potential hazards identification, safe work procedures, and strategies for preventing, controlling, and mitigating unnecessary or excessive personnel exposures.
- f.** Ensure that informative reading materials on potential radiation hazards shall be maintained by Washington headquarters, regions, centers, and field offices, and shall be made available to concerned employees on request.
- g.** Ensure that all existing radiation and high fields sources are inventoried, and that measured radiation emission levels are archived by facility type, source type, configuration, location, and date. Where employee exposures to these sources have been measured (i.e., dosimetry), the appropriate employee job classification numbers and job task descriptions shall also be archived.
- h.** Ensure that specifications for and acceptance testing of new equipment, subsystems, and systems to be developed or acquired under the NAS Facilities Modernization and/or as part of the NAS System Architecture complies with applicable radiation safety standards and guidelines.
- i.** Maintain a centralized RSP resource file and data base to include: work area radiation hazard measurements and estimates of radiation hazard by type, radiation survey data at typical facilities, and for representative sources, employee exposure and source(s) of exposure; also, results of baseline and periodic employee workplace radiation surveys and hazard assessments, and results of both scheduled or planned and on-request or unplanned investigations.

j. Ensure that all radiation emissions survey data and employees' exposure records and related health or medical evaluations shall be maintained for the duration of employment plus 30 years in accordance with 29 CFR 1910.1020, *Access to employee exposure and medical records*.

k. Investigate and document all alleged workplace exposure incidents and levels that exceed the adopted exposure criteria, and recommend prevention and mitigation strategies; or medical treatment and/or inclusion in a medical surveillance program, if recommended by AAM.

l. Require that all commercially acquired FAA equipment that are unintentional radiation sources (such as microwave ovens, computer, communication, and display devices, physical security screening equipment), have evidence of manufacturer or supplier compliance with applicable FCC or FDA/CDRH radiation safety standards.

1407. NIR EMPLOYEE EXPOSURE CRITERIA. Following is a brief overview of the criteria for the different radiation frequency bands. Consult the appropriate current version of the TLV booklet and/or ANSI/IEEE C95.1 for the actual criteria.

a. SRF limits for electromagnetic radiation with frequencies (f) below 30 kHz, including ELF/EMF power frequencies and harmonics ($f < 300$ Hz). These TLV's include both electric and magnetic fields down to static ($f = 0$) electric and magnetic fields. Special warnings and more stringent TLV's are noted for workers wearing electronic implants, such as pacemakers, susceptible to electromagnetic interference (EMI) from NIR sources.

b. RF radiation with $30 \text{ kHz} < f < 300 \text{ MHz}$ and MW radiation with $300 \text{ MHz} < f < 300 \text{ GHz}$. These TLV's are identical to the controlled environment electric and magnetic fields, or equivalent power density limits, in ANSI/IEEE C95.1-1991, "*Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz*," and are applicable only to experienced, trained personnel, such as radar and/or environmental technicians, certain members of the Academy, safety professionals and allied safety officers, and other cognizant individuals. The ACGIH also adopted the C95.1-1991 controlled environment limits on RF-induced and contact (shock and RF burn limits) for whole body and partial body currents and on pulsed, multi-frequency or multiple-source radiation that requires summation, as well as spatial and time averaging to ensure exposure safety.

(1) Action Levels. MPE's for uncontrolled environments shown in ANSI/IEEE C95.1-1991 are applicable to most FAA workplaces, and shall be used as *action levels* for implementing this chapter and program guidance to control employee exposure to RF and MW radiation.

(2) Representative baseline surveys shall be conducted in accordance with program guidance to identify controlled and uncontrolled environments, and to demonstrate that *action levels* are not exceeded.

c. Laser safety. ACGIH-98 adopts appropriate technical standards for safe use of lasers in the workplace, as a function of wavelength, power, beam cross-section, exposure type (both pulsed and continuous wave, CW), duration of exposure, and body cross-section exposed (ocular or skin).

