M516
P-7

To : Tom Thompson, US NRC Region I

Date: 5/5/09

From : Chris Coon, D.V.M

Subject : Haven Lake Animal Hospital, License Application
Mail Control Number **143558**

07-31361-01
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Mr. Thompson,
Thank you for relaying your questions concerning the Haven Lake Animal Hospital license application to Jim Fongheiser. I am providing the following responses:

1. The administration protocol is attached for your review. Administration will be performed by trained individuals or by Dr. Coon himself. A survey of the holding area after each administration is part of that protocol, as well as monitoring the uncontrolled area boundary. Our I-131 treatment area is designed into a large, unused area of our facility to ensure minimal exposure to staff, and to allow flexibility in changing the outer boundary with rope barriers if an unforeseen dose rate is encountered. Expected dose ranges using 5 mCi I-131 dose to the animal will initially be approximately 10 mR/hr at one foot from the animal, and decay down from there.

2. Our release criteria is stated on page 37 of our radiation protection program and is based on the NRC memo from John Hickey to Doug Collins (see attached). Although we commit to a minimum of 96 hours hold time, we plan to schedule the administration procedure and the subsequent animal pick-up to be at or near 7 days hold time. This would allow pet owner's to do worst case planning and minimize exposure concerns.

3. Instructions to the animal owner and a consent form have been developed and are attached for your review. They include a questionnaire to evaluate any special needs for an owner/family situation.

4. In the event that a bio-assay is needed for any individual, the Milford Hospital is local. I know they have a cancer center and I have contacted them to ensure they have the ability to measure thyroid doses and support a bioassay need for us.

5. Our spill procedure is found on page 22, and 23 of our radiation protection manual and is attached for your review. Isolation of the area to assess and then perform a decon, and notification of the RSO are two key points in the program.

6. Dose rates on the outside of the hot lab should be minimal. Only unit doses will be ordered for administration to the pets, and little other radioactive material will be stored there. Other controlled area perimeters, such as the holding kennel, will be maintained at 2 mR/hr by using shielding in the room or by using a flexible rope barrier on the outside of the room if a temporary, unexpected dose rate is found. We only expect a maximum occupancy of the holding kennel to be 2 to 4 treated animals.

143558

7. My radiation safety officer experience includes 13 years as the physicist at Bustleton Radiology, which uses I-131 in imaging. I also have 15 years experience in the nuclear power industry. During that time my responsibilities included being the dose assessment team leader for the emergency response organization, responsible for recommending the administration of KI capsules when needed, and I also served as the Radiation Protection Manager at a two unit BWR. My resume, and some specific relevant training is attached for your review.

In addition, you should know that we have a full radiation protection program and record keeping system developed that will be implemented once authority to operate has been granted to us through the licensing process. We do not intend to complete the build-out or purchase equipment until licensing is assured.
Please let me know if you have any further questions.

Thank you,

Chris Coon, D.V.M.

Attachments:

**Haven Lake Animal Hospital**
**300 Milford-Harrington Hwy**
**Milford, DE 19963**

# Treatment Protocol for I-131 Treatment

**NOTES:**

1. **Always use good technique and wear gloves when handling potentially contaminated material.**
2. **Maintain positive control over I-131 doses and other radioactive material at all times.**

## Prerequisites:

1. Daily instrument checks have been performed and documented.
2. Package receipt survey has been performed and documented.
3. Verify correct animal is selected and prepared for the treatment per the veterinarian's request.
4. Ensure that the animal owner has been given the treatment plan overview, completed the questionnaire and signed the consent form.
5. Administrations will be performed by Dr. Coon, or under Dr. Coon's supervision or by an individual specifically trained to perform the administration to the animal.

