

Addendum to Part One: Procedure Manual for the Use of Radioactive Materials

**Radiological Safety Procedure Manual for  
Veterinary Use of Radioactive Material**

Radiological Safety  
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## **Addendum**

### **Refer: Procedure Manual for the Use of Radioactive Materials-Part I**

#### **Note: Follow Reg. Guide 3.15**

This document contains operating and radiation safety procedures for veterinary use of radioactive materials for diagnosis and treatment and **not for research**

### **I. Nuclear Medicine Procedures for Diagnosis and Therapeutic (Tc-99m and I-131) and PET isotopes**

#### **1. Training of Authorized Veterinarians, Technologists**

Usage of radioactive materials in animals is authorized by a licensed veterinarian (DVM) who is licensed in accordance with the laws of The State of Texas to dispense and use drugs in the practice of veterinary medicine, and has didactic and clinical radioisotope training and experience commensurate with the proposed use of radioactive material. The authorized users will be approved the Radiation Safety Committee following submission of training and experience in accordance with Title 25 Texas Administrative Code (25TAC) Section (289.256(gg), and (aaa), as applicable.

Before usage of radioactive materials, all authorized veterinarians shall complete general radiation safety training for veterinary medicine use offered by TAMU Environmental Health and Safety (EHS) - Radiological Safety Staff (RSS). Training outline is described in Radiation Safety Procedures Manual Part I. Online Refresher training is offered every year.

All personnel involved in nuclear medicine procedures (diagnostic and therapeutic) undergo specific laboratory training that includes:

- Receipt of radioactive material;

- Performing checks for proper operation of survey meters;
- Using procedures to contain spilled byproduct material safely;
- Proper decontamination procedures; and emergency response.

Curriculum Vitae of primary DVM's who orders and/or performs diagnosis and therapy are included in Appendix A.

## **2. Facility**

All nuclear medicine procedures are performed in authorized areas and only authorized personnel have access to those areas. Appendix B shows the current authorized locations for nuclear medicine practice at the Veterinary Teaching Hospital (VTH) and PET facilities at Texas Institute of Preclinical Studies (TIPS).

## **3. Radioactive Material Receipt and Storage**

Radioactive material use is authorized by the TAMU Radiological Safety Committee (RSC) only upon appropriate review of the safety procedures.

- Radioactive material for nuclear medicine procedures will be delivered directly to Nuclear Medicine room at the Veterinary Teaching Hospital.
- PET isotopes for imaging using PET/CT at TIPS will be delivered directly to TIPS radiopharmaceutical lab.
- All personnel who receive radioactive material shall complete the package receipt training offered by EHS -RSS.
- All packages containing radioactive material shall be checked by appropriately trained staff according to procedures outlined in Procedure manual for the use of radioactive materials.
- Receipt records shall be kept at the receiving locations

- Prepared doses shall remain in a shielded syringe until administration. After administration, the syringe shall be returned to the appropriate shield in an authorized storage area.
- All disposable material shall be disposed of in the receptacle designated for radioactive material.
- All personnel who are involved in shipping remaining radioactive materials to the manufacturer shall complete DOT awareness training and refresher training.

#### **4. Dose Preparation and Administration**

##### General

- All diagnostic and therapeutic procedures shall be ordered by the attending DVM
- Appropriate dose will be determined by the attending DVM
- Written directives, in accordance with 25TAC 289.256(t)(4), are to include at a minimum that the patient's identity is verified and that each administration is in accordance with the written directive, prepared in accordance with 25TAC 289.256(t).
- Individuals working under supervision of an Authorized User, such as technologists, will receive instruction on your written directive procedures, agency rule, and license conditions, in accordance with 25 TAC §289.256(s).
- In accordance with TAC 289.256 (x), the activity of each dosage (unit dose or other than unit dosage) will be determined and recorded before its use.
- For a unit dosage, this determination shall be made by:
  - direct measurement of radioactivity; or
  - a decay correction, based on the activity or activity concentration
- For other than unit dosages, this determination shall be made by:

- direct measurement of radioactivity;
  - combination of measurement of radioactivity and mathematical calculations; or
  - combination of volumetric measurements and mathematical calculations.
- TAMU will calibrate dose calibrators, in accordance with 25 TAC §289.256(v) if applicable.
- Unless otherwise directed by an authorized user, a dosage will not be administered if it does not fall within the prescribed dosage range or if it varies more than  $\pm 20\%$  from the prescribed dosage.
- Whole body and extremity dosimeters shall be worn by Nuclear Medicine personnel at VTH and TIPS during dose preparation and administration
- Gloves and lab coats shall be worn by all personnel involved in dose preparation and administration
- Patient handlers shall also wear gloves and lab coats as appropriate. If applicable, surfaces with the potential for contamination should be covered with absorbent paper during dose preparation and administration
- Access to radioactive material room is controlled and the use is limited to only authorized users
- Routine radiation/contamination surveys (fixed and removable) will be performed where radionuclides are used and stored including animal confinement areas
- A survey will be performed with a radiation detection instrument at the end of each day of use all areas where radioactive material requiring a written directive was prepared for use or administered, in accordance with 25 TAC §289.256(bb).

- TAMU shall calibrate the survey instruments used to show compliance with 25TAC§289.256(w) and with 25TAC§289.202 before first use, annually, and following a repair that affects the calibration.
- Waste management methods will be followed as outlined in the Procedures Manual for use of Radioactive Materials-Part I
- Personnel routinely involved in the preparation or administration of I-131 shall be monitored periodically and thyroid bioassays performed. Other individuals involved will be monitored on a case-by-case basis.
- Bioassays shall also be performed where there is a possibility of an intake of radioactive material. This includes instances where contamination is detected around the face.
- Bioassays shall also be performed upon request.

#### Tc-99m/F-18

- Personnel, equipment, and the procedure area shall be surveyed for contamination after administration.
- Warning signs will be posted for the stalls/holding room that house the patients injected with radioactive materials.
- Patient with Tc-99m will remain in the stall/ holding room for no less than 24 hrs. after administration.
- Patient F-18 will remain in the appropriate holding room till the surface radiation level measured using an appropriate survey instrument is less than 2 millirem per hour (2 mrem/h).

#### **Patient Release (Tc-99m)**

- Patients (large animal or small animal) shall be released no earlier than 24 hrs. and from Nuclear Medicine control when the maximum surface dose rate of patient is less than 2 millirem per hour (2 mrem/h) at no earlier than 24 hrs. External radiation levels of the patient at release shall be documented.
- If the patient is to remain in the hospital, the attending clinician may move the patient to a freshly bedded stall upon release by Nuclear Medicine personnel.
- The stall or holding area where the patient is housed after administration shall be posted as “Caution-Radioactive material” for a minimum 48 hrs. following administration.
- The nuclear medicine personnel or EHS\_RSS shall survey the stalls no more than 1-2 inches away from the bedding using an appropriate survey instrument before release.
- If the stall is needed less than 48 hours after injection, the stall shall be surveyed by Nuclear Medicine or EHS – RSS and areas of contamination shall be removed and held for decay before being released for cleaning.
- Restrictions on small animal cages shall follow similar requirements.
- Written release instructions (as per NUREG 1556, Vol 7) shall be provided to the owner.

#### I-131

- All operations involving the preparation of the I-131 shall be carried out behind the appropriate shielding in the nuclear medicine hot lab.
- All potentially contaminated disposable material shall be disposed of in the receptacle designated for radioactive material.
- Contamination survey of personnel, equipment, and the preparation area shall be performed after administration.

- If transport carrier is used for patients injected with radioactive material, contamination survey of the carrier shall be performed after use.
- All authorized personnel caring for the I-131 patients shall perform survey appropriately.