1408. IONIZING RADIATION EMPLOYEE EXPOSURE CRITERIA. The ACGIH 1998 TLV's for ionizing radiation include specific occupational exposure safety guidelines to limit exposures to ionizing radiation, including particulates (e.g., inhaled radon) and electromagnetic (e.g., x-rays from radars and VDTs). These guidelines are based on the most recent guidance from the National Council for Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP). The ACGIH also endorses the ALARA (as low as reasonably achievable) principle for minimizing workplace exposures. Special radiological protection guidance is given to minimizing exposures for declared pregnant employees, so as to limit the *in utero* dose. The existing OSHA standard for ionizing radiation, 29 CFR 1910.97, is outdated and does not specifically protect pregnant workers; however, the standard's program elements (e.g., labeling, warning signs, personal monitoring in special cases, reporting, and recordkeeping) shall be followed in this chapter.

1409. RADON EXPOSURE CRITERIA. The ACGIH-98 includes recommended occupational TLV's for radon daughters of 4 working level months (WLM) per year. This is approximately equivalent to an annual exposure to an average of 16 picocuries of radon per liter of air (pCi/l). The FAA adopts this guideline for exposure to indoor radon in FAA-controlled occupational environments.

1410. RESPONSIBILITIES. In addition to the responsibilities described in chapter 1, the following program-specific responsibilities apply.

a. AEE shall:

(1) Develop policy for the RSP, including exposure criteria and organizational responsibilities to the AXX-400 level.

(2) Provide oversight of the RSP to ensure all program elements established by AEE and implemented by AAF are effective in identifying, measuring, evaluating, preventing, minimizing, controlling, mitigating, documenting, or assessing potential radiation hazards to employees at FAA facilities, or as a result of FAA activities.

(3) Coordinate any policy changes relating to the RSP with all affected organizations.

(4) Review RSP implementation guidance and data products to ensure that all elements of this chapter are adequately addressed and implemented in a timely manner.

b. AAF shall:

(1) Administer the RSP and ensure that written implementation guidance is developed and applied in accordance with this chapter; proposed guidance shall be coordinated with AEE prior to distribution to the field.

(2) Provide adequate resources as required for the effective management of the RSP.

(3) Provide a Radiation Protection Officer (RPO) function with the responsibility to serve as the agency focal point for all employee radiation health and safety issues. RPO responsibilities shall include:

(a) Serve as the headquarters focal point for employee concerns relating to alleged radiation hazard from FAA existing and developmental communication, navigation and surveillance (CNS) facilities, systems, and components, when these complaints cannot be resolved at the regional level.

(b) Develop or review data to assess employee radiation exposure levels and implement procedures to protect employees from potential FAA radiation hazards.

(c) Evaluate and respond to employee requests for potential radiation hazards health interpretations of radiation emissions measurements and exposures that cannot be handled at the regional level; forward requests for medical interpretation to AAM.

(d) Review and evaluate proposed nonroutine tasks of trained workers to ensure that exposure does not exceed adopted limits.

(e) Collaborate with appropriate AAF and employee representative organizations in acquiring measurement data for potential radiation hazards, as needed.