## Protective Equipment and Supplies:

1. Ensure that a shielded, measured unit dose is ready for administration to the animal.
2. Have a "pill gun" available for use for the administration of the dose to the animal.
3. Have several absorbent pads available on the treatment table in the event the capsule is rejected by the animal.
4. Have a functioning survey meter available in the treatment room.
5. Have on hand some additional gloves, decon solution, and cleaning supplies in the event of a spill.
6. Wear disposable gloves and a lab coat during the treatment.
7. Wear assigned dosimetric device to monitor personal exposure while working with the animal and the doses.

**Attachment 14**
**Clinical Program**

Written clinical policies and procedures will be maintained in our facility which will incorporate our radiation protection program commitments and the guidance provided by the Nuclear Regulatory Commission regarding the management of cats treated with I-131.

A method will be established to document the discussion of the procedure, the hold times for the animal, and the instructions for the animal's after-care with the animal owner(s). A signature on a consent form that outlines these items will be obtained from the owner prior to the animal being treated. Consideration will be noted for any special circumstances that should be factored into the treatment plan and animal after-care instructions. This pre-administration acceptance screening and subsequent evaluation of indicators (such as cat/owner interaction, the owner's degree of compliance with instructions, and other behaviors) will provide high confidence of compliance with the dose limits for the public and may be used in establishing release criteria for individual cats.

Personnel involved in dose administrations will be instructed in proper handling techniques for the unit doses and the potential for contamination. Area and personnel survey techniques will be stressed.

Hold times for animals will follow the guidance provided by the NRC and will, at a minimum, be greater than 96 hours from the time of administration of the dose. A routine dose administration schedule will be established that will exceed these times by design.

Controlled areas where animals are prepped, where doses are administered and where treated animals are held will treated as potentially contaminated areas and surveyed to minimize the spread of contamination.

Personnel caring for treated animals during their hold time will be instructed in methods to minimize their exposure and the spread of contamination. They will also be instructed in methods to collect, store and document contaminated waste being held for our decay-in-storage disposal technique.

Animals will be released only when they meet the criteria in the NRC Guidance which limits the dose to members of the public, including the animal owner, to 100 mrem. A combination of methods will be used to ensure this limit is upheld, including the animal's dose rate at one foot, and the assurance that written instructions provided to the owner will be followed.
Written instructions given to the animal owner will include at a minimum:

(1) waste handling and storage instructions
(2) contamination control techniques
(3) appropriate human interaction guidance/isolation instructions

After 96 hours hold time, the following guidance for interaction would be appropriate for animals that are within the specified dose rate criteria at time of release:

| | |
|---|---|
| 0.25 mR/hr at 1 foot | restricted very close contact; isolation usually not required |
| 0.5 mR/hr at 1 foot | limited human interaction; isolation for 1-2 days; later restricted very close contact |

Documentation will be maintained in the facility for inspection.

` MEMORANDUM TO: Douglas M. Collins, Director
Division of Nuclear Materials Safety, RII

FROM: John W.N. Hickey, Chief /RA/
Materials Safety and Inspection Branch
Division of Industrial and Medical
Nuclear Safety, NMSS

SUBJECT: TECHNICAL ASSISTANCE REQUEST DATED MAY 18, 2001, RELEASE CRITERIA FOR CATS TREATED WITH RADIOACTIVE IODINE

ISSUE:

In a technical assistance request (TAR) dated May 18, 2001, Region II requested guidance on veterinary patient release criterion for cats treated with radioactive iodine and clarification of whether the licensee can take credit for specific verbal instructions in developing the release criteria. The veterinary patient release criterion is governed by the 100 millirem (mrem) public, yearly dose limit in 10 CFR 20.1301, "Dose limits for individual members of the public."

ACTION:

The licensee must assure the dose from a I-131 treated cat to individual members of the public (including members of the family) does not exceed the 100 mrem annual public dose limit in 10 CFR 20.1301. The licensee can provide the owner with written instructions (to avoid confusion) as a means of reducing dose to members of the public. Because compliance with these written instructions by the owner cannot be guaranteed, the instructions can provide a margin for dose reduction but should not be relied upon as the primary means to keep the dose to members of the public below the 100 mrem public dose limit.

