

The University of Texas
Southwestern Medical Center at Dallas

Requirements for use of DTPA(Tc-99m) Aerosols

I. These requirements ensure compliance with the Texas Regulations for Control of Radiation by following guidelines set forth in NRC Regulatory Guide 10.8 Revision 2, Appendix O.

II. Additional Sublicensing Information

1. Specify the maximum number of millicuries of DTPA(Tc-99m) aerosol to be used per week:_____
2. List the room number(s) of the room(s) to be authorized for DTPA(Tc-99m) aerosol use or storage:_____

Complete a RSF-005a for each room listed above showing all air inlet and exhaust vents and indicating by arrows the airflow patterns.

3. Describe the method of exhausting air from the facility during times when Xe-133 is being used. Describe the method for preventing recirculation of air to the remainder of the facility during DTPA(Tc-99m) aerosol usage. Specify airflow rates into and out of the room. If an exhaust stack is used, specify how far the point of exhaust is from any unrestricted area.

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4. Describe the method used for administering the dose to the patient and the method used for collecting, trapping, or exhausting the exhaled . If a trap is used, describe the procedure for testing the trap to assure that it is properly holding the DTPA(Tc-99m) aerosol.
5. Describe emergency procedures for coping with large accidental releases of DTPA(Tc-99m) aerosol, such as loss of an entire patient dose or bulk quantity. In case of such a release, the room shall be evacuated and the air exhausted until the DTPA(Tc-99m) aerosol concentration in the room is less than $4 \times 10^{-5} \mu\text{Ci/ml}$. The time the room shall be evacuated shall be calculated from the following equation:

$$t = \frac{-V}{Q} * \ln \left(C * \frac{V}{A} \right)$$

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6. Show calculations to demonstrate that personnel are exposed to weekly average concentrations of DTPA(Tc-99m) aerosol less than $4 \times 10^{-5} \mu\text{Ci/ml}$, and that the general public is exposed to concentrations of DTPA(Tc-99m) aerosol less than $1 \times 10^{-6} \mu\text{Ci/ml}$. In lieu of the above calculations, if the room has an outside exhaust flow rate equal to or greater than that indicated in the appropriate row corresponding to weekly workload in the tables below, the following information can be provided: exhaust flow rates; indicate direct exhaust, DTPA(Tc-99m) aerosol trap, or plastic bag collection system; and location of exhaust release.

Table 1. Exhaust Release Site is Inaccessible but Not Remote from General Public

Weekly Workload [mCi/week]	Exhaust Flow Rate (With Trap or Plastic Bag Collector) [ft ³ /min]	Exhaust Flow Rate (Without Trap or Plastic Bag Collector) [ft ³ /min]
10	50	120
25	75	300
50	150	600
100	300	1200
200	750	3000

Table 2. Exhaust Release Site is Inaccessible and Remote from General Public

Weekly Workload [mCi/week]	Exhaust Flow Rate [ft ³ /min]
10	50
25	50
50	100
100	150

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III. Radiation Safety Considerations

1. Facility Design

- a. When DTPA(Tc-99m) aerosol is in use, the DTPA(Tc-99m) aerosol facility shall be a closed room with an exhaust system to direct air outside the facility.
- b. When DTPA(Tc-99m) aerosol is in use, the room shall be exhausted such that it remains under a negative pressure with respect to adjacent rooms and hallways.
- c. When DTPA(Tc-99m) aerosol is in use, there shall be no recirculation of air to the remainder of the facility and the exhausted air shall be released outside the facility at a point not normally accessible to personnel or the general public and not near any air intake of any ventilation system.
- d. After the use of DTPA(Tc-99m) aerosol, the exhaust to the outside may be shut off and the room may be returned to the normal air conditioning system, if so desired.

2. Collection and Disposal of DTPA(Tc-99m) Aerosol

- a. The patient shall be required to exhale into a face mask or mouthpiece connected by a flexible hose that exhausts to a DTPA(Tc-99m) aerosol trap, to a shielded plastic bag, or directly to the room's exhaust to the outside.
- b. If the exhaled DTPA(Tc-99m) aerosol is released directly to the exhaust, the air flow rate in the exhaust shall be such that the DTPA(Tc-99m) aerosol concentration is less than 1×10^{-6} mCi/ml at the unrestricted location nearest to the point of exhaust.
- c. If a trap or shielded plastic bag is used, a conservative estimate of leakage is 25% of the total DTPA(Tc-99m) aerosol used. Therefore, if a trap or plastic bag is used, the exhaust air flow rate required would be only 25% of what would be necessary if the DTPA(Tc-99m) aerosol is released directly into the room's exhaust system.
- d. If a DTPA(Tc-99m) aerosol trap is used, the air exhausted from the trap shall be collected periodically and counted to determine if DTPA(Tc-99m) aerosol is leaking through the filter. An automatic monitoring system with an alarm may be used instead of periodic checking. When the filters no longer trap DTPA(Tc-99m) aerosol, they shall be replaced or otherwise made effective as prescribed by the manufacturer.
- e. If a shielded plastic bag is used to collect the exhaled DTPA(Tc-99m) aerosol, precautions shall be taken when exhausting the bag to the atmosphere to prevent exposure to personnel and to the general public. The bags should be exhausted in the open air and down wind from the person releasing the DTPA(Tc-99m) aerosol. An exhaust fan with hose should be used to direct the release in the proper direction. The bags shall not be handled outside of their shielded container except for short periods of time necessary for their disposal.