- (f) Assist in development of required radiation assessment audits.
 - (g) Assist AEE upon request as co-liaison with Federal worker protection and environmental safety and health regulatory agencies (OSHA, NIOSH, FDA/CDRH, FCC, EPA) and with other professional radiation health societies (ACGIH, ANSI/IEEE, NCRP), whose missions are to develop standards and guidelines to protect workers from radiation hazards.
- (4) Coordinate with appropriate organizations as required to secure their support for RSP implementation. Specifically:
- (a) Coordinate with AAM when seeking additional health or medical interpretation of any radiation measurement data.
 - (b) Ensure that annual field safety assessments of employee work tasks and/or work environments are conducted to identify employees for inclusion in the RSP; to identify new operations or modifications to the workspace environment that may increase the potential for radiation exposure hazard; and ensure that these assessments are supported by radiation emission and/or exposure measurements, if needed. All assessments shall be documented.
 - (c) Ensure all radiation exposure records are maintained in accordance with 29 CFR 1910.1020, *Access to Employee Exposure and Medical Records*. All radiation exposure hazard assessments shall be documented and archived.
 - (d) Provide technical assistance to the regions and the two centers for radiation hazard prevention, control, and/or mitigation strategies upon request or as needed.
 - (e) Implement initial and periodic radiation hazard evaluation training; and document all such training and maintain training records for a minimum of 3 years for the following employee groups:
 - i. Safety and health professionals and staff, who must perform baseline and periodic workplace radiation hazard assessments.
 - ii. Employees who must perform work tasks or work in environments where potential exists for exposure above adopted TLV's.
 - iii. Spectrum engineering staff in the performance of occupational radiation hazard measurements and evaluations of compliance with FAA adopted standards.
 - (f) Collect or develop and provide informational resources on radiation safety to concerned employees upon request.
 - (g) Provide technical assistance as appropriate to appropriate AF organizations to ensure that the employee safety paragraphs in radar maintenance orders (6000-series) and related publications are revised to include this chapter, and that safety information is available, current, and sufficient to the needs of the users.
 - (h) Provide Regional Frequency Management Offices (FMO) and the Mike Monroney Aeronautical Center and the William J. Hughes Technical Center counterparts with equipment and/or technical support required for emissions measurement and exposure assessment and for identification of uncontrolled and controlled environments.
 - (i) Maintain and annually update the radiation measurement equipment inventory and ensure that equipment calibrations are maintained in accordance with manufacturer recommendations.

(j) Periodically update Order 6050.32, Spectrum Management Regulations and Procedures Manual, and/or other written procedures consistent with this RSP policy, and update FMO training materials to ensure compliance with current standards.

(k) Maintain a centralized Spectrum Engineering data base or management information system of official records to log and track representative hazard measurements data. The repository should include baseline and periodic radiation hazard measurements for representative radiation sources and facilities, calculated estimates of exposure for representative employee classifications and/or job tasks, and data arising from all planned or unplanned investigations relating to possible potentially hazardous radiation exposures.

c. AAM shall:

(1) Provide medical interpretation of radiation exposure estimates for FAA employees upon request by the RPO and consult with outside specialists deemed appropriate to evaluate measurements collected by AAF.

(2) Develop written guidance for the regional flight surgeons related to employee radiation exposures and provide a copy to AEE and AAF for review prior to distribution.

(3) Maintain medical records of employees with documented exposure to radiation above the adopted FAA radiation exposure standards, and ensure accessibility to employees in accordance with 29 CFR 1910.1020, *Access to Employee Exposure and Medical Records*.

(4) Recommend an appropriate medical surveillance strategy when an employee has received an accidental or routine radiation exposure in excess of the adopted TLV's.

d. ARA shall:

(1) Coordinate with AAF early in the planning and design phase of prototype equipment that may generate radiation in excess of the adopted MPE's, as established for uncontrolled areas in ANSI/IEEE C95.1-1991.

(2) Ensure that all designs, acquisition, and acceptance testing plans are reviewed by the RPO for potential radiation hazards. This review shall be documented.

(3) Ensure that manufacturers and suppliers of FAA-purchased equipment containing radiation sources provide appropriate radiation source identification, emissions data, and potential hazard warning labels that demonstrate compliance with RSP standards and guidelines.

(4) Develop written procedures for review and evaluation of potential radiation hazards during planning, siting, acquisitions, construction, maintenance, modifications, upgrades or modernization, and all other phases of life-cycle management for real property (i.e., environmental assessment reviews). The procedures (and subsequent revisions) shall be reviewed by AEE and AAF prior to distribution.

(5) Provide to the RPO radiation safety information for new FAA equipment, systems, and facilities as needed to ensure compliance with the RSP and AAF guidance.