Sample owner instructions should include how to handle contaminated litter, bedding and other objects the cat comes into contact with, and the permitted extent and duration of contact by individuals with the cat. These instructions should be evaluated with respect to the ease with which the owner can comply with them and the degree and duration of compliance needed to assure the maximum dose to a member of the public does not exceed 100 mrem.

CONTACT: Donna-Beth Howe, Ph.D., NMSS/IMNS
(301) 415-7848

Because neither the reviewer nor the licensee should expect the owner's strict compliance with the instructions, the licensee should include a sufficient safety margin in the instructions to account for this uncertainty.

The license reviewer may accept a proposed veterinary cat release criteria based upon a minimum number of days after I-131 treatment (not less than 4 complete days after treatment) and maximum dose rate (normally 0.25 milliRoentgen/hour (mR/hr) at 1 foot). This does not relieve the licensee from providing

written instructions and assurance that each release will be in compliance with 10 CFR 20.1301. If the instructions pertaining to the extent and duration of contact permitted with the cat are easy for the owner to comply with, and it appears that the potential dose would be well below 100 mrem, it may be acceptable, on a case-by-case basis, to release a cat with a radiation dose measurement as high as 0.5 mR/hr at 1 foot. Regardless of the release level used, the licensee should have records to document that the veterinary patient release criterion used for an individual patient will result in compliance with 10 CFR 20.1301.

Since the I-131 effective half-life, radiation profile, typical behavior pattern, and living situation for each cat are different, the actual release date needs to be established for each individual cat. This determination should be based upon the radiation measurement and effective half-life of I-131 for the patient at the time of release. As a minimum, two consecutive daily radiation measurements made at the same time of day and same distance from the cat are needed to calculate the effective half-life of I-131 for the treated cat. When cats are released, the licensee should assume that over time there will probably be diminishing compliance by the owner with the licensee's instructions. Additional consideration may be necessary when establishing the release date for an I-131 treated cat to a home with small children.

BACKGROUND:

NRC originally authorized release of cats treated with I-131 when: the dose rate was less than 1 mR/hr at 6 inches (0.25 mR/hr at 1 foot); instructions were provided to the owners; and the licensee could demonstrate that the limits of 10 CFR 20.1301 would not be exceeded (see Attachment 1, Health Physics Position 286). This guidance continues to be a good bench mark that can be used to estimate when the patient may be released. Its use, however, must also be combined with patient specific information and radiation data. The 0.25 mR/hr at 1 foot is a conservative release criteria. If the owner follows the instructions to limit interaction with the cat for the first few days, it is unlikely that a person would receive a 100 mrem dose even considering diminishing compliance with the instructions after the first few days.

Applying the 0.25 mR/hr at 1 ft criterion to measurements provided by one licensee, shows that only a few cats could be released 4 days after treatment (Attachment 2, day 5 of the table) and some cats would have to be held beyond 8 days. Holding these cats longer than the 4 to 8 days may not be necessary to assure compliance with 10 CFR 20.1301. Higher release levels may be appropriate for specific situations, but each higher release level will require a greater degree of compliance by the owner with the licensee's instructions over longer periods of time.

On a case specific basis, a radiation release measurement as high as 0.5 mR/hr at 1 foot may be acceptable provided it is easy for the owner to comply with the instructions pertaining to the extent and duration of contact permitted with the cat and difficult for an individual to receive a dose of 100 mrem. Attachment 3 demonstrates the potential doses to the owners when a cat is released, and the owners do not comply with instructions. The patient release criterion associated with the incident reported in Attachment 3 was less than 2 mR/hr at 1 meter, and the owners ignored all instructions.

Release criteria above 0.5 mR/hr at one foot are not recommended because strict compliance by owners with the licensee's instructions for extended periods is unlikely, and therefore compliance with the public dose limits cannot be assured.

REVIEWER NOTES:

See Attachment 4.

