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Safety

**RADIOLOGICAL SAFETY OPERATING AND
EMERGENCY PROCEDURES**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction defines responsibilities and outlines safety and emergency procedures for radiographic exposure during routine maintenance inspections. It implements AFD 91-3, *Occupational Safety and Health*. It also references T.O. 33B-1-1, *Nondestructive Inspection Methods*, T.O. 11A-1-33, *Handling and Maintenance of Explosives Loaded Aircraft*, AFOSH STD 127-110, *Nondestructive Inspection and Oil Analysis Program*. It applies to all personnel assigned to the wing.

SUMMARY OF REVISIONS

This instruction is revised to re-designate the control number to align with the AFRC InfoBase. A (I) indicates revisions from the previous edition.

1. Responsibilities:

1.1. Squadron Commanders and Maintenance Officers and Flight Chief Supervisors:

1.1.1. Are thoroughly familiar with this instruction and publishing directives as referenced.

1.1.2. Ensure compliance with this instruction and publishing directives as referenced.

1.1.3. Ensure scheduling radiographic exposures of structural inspections in areas surveyed by bio-environmental engineers. **Attachment 1.**

1.1.4. Ensure periodic inspections by quality assurance and ground safety personnel of facilities and compliance with current directives.

1.2. Maintenance Operations Center:

1.2.1. Ensures schedules and placement of aircraft for x-ray are surveyed by bio-environmental engineers. **Attachment 1.**

1.2.2. Confirms the availability of materials, equipment and technicians to accomplish radiographic exposure inspections.

1.2.3. Ensures aircraft scheduled for x-ray have been rendered safe for radiographic inspections with the following specific areas of concern:

1.2.3.1. Ensures aircraft safe for maintenance.

1.2.3.2. Ensures munitions safe for fuel system maintenance (if required).

1.3. Fabrication Flight Chief:

1.3.1. Ensures the individuals qualifications and documentation for radiographic are as prescribed by T.O. 33B-1-1.

1.3.2. Ensures that safety precautions and radiation protection procedures are followed during operations of radiographic equipment.

1.3.3. Ensures determination of x-ray areas and surveys are conducted as prescribed by T.O. 33B-1-1.

1.4. Nondestructive Inspection Lab Supervisor:

1.4.1. Develops and maintains current radiological safety operating and emergency procedures approved by the director of base medical services.

1.4.2. Administers all industrial radiographic operations and ensures compliance with all aspects of the Radiation Protection Program.

1.4.3. Ensures all personnel are qualified in radiographic operations.

1.4.4. Issues and controls film and thermo luminescent dosimeter (TLD) badges for recording radiation exposures.

1.4.5. Ensures, at least 2 calibrated radiation survey instruments are available and used during all radiographic operations.

1.5. Bio-environmental Engineering Services (SGPB). Conducts initial and annual As Low As Reasonably Achievable (ALARA) training to all personnel assigned to radiographic operations.

NOTE: Strict adherence and compliance with prescribed safety standards is mandatory for all personnel participating in radiographic operations.

2. Emergency Procedures:

2.1. Whenever an over exposure to any person is suspected, an emergency situation shall be considered to exist.

2.2. Immediately cease all radiographic operations, and report the incident to the nondestructive inspection lab supervisor (day or night).

2.3. Obtain the name, social security number and organization of all personnel suspected of overexposure.

2.4. Notify the base medical service of the suspected overexposure and turning the individual film and TLD badge and the control badge to them if applicable.

NOTE: Contact: Bio-Environmental Engineering Services.