(6) Ensure, with technical assistance from AAF, that emerging or planned NAS systems and components or modifications to existing systems are evaluated for possible radiation and fields hazards in all phases of acquisition and life-cycle management.

e. **AHR** shall assist as necessary to ensure that the RSP policy is addressed in employee programs and policies, with special attention to employee categories identified as having potential for exposure to radiation. Examples of programs include Workers' Compensation claims for workers alleging excessive exposure to radiation; siting and construction of child care centers (see Figure 14-2, Evaluation of Potential Radio-Frequency (RF) Radiation Hazard at Planned and Existing Child Care Centers); and affirmative action programs for pregnant women or workers with pacemakers or other medical implants.

f. **Regional Airway Facilities Division (AXX-400), Environmental, Safety, and Emergency Management Division (AMP-100), and Facilities Services and Engineering Division (ACT-600) shall:**

(1) Implement the RSP in their region or center in accordance with this chapter and written guidance provided by AAF.

(2) Ensure that the request for resources for implementation of the RSP is addressed in the budgetary review process.

(3) Ensure that regional (or center) employees have clear procedures for requesting assistance in the identification of and resolution of concerns of potential and alleged radiation hazards.

(4) Ensure that all appropriate FAA personnel potentially exposed to radiation above adopted TLV's are informed and/or trained in safe work practices and radiation exposure prevention, and that such training is documented.

(5) Ensure that the Regional Occupational Safety and Health Manager (ROSHM) and/or allied safety officers and/or the FMO's receive training and adequate resources needed to identify, measure, evaluate, control, and mitigate radiation hazard risks in the workplace, and that the training is documented.

(6) Ensure that records of employee radiation exposure measurements, including calculated estimates of exposure, are maintained for each employee for the duration of employment plus 30 years. If these records are archived at a storage facility, ensure that they are properly catalogued and readily accessible.

(7) Inform employees that records are available to them and on how they can obtain such records, in accordance with 29 CFR 1910.1020, *Access to Employee Exposure and Medical Records*.

g. **All FAA managers** shall assist wherever possible in the identification of FAA employees whose job tasks or work environments expose them to radiation hazards, or who are at special risk (e.g., pregnant employees or those with medical electronic implants). Contact the FAA region, center, or Washington headquarters safety office or a local safety and health professional/allied safety officer for assistance in the evaluation of workplace radiation hazards.

1411-1499. RESERVED.

Figure 14-1. OSHA RESPONSE CONCERNING FAA'S ADOPTION OF CONSENSUS RADIATION SAFETY STANDARDS

U.S. Department of Labor	Occupational Safety and Health Administration Washington, D.C. 20210	
	Reply to the Attention of	
SEP 21 1998		
The Honorable Melissa J. Spillenkothen Assistant Secretary for Administration Department of Transportation M-1, Room 10314 400 7th Street S.W. Washington, D.C. 20590		
Dear Ms. Spillenkothen:		
<p>The Occupational Safety and Health Administration (OSHA) has reviewed your document entitled Chapter 28; Radiation Safety Program," and believes that when implemented this document will provide equal or greater protection than 29 CFR 1910.97. Thus OSHA agrees that the Federal Aviation Administration (FAA) may use this standard in place of 29 CFR 1910.97 to regulate occupational exposure to radiation.</p>		
<p>The exposure limits selected by FAA are well recognized and supported by the safety and health community as well as OSHA by reference (e.g. ACGIH TLV's and ANSI). Although more restrictive than the OSHA standards, complying with the selected consensus standards is feasible and will provide a more protective workplace. The selection of the more restrictive public exposure limits from the current ANSI C95.1 standard as an "action level" which determines when an RF Safety Program is necessary is particularly useful. Most importantly, the adoption of the most recently published ACGIH TLV's will ensure that the FAA program is not locked into outdated standards, in that limits are automatically updated with each update to the TLV's. Of course, full implementation of this program is key to providing the worker protection described.</p>		
<p>Accordingly, the FAA is permitted by 29 CFR 1960.16 to prescribe and enforce more stringent permissible exposure levels or threshold limit values and may require more frequent monitoring of exposures without recourse to the approval procedures for alternate standards described in 29 CFR 1960.17. OSHA believes that the radiation program proposed by the FAA is more protective than the 1910 standard and agrees that FAA should adopt this as its radiation standard. Additionally OSHA will use this proposed standard to determine worker exposure to radiation and will not measure compliance against 29 CFR 1910.97.</p>		

Figure 14-1. OSHA RESPONSE CONCERNING FAA's ADOPTION OF CONSENSUS RADIATION SAFETY STANDARDS, contd.

