



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

ORDER
6340.28

02/03/06

SUBJ: Procedures for Conducting Radiation Hazard Surveys and Radiation Safety Training

1. Purpose. This order provides procedures to conduct ionizing and nonionizing radiation surveys of Air Route Surveillance Radars (ARSR-1, -2, and -3) and Fixed Position Radar Systems (FPS 20 series).

Note: The ARSR-4 radar transmitters do not generate ionizing radiation due to the solid-state class C amplification and longer pulse duration. Therefore, the ARSR-4 radars are not subject to the actions of this order.

2. Distribution.

a. This order is distributed to Technical Operations field offices having the following facilities/equipment: ARSR-1, -2, -3, and FPS 20/60/90 series.

b. After publication, an electronic version of this order will be made available on the Intranet site located at <http://atowdirectives.faa.gov/>.

3. Effective Date. This order is effective upon signature.

4. Scope. This order applies to all Air Route Surveillance Radars (ARSRs) and Fixed Position Radar Systems (FPS 20 series) except ARSR-4s.

5. Conversion of Notice to Order. The procedures contained in Notice 6340.82, Interim Procedures for Conducting Radiation Hazard Surveys and Radiation Safety Training, which expired on January 12, 2006, are critical to the continued safe operation of the National Airspace System (NAS). To avoid disruption to the NAS and provide for the safety of FAA employees, the interim procedures of Notice 6340.82 are hereby converted to permanent procedures through the issuance of this order. An informal survey of the Regional Program Managers for Environment and Safety and the Regional and the Regional Occupational Safety and Health Managers (ROSHM) was conducted to identify any major objections to converting the interim procedures to permanent procedures. While several recommendations were submitted to improve the procedures, no major objections to the conversion were identified. It has been determined therefore to hold the changes that were recommended in abeyance and initiate an update of this order following publication so that the changes can be addressed through the formal coordination process. Minor editorial changes were made in converting the notice to this order. The technical content was not changed.

Distribution: 5217, 5219, 521A, 521C, 525H, 525N, 525T, 525V, 525W, 52AA, 52AE, 52AG, 52BA, 52BF, 52BG, 52BK, and 52BM **Initiated By:** AJW-23

6. References.

- a. Latest version of Order 3900.19, FAA Occupational Safety and Health Program.
- b. OSHA Standard 29 CFR Part 1910.1020, Access to Employee Exposure and Medical Records.
- c. Latest version of American Conference of Government Industrial Hygienists (ACGIH) TLV's and BEI's—Threshold Limit Values for Chemical Substances and Physical Agents.
- d. Latest version of ANSI/IEEE C95.1, Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz.
- e. Latest version of Order 6050.32, Spectrum Management Regulations and Procedures Manual.
- f. CDC/ATSDR Occupational Health and Safety Manual, Radiation Safety Manual.

7. Action. At all long-range radar sites, except ARSR-4s, the following shall be implemented:

- a. The Frequency Management Officers (FMO), the ROSHMs, or ROSHM designee, are responsible for conducting and documenting the radiation surveys.

(1) The ROSHMs (or ROSHM designee) are responsible for assessing employee exposure, based on the survey data collected, and responding accordingly. If the surveys have not been performed within the last 12 months, contact the ROSHM or FMO.

(2) Facilities that have been surveyed within the past 12 months need not be re-surveyed until 12 months have passed or replacement final power amplifier (FPA) vacuum tubes have installed or radiation shielding reconfigured.

- b. The radar technician shall notify the ROSHM, or ROSHM designee, within 8 hours of the replacement of FPA vacuum tube(s). A list of the current ROSHMs and their phone numbers are available at the EEOSH Services website:

<http://ats.awa.faa.gov/aaf/afz/800/afz800frame.htm>

(1) At ARSR-1, ARSR-2, ARSR-3 and FPS radars, the FMO/ROSHM/ROSHM designee shall conduct radiation surveys within 14 days when klystrons, magnetrons, thyratrons (except those operating below 12.4 kilovolts, such as magnetron thyratrons), or amplitrans are installed or ionizing radiation shielding is replaced or reconfigured.

(2) For surveys performed as a result of FPA vacuum tube replacement, the survey must determine exposure in the vicinity of the component that was replaced. A full facility radiation survey is not required if one has been performed within the past 12 months. The affected radar channel can be operational in the interim provided the ACGIH endorsed ALARA (as low as reasonably achievable) principle is followed to ensure radiation exposure levels are below the ACGIH guidelines.