- 2.5. Record final pocket dosimeter reading on AFTO Form 115, **Pocket Dosimeter Results Log**.
- 2.6. Obtain a signed statement from the exposed individual(s) of their actions resulting in the exposure.
- 2.7. Individuals suspected of over exposure will be taken to the following medical service facilities:
 - 2.7.1. Military. Flight Surgeon's Office - Hospital
 - 2.7.2. Civilian. Occupational Medicine Services - Bldg 249.
 - 2.7.3. Non-duty hours. Emergency Room - military or civilian.
- 2.8. Do not move equipment or attempt to recreate the incident without SGPB approval.
- 2.9. A complete record of the incident is prepared by the nondestructive inspection lab supervisor with signed statements from all operators and exposed personnel indicating their concurrence with the report. This record shall include the following data:
 - 2.9.1. Orientation and duration of exposure.
 - 2.9.2. A detailed sketch of the area indicating x-ray apparatus positions and positions of personnel.
 - 2.9.3. A copy of this report shall be filed in each exposed person's medical record.
- 2.10. The completed AFTO Form 115 is permanently maintained as prescribed by AFR 4-20, *Disposition of Air Force Records-Records Disposition Schedule* on file in the work center along with any other documents generated during the subsequent investigation of the suspected over exposure.

3. Preparing for Exposure in Unshielded/Enclosed Facilities:

- 3.1. A copy of the radiological safety operating emergency procedures is available during all radiographic operations.
- 3.2. Charge two pocket dosimeters or one digital alarm dosimeter per person and record reading on AFTO Form 115.
- 3.3. Check AFTO Form 244, **Cable Record** or other maintenance documents for the condition of the equipment prior to use.
- 3.4. Turn on survey meters and allow them to warm up as specified by owner manuals. At least two survey meters are used during all radiographic operations.
- 3.5. Perform functional check of survey meters and record readings on AFTO Form 140, **Radiac Equipment Maintenance Record**. Ensure survey meters are not overdue PMEL calibration.
- 3.6. Whenever the x-ray tube head is connected to a possible electrical unshielded source, survey meter is used to continuously monitor for radiation.
- 3.7. Illuminate entire area for night operations.
- 3.8. Limit access to radiation area by using door locks.
- 3.9. Place "x-ray on when lit" beacons near x-ray tube head or primary beam and connect to interlock devices.

- 3.10. Place AFTO Form 9, **Caution Radiation Area** sign along barrier.
- 3.11. Place x-ray equipment in position for first exposure, locating control unit at maximum possible distance from tube head and primary beam.
CAUTION: If tube head is to be placed on a maintenance stand (B-1, B-4, etc.), disconnect and remove tube head from stand when repositioning for other shots.
- 3.12. Make all required electrical connections and secure. Connect coolant lines, if applicable. Ensure unit is properly grounded. Carefully place tube head in cradle or stand.
- 3.13. Check SF-6 gas pressure on tube head as specified in the service manual.
- 3.14. Check coolant level, turn cooler on and note pressure gauge reading.
- 3.15. Position head collar and cover on tube head window for warm-up operations.
- 3.16. Verify that the area and the object to be x-rayed are clear of any personnel.
- 3.17. Position monitors. One radiographer remains at the controls at all times during irradiation. Monitors use audible signals (radio, whistle, etc) to communicate if necessary.
- 3.18. Install safety key, turn line switch-safety key to "ON". Set timer to required time.
- 3.19. Warm up x-ray unit according to tech data.

NOTE: Except when verifying safety interlock operations and in emergencies, door interlocks will not be used to terminate the exposure. The exposure will be terminated at the control panel. When radiographic exposure has been completed, the power safety switch key shall be removed from the control panel, if the control panel is left unattended.

4. Exposure:

- 4.1. Position film for exposure.
- 4.2. Position tube head according to exposure technique. Ensure head collar/cover on tube head is not blocking window.
- 4.3. Again, verify that restricted area is clear of unauthorized personnel.
- 4.4. Position monitors so that the entire parameter is in view at all times.
- 4.5. Set timer, kilo volt, and milli amperes according to technique. Make exposure.
- 4.6. Radiographer must keep their radiation exposure as low as reasonably achievable and in all cases below the permissible exposure limit.
- 4.7. After all radiation is completed, remove power safety key and return it to key storage box.
- 4.8. Record final dosimeter readings on AFTO Form 115.
- 4.9. Account for all equipment and supplies and properly store them.

DAVID E. TANZI, Brig Gen, USAFR,
Commander

Attachment 1

FLIGHT LINE/TAXI ROAD BUILDING 578