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Please advise this office when full implementation is expected, so that we can apprise our compliance inspectors.

Sincerely,



Emzell Blanton, Jr.
Deputy Assistant Secretary

**Figure 14-2. INTERIM POLICY #AEE097-02, EVALUATION OF POTENTIAL
RADIO FREQUENCY (RF) RADIATION HAZARD AT PLANNED AND
EXISTING CHILD CARE CENTERS, DATED APRIL 21, 1997**



U.S. Department
of Transportation
**Federal Aviation
Administration**

Memorandum

Subject: ACTION: Interim Policy Memo AEE097-02: Evaluation of
Potential Radio Frequency (RF) Radiation Hazard at Planned And Existing Child Care Centers **Date:**

From: Acting Assistant Administrator for Policy, Planning, and Planning, and International Aviation, API-1 **Reply to**
Attn. of:

To:

BACKGROUND

The FAA has sited day care centers on or near the grounds of certain FAA facilities in order to improve productivity and efficiency of employees by providing safe, high-quality, and affordable child care during extended hours in locations where such care is not available in the community. FAA Order 3910.3A, Radiation Health Hazards and Protection (1983), requires that FAA workplaces be protected from potential radio frequency radiation (RFR) exposure hazards, but does not include guidelines for controlling potential exposure to children occupying FAA-sponsored child care centers (CCC). To meet this need, we are issuing interim policy for requiring RFR hazard evaluations when siting CCC in the vicinity of FAA radar and communication facilities or when planning modifications to existing CCC. The Office of Environment and Energy (AEE) is currently updating Order 3910.3A, which is planned for release in September 1997. It will include this interim policy.

PURPOSE

This memorandum provides interim policy to facilitate the acquisition of RFR hazard evaluation data for inclusion in proposals for siting new CCC, or when making facility modifications which could increase the potential for hazardous RFR exposure to occupants of existing CCC.

AUTHORITY

AEE has policy and oversight responsibility for FAA employee occupational safety and health programs.

NAS Transition and Implementation (ANS) has broad responsibility for implementation of safety and health programs. Policy regarding the construction of CCC at the approved location/facility resides with ANS and is based on logistical parameters such as existing space, location of radars, etc.

The Office of Spectrum Policy and Management (ASR) has responsibility for performing RFR measurements at FAA sites, or where FAA personnel are employed, and providing technical analysis and interpretation of the RFR measurements.

Figure 14-2. INTERIM POLICY #AEE097-02, EVALUATION OF POTENTIAL RADIO FREQUENCY (RF) RADIATION HAZARD AT PLANNED AND EXISTING CHILD CARE CENTERS, DATED APRIL 21, 1997, contd.

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The Office of Human Resource Management (AHR) is the program office responsible for programmatic policies for the establishment and management of FAA CCC. This role includes review of competing proposals for siting of new CCC and determining which proposals to fund, based on regional needs and available resources. AHR, at the national level, is not involved with the proposal development process; instead, proposal development, including necessary environmental assessments (including potential radiation hazard), is initiated at the field level.

FAA Directive 1100.2C, Organization - FAA Headquarters, is being revised to incorporate the organizational functions and responsibilities consistent with the FAA Notice N 1100.234, dated December 12, 1994. This interim policy memorandum specifies what must be done and who is responsible for evaluating potential radiation hazard at proposed and existing CCC sites. Details of how the interim policy will be implemented are the responsibility of ANS and will be addressed separately.

RF EVALUATION CRITERIA

Compliance with American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE) standards and FAA directives is required. Until FAA Order 3910.3A is updated, the criteria to be used for evaluation of potential RFR hazard to children will be the maximum permissible exposures (MPE) provided for "uncontrolled areas" in the current version of the ANSI approved ANSI/IEEE C95.1-1991, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," dated April 27, 1992. RFR hazard evaluations will be obtained using one or both of the following two approaches:

- (1) Use of actual field measurements made at other similar facilities or sites which are representative of the facility or site under consideration, and/or
- (2) Calculations of RFR exposures based on current specifications or RFR emissions data for the radar/communications systems in use at the location.