(3) Between the time that the tube is replaced and the radiation survey is performed, personnel tuning or adjusting the channel shall spend no more than **4 hours** of accumulated time within **3 feet** of the potential x-ray source with the tube transmitting at full power. All personnel shall document time, distance, and tasks performed within 3 feet of the radiating tube in the comments section of the Maintenance Management System.

c. If the survey indicates emissions exceed action levels at 14 inches from the radiation source, the ROSHM, (or ROSHM designee) shall be notified within 3 working days. At that time, the ROSHM (or ROSHM designee) shall:

(1) Perform an employee exposure assessment.

(2) Ensure that the results of the survey and assessment are provided to the affected employee.

(3) Work with the affected employees to establish a monitoring and documentation program to ensure that the annual exposure limit is not exceeded.

d. If the radiation action levels are not exceeded at 14 inches from the radiation source, the person (FMO/ROSHM/ROSHM designee) performing the survey shall provide copies of all ionizing and nonionizing radiation site surveys no later than 30 days following the survey to the following:

(1) The Regional Occupational Safety and Health Manager.

(2) The System Management Office (SMO) Safety Officer/Safety Environmental Compliance Manager (SECM).

(3) Air Traffic Control (ATC) Spectrum Engineering Services.

(4) The ATC Facilities Energy, Environmental and Occupational Safety and Health (EEOSH) Services Group (formerly AFZ-800).

e. The ROSHM shall provide radiation safety awareness training for FAA technicians assigned to work at the sites surveyed.

f. The SECM shall ensure that proper ionizing and/or non-ionizing warning signs are posted at all radar facilities in accordance with OSHA regulations.

g. The ROSHM/SMO Safety Officer/SECM shall coordinate with the supervisors of affected employees to ensure that employees are notified of their radiation exposure in accordance with OSH 29 CFR 1910.1020: Access to Employee Exposure and Medical Records.

h. The ROSHM/SMO Safety Officer/SECM will provide all affected personnel with a copy of the latest version of Order 3900.19B, Chapter 14, Radiation Safety Program.

8. Background.

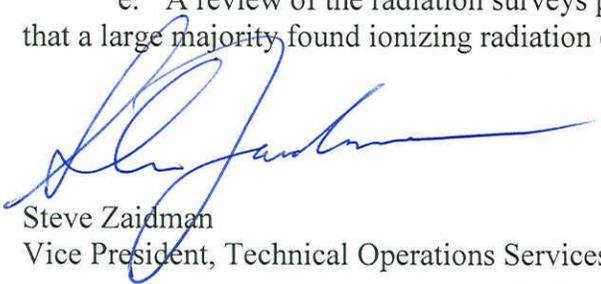
a. Due to the recent ionizing radiation safety program issues at radar facilities, it is imperative that the actions of this order be implemented immediately. Questions should be directed to the SMO SECM or the ROSHM.

b. Ionizing radiation is high-energy electromagnetic radiation that is capable of producing ions as it passes through matter. In the FAA, the principal sources of x-ray ionizing radiation are the final power amplifiers found at radar sites. These include klystrons, magnetrons, thyratrons (except those operating below 12.4 kilovolts, such as magnetron thyratrons) and amplitrons.

c. Nonionizing radiation is a less energetic form of electromagnetic radiation with insufficient energy to ionize matter. It is emitted by equipment operating at frequencies ranging from 3 kHz to 300 GHz.

d. The FAA ionizing radiation action level (2.5 milliRoentgens/hour (mR/hr) measured 14 inches from the radiation source) is based on the American Conference of Governmental Industrial Hygienists (ACGIH) Guidelines. The FAA nonionizing radiation action levels (measured 14 inches from the radiation source) are based on the Institute of Electrical and Electronics Engineers (IEEE) C95.1 uncontrolled (public) exposure limits. Exposure above these action levels triggers additional employee safeguards as required by OSHA Standard 29 CFR Part 1910 and Order 3900.19B, chapter 14.

e. A review of the radiation surveys performed at FAA long-range radar sites indicates that a large majority found ionizing radiation exposures **below** the 2.5 mR/hr action level.



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