Attachments:
1. Health Physics Position 286
2. Effective Half-life of I-131 Table submitted for License No. 37-3037-01
3. NMED Report 010664
4. Reviewer notes
5. Items 10.11 and 10.12 submitted for License No. 37-3037-01
6. MicroShield Calculations
7. Release Criteria RadioCat License No. 45-25330-01

NMED Report 010664

ABSTRACT: The Polk County North Central Landfill reported that a City of Lakeland garbage truck set off their radiation monitor alarm. The load was dumped and a bag of kitty litter was found to be the source of radioactivity (probably I-131). Tag J-17 was issued and the investigator impounded the bag for decay and disposal. On 5/16/2001, the State of Florida Public Health Unit stated that the landfill had discovered the residence from which the kitty litter originated and had spoken to the cat's owner. The Public Health Unit visited the residence to determine the level of contamination. The owner of the cat stated that the cat had been given a 0.19 GBq (5 mCi) I-131 treatment from the Cat Thyroid Center (Ruskin Animal Hospital & Cat Clinic) on 5/1/2001. The investigator surveyed the home on 5/18/2001 and found the following readings: Cat read 2.5 mR/hour on contact with the surface of the shoulder and 0.04 mR/hour at one meter; garbage bags read 3 mR/hour on contact; floor next to litter box read 400 cpm; spot on floor where cat spit up read 2,000 cpm; towel in bathroom where cat often naps read 3,000 cpm; owner's bed where cat sleeps read 3,000 cpm and bedding material brought home from clinic (not used since discharge) read 1,000 cpm. The actual contact readings of the cat upon discharge from the clinic on 5/3/2001 was 90 mR/hour. The owner stated that she had lost the animal hospital discharge instructions and had been sleeping with the cat. The female owner stated that the cat had actually slept on her during the first ten days touching her head or neck an average of six hours per night, one foot from her husband's head area. It was estimated that the female owner received 2.88 cSv (rem) whole body dose (gamma). The male owner was estimated to have received 0.534 cSv (rem) whole body dose (gamma). Based on calculations using the actual dose rate from this cat, it appears impossible to keep the general public below 0.1 cSv (100 mrem) following the clinic's outpatient instructions. The cat died on 6/5/2001.

| Event Date | Discovery Date | Report Date |
|---|---|---|
| 05/08/2001 | 05/08/2001 | 05/17/2001 |

Licensee / Reporting Party Information:
Agreement State Regulated: YES
Reciprocity: NONE
License Number: NON-LICENSEE
Licensee: PRIVATE INDIVIDUAL
Docket: NA
City: LAKELAND
Program Code: NA
State: FL
NRC Region Office: 2

## REVIEWER NOTES

Distance Perspectives

The measurement distances used by several licensees include radiation measurements at 1 meter, 1 foot, and 6 inches. NRC's definition of the" whole body" in 10 CFR Part 20 is the head, trunk (including male gonads), arms above elbow, or legs above knee. The distances provided are put into perspective by relating them to distances from the highest activity measured from the cat to the center of the area of the person that NRC defines as the "whole body. "

One meter is the approximately distance from a cat lying on the floor to a standing adult. One foot is approximately an arm's distance. Thus, one foot could either be the distance from a cat to a person patting a cat when keeping the cat at arm's distance or the distance from a cat lying on the floor to an adult sitting in a chair near the cat. Although six inches would be the maximum distance from a cat to an adult holding the cat in their lap, three inches is a better estimate of this distance from a cat. All these distances should at least be halved when considering small children.

During transportation, one foot is approximately the distance between an adult driver and a cat in a carrier in the front passenger seat of a car. This distance would be between 1-2 feet if the cat were in the back seat, and may approach 1 meter if the cat was in the back of a van or station wagon.