RESPONSIBILITIES

a. AEE shall:

- (1) Establish policy for ensuring that siting of new CCC and/or modifications of existing CCC receive appropriate evaluation for possible RFR hazard.
- (2) Provide oversight to verify that this evaluation is being accomplished in an appropriate manner.

b. ANS shall:

- (1) Administer the implementation of this policy (relative to design and construction) to ensure that occupants of future and existing FAA-sponsored CCC are not exposed to RFR in excess of ANSI/IEEE criteria.
- (2) Develop and implement guidelines to ensure that future and existing CCC receive evaluation of possible RFR hazard prior to commencement of construction activities.

Figure 14-2. INTERIM POLICY #AEE097-02, EVALUATION OF POTENTIAL RADIO FREQUENCY (RF) RADIATION HAZARD AT PLANNED AND EXISTING CHILD CARE CENTERS, DATED APRIL 21, 1997, contd.

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- (3) Provide for adequate funding for the effective implementation of the guidelines.
 - (4) Coordinate with ASR in all phases of implementation.
 - (5) Review technical RFR hazard evaluation reports and collaborate with ASR in providing technical recommendations to the field AHR office for the selection of a location for a CCC.
 - (6) Provide for the timely resolution of any deficiencies found by the RFR hazard evaluations.
 - (7) Coordinate with field personnel to ensure their support for the implementation of this interim policy.
- c. ASR shall:
- (1) Provide support as needed to ensure that future and existing CCC receive proper evaluations of RFR hazard prior to commencement of construction activities.
 - (2) Ensure that personnel designated to carry out RFR measurements follow current, peer-approved techniques and standards for calculating estimates for exposure and for obtaining field measurements.
 - (3) Ensure that properly functioning and calibrated equipment is provided to perform the field measurements.
 - (4) Review technical RFR hazard evaluation reports and collaborate with ANS in providing technical recommendations to the field AHR office for the selection of a location for a CCC.
 - (5) Coordinate with the regional Frequency Management Office (and center equivalents) to ensure its support of this program.
- d. The Regional Airway Facilities Divisions (AXX-400), the Office of Facility Management (AMP-1), and the Facilities Management Division (ACT-400) shall:
- (1) Administer the implementation of this policy in the regions and centers to ensure that occupants of future and existing FAA-sponsored CCC are not exposed to RFR in excess of ANSI/IEEE criteria.
 - (2) Ensure that funding is requested to provide for the acquisition of RFR measurements and for any remedial action(s) that might be required.
 - (3) Ensure that the regional Frequency Management Office (or center equivalent) coordinates with ASR in all matters involving CCC.
 - (4) Ensure that actual field measurements are performed following construction or modifications of CCC in order to verify pre-construction calculated estimates of exposure.

Figure 14-2. INTERIM POLICY #AEE097-02, EVALUATION OF POTENTIAL RADIO FREQUENCY (RF) RADIATION HAZARD AT PLANNED AND EXISTING CHILD CARE CENTERS, DATED APRIL 21, 1997, contd.

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(5) Ensure that the potential for radiation hazard from nearby utility transmission lines, transformers, power conditioning and generation units, or other possible sources of RFR is considered when actual field measurements are performed.

(6) Ensure that technical RFR hazard evaluation reports are reviewed and that technical recommendations are provided to the regional and center AHR office for the selection of a location for a CCC.

(7) Ensure that necessary controls and/or mitigation measures are implemented in a timely manner if a RFR hazard to occupants of CCC is identified.

e. The regional Human Resource Management Division or center equivalent shall request assistance from the regional Airway Facilities Divisions (AXX-400), the Office of Facility Management (AMP-1), or the Facilities Management Division (ACT-400), as appropriate, when RFR hazard evaluation data are needed in connection with new or existing CCC.

If you have questions concerning this policy, please contact Jeanne Kosch, Occupational Safety and Health Program Manager for Policy, AEE-200, at (202) 267-9719.



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