### **Release Criteria for Patients Treated for Hyperthyroidism**

- The patient will remain in isolation at the hospital for a minimum stay time of 4 days following I-131 injection.
  - (As an example, cat injected between 8 am and 5 pm on Monday may be released between 8 am and 5 pm on Friday of the same week).
- Following the minimum 4 days, the highest radiation level at 1 meter from the thyroid of the patient will be measured by an appropriate survey instrument.
- If the highest radiation level at a meter is less than 0.5 mR/hr post the minimum 4 days, the patient may be released.
- If the radiation level at 1 meter is greater than or equal to 0.5 mR/hr after the minimum 4 days, the patient must be retained until such time as the requirement 3 is met.
- All release information will be documented to include the date and time of survey, survey instrument used, instrument calibration due date, measured radiation level (mR/h), name of the individual performing the survey and the final patient release date/time.
- Written release instructions (as per NUREG 1556, Vol 7) will be provided to the owner during discharge.
  - To help accomplish ALARA, owners will be given instructions on how to handle contaminated litter, bedding and other objects that the patient comes in contact



with. The instructions will also address the extent and duration of contact by individuals with the patient.

- Certification of Owners will be obtained-that the owner has read and agrees to abide by all necessary restrictions, including those emergency procedures to be followed in case of the death of the patient during this period the restrictions are necessary.
- The patient will remain in isolation at the hospital for a minimum stay time of 4 days following I-131 injection.
- Following the minimum 4 days, the highest radiation level at 1 meter from the thyroid of the patient will be measured by an appropriate survey instrument.
- If the highest radiation level at a meter is less than 0.5 mR/hr post the minimum 4 days, the patient may be released.
- If the radiation level at meter is greater than or equal to 0.5 mR/hr after the minimum 4 days, the patient must be retained until such time as the requirement 3 is met.
- All release information will be documented to include the date and time, survey instrument used, calibration due date, measured radiation level, name of the individual performing the measurement and the final patient release date.

Written release instructions (as per NUREG 1556, Vol 7) will be provided to the owner during discharge. Certification of Owners will be obtained-that the owner has read and agrees to abide by all necessary restrictions, including those emergency procedures to be followed in case of the death of the patient during this period the restrictions are necessary.

### **Medical Care of Patients in Radiation Isolation**

- If the condition of the patient necessitates medical care requiring it to be removed from its cage (such as the need for medications or fluid therapy), precautions must

be taken to prevent or minimize dose to personnel, contamination, and airborne radioactivity.

- If invasive emergency care is required (such as surgery), Nuclear Medicine and EHS - RSS must be notified as soon as possible.
- Emergency care personnel shall receive instruction regarding methods to prevent the spread of contamination and methods to minimize internal and external exposure.

### **Death of a Patient**

If a patient should die during treatment or after a scan, the following steps should be taken to ensure that exposure to personnel and the owner are minimized.

- EHS-RSS and Nuclear Medicine should be notified as soon as possible.
- The carcass shall be surveyed at surface to determine the external radiation level.
- If possible, the carcass shall be placed in a plastic bag. The radioactive material tag on the cage or stall shall be attached to the animal or attached to the bag in which the animal was placed.
- Necropsy personnel shall be notified and the tagged carcass shall be placed in the necropsy locker for storage. It is not to be placed in the disposal locker.
- No necropsy/biopsy procedures shall be performed on the animal without permission from EHS-RSS.
- The patient remains shall not be released if the radiation level precludes release as per release criteria.

**I. Requirements for possession of sealed sources and brachytherapy sealed sources.**

(25 TAC §289.256 (z))

Veterinary teaching hospital possesses a Sr-90 eye applicator source and manual brachytherapy procedures will be followed. As documented in License L00448 condition 23. The licensee is exempt from the requirements of 25 TAC §289.256 (ww) and (xx) for the veterinary use of Sr-90 eye applicators.

- The radiation safety and handling instructions supplied by the manufacturer and the leakage test requirements in accordance with 25 TAC §289.201(g) shall be followed.
- A physical inventory at intervals not to exceed six months shall be performed and documented.
- Leak test for the sealed source shall be performed and documented at intervals not to exceed six months.
- Sealed source storage- authorized user locations –use locations authorized by RSC.
- The manual brachytherapy will be performed by the authorized veterinarian.
- Safety instructions will be provided to personnel who are assisting with the process.
- After usage of the Sr-90 eye applicator, the user shall return the sealed source to the permanent storage area.
- Radiation surveys shall be performed with an appropriate instrument to make sure the source is in the shielded configuration and exposure to members of the public is below 2 mR/h.
- All authorized locations for use will be posted according to 25TAC §289.256.