Radiocat® - 1999 Radiation measurement and effective half-life Data

Veterinarians typically use 3- to 5-millicuries to treat feline hyperthyroidism. Radiocat®, provided data collected on 36 cats treated between April 12- 26, 1999, at the licensee's Maryland facility (Attachment 2). The data consisted of observed exposure rate measurements made 1 foot from the thyroid-region for each cat after injection and subsequently approximately 1, 3, 4, 5, and 6 days after treatment. In most cases, measurements were stopped after a reading of 0.4 mR/hr or less after day 4. This data was used to calculate I-131 effective half-lives for each cat. For 29 of the cats, the I-131 effective half-lives at day 1 ranged from a low of 1.0 to a high of 4.5 days; for the remaining 7 cats there was no decline in radiation measurements. The licensee incorrectly concluded the I-131 effective half -life for these animals was zero. This error lowered the licensee's average I-131 effective half life to 1.7 days when it should have been 2.1 days for those animals with declining measurements. Although the animals with no decline in measurements should have been assigned I-131 effective half-lives of 8 days (the physical half life of I-131), the measurement data at 3 days after injections shows a marked reduction in radiation levels to those similar to the other cats.

The I-131 effective half-life data presented for 3, 4, 5, 6,and 7 days after I-131 administration show variation between different days for the same cat. In some cases, the I-131 effective half-lives increased with time. There was also variation among cats. As evidenced by the large standard deviations resulting from simple averaging, the data sample is probably too small to draw statistical conclusions. At their time of release, most cats (26 of 36) had an estimated I-131 effective half-life of 1.5 days or less. The longest I-131 effective half-life was 3.1 days.

In 1999, the licensee also provided a table estimating the dose to an individual spending 3 hours a day with a released patient with an estimated retained activity of 500 microcuries (Attachment 5). Dose estimates 6 inches from the patient's thyroid area were used to approximate close contact.

NRC MicroShield Calculations

MicroShield version 5.05 was used to perform dose rate calculations and estimate retained activity from dose rates to verify data submitted in 1999 by the licensee (Attachment 6).

The first data point evaluated was the exposure rate expected at 6 inches from 500 microcuries of retained activity (Attachment 4, Table on page labeled "page 4 of 6, Item 10"). The MicroShield variables were set at: a 0.3 centimeter diameter sphere (for an approximation of the thyroid volume), retained activity of 500 microcuries, and 6 inch distance from the source. The MicroShield result was 4.8 mR/hr compared to the licensee's value of 2 mR/hr. This indicates that the licensee's results may be a factor of 2 too low for a cat with 500 microcuries of residual activity.

However, if the cat was released with a measurement at day 5 of 0.5 mR/hr at a foot (not 500 microcuries), the licensee's table could be used since 0.5 mR/hr at 1 foot is essentially 2 mR/hr at 6 inches. Actual measurements at these close distances may vary due to geometry and effect of I-131 present on fur or in the bladder.

MicroShield was also used to estimate the retained activity expected from the licensee's release criteria of a dose reading of 0.5 mR/hr at 1 foot and the newer requested dose rate of 0.5 mR/hr at one meter. An estimated 210 microcuries curies of I-131 would result in 0.5 mR/hr at 1 foot and 2.4 millicuries was estimated to result in 0.5 mR/hr at 1 meter. A residual radioactivity of 210 microcuries is calculated to result in an estimated dose rate of 2.0 mR/hr at 6 inches, and a an estimated 22 mR/hr at 6 inches for a residual radioactivity of 2.4 millicuries. A residual activity of 100 microcuries is calculated to result in an estimated dose rate of 1.0 mR/hr at 6 inches, the maximum residual activity for the measurements cited in the 1992 TAR request and Health Physics Position 286 (Attachment 1).

Radiocat® release analysis based upon ALI

In Attachment 7, Radiocat® used calculations to demonstrate that cats could be released at 3 days based upon estimates that 95-98 percent of the free I-131 was excreted from the cat in the first 24 hours. The human uptake criteria used resulted in a calculated dose to a person of 26 mrem. One flaw in the licensee's calculations was equating "95 percent of the free I-131" that was excreted in the first 24 hours with "95 percent of the entire I-131 dosage" being excreted every 24 hours. The measurement and effective half-life data demonstrate that these are not the same for the hyper-thyroid cat. The calculations provided in Attachment 7 based upon ALI considerations should not be used in determining when a cat can be released.

When combined with information about the cat's behavior and the home's occupants, the radiation measurement made 1 foot from the thyroid area of the cat and the I-131 effective half-life for the cat calculated when that measurement reaches 0.5 mR/hr at one foot are probably the best parameters to use when estimating dose to the public and determining whether the patient can be released. For example, a patient with a dose rate of 0.5 mR/hr at one foot but an I-131 effective half-life of 3 or 4 days may need to be held for another day or two while another cat with the same reading but an I-131 effective half-life of 1 to 1.5 could be released to an adult only home. Age, mobility, and attachment of a child to the cat would need to be considered when considering releasing a treated cat to a home with children.

D. Collins

On a case specific basis, a radiation release measurement as high as 0.5 mR/hr at 1 foot may be acceptable provided it is easy for the owner to comply with the instructions pertaining to the extent and duration of contact permitted with the cat and difficult for an individual to receive a dose of 100 mrem. Attachment 3 demonstrates the potential doses to the owners when a cat is released, and the owners do not comply with instructions. The patient release criterion associated with the incident reported in Attachment 3 was less than 2 mR/hr at 1 meter, and the owners ignored all instructions.

Release criteria above 0.5 mR/hr at one foot are not recommended because strict compliance by owners with the licensee's instructions for extended periods is unlikely, and therefore compliance with the public dose limits cannot be assured.

REVIEWER NOTES:

See Attachment 4.

Attachments:
1. Health Physics Position 286
2. Effective Half-life of I-131 Table submitted for License No. 37-3037-01
3. NMED Report 010664
4. Reviewer notes
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6. MicroShield Calculations
7. Release Criteria RadioCat License No. 45-25330-01

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**Haven Lake Animal Hospital**
**300 Milford-Harrington Hwy**
**Milford, DE 19963**

## Treatment Plan Overview for I-131 Treatment

It has been determined through a careful diagnostic process that the most appropriate treatment for your pet's condition is the administration of a dose of radioactive Iodine-131. This procedure is performed routinely for humans with certain thyroid conditions. The thyroid gland concentrates the radioactive iodine which then eliminates the defective tissue. Over time, the iodine "decays' to a non-radioactive element and, at the same time, is being eliminated by the subject's body. A properly administered iodine-131 treatment is not considered dangerous in any way to the animal or those who come in contact with it. Haven Lake Animal Hospital has been approved and fully licensed to perform this procedure.

During the time that the iodine is present in your pet, certain precautions are taken to minimize exposure to our staff, to you and your family, and to the environment. The excess iodine begins to be eliminated by your pet in feces and urine soon after administration. As time passes, less iodine remains. As a precaution, and in accordance with regulatory guidance, your pet will be maintained in our facility during this first stage of treatment. This allows us to monitor the animal, and provide appropriate care, while collecting all contaminated waste for storage until it is no longer radioactive. It is our focus to provide this treatment with the minimal stress to your pet and you, while meeting all of the conditions of our licensing commitments.

A release date and time after the minimum 96 hours will be determined for your pet. The most effective method for minimizing radiation exposure to individuals during the first few days of re-introducing your pet to your home is to maintain a few feet of distance from it when possible.

In order to move forward with this treatment, it is important that you understand the treatment plan and agree to cooperate with our written release instructions. The key points of the plan include:

1. Your pet will be administered a dose of radioactive iodine-131.
2. Your pet will stay at our facility for a minimum of 96 hours after administration to allow for the proper care for the animal and the reduction of exposure from the animal.
3. When you pick up your pet, you will be given a set of written instructions that will give guidance on:
    a. Any limitations on direct interactions, such as holding the animal, for a specified time period.
    b. The collection and storage of feces, urine, and other body fluids.

Your cooperation is very important to the successful treatment of your pet. We encourage you to ask any questions that you may have so that you fully understand the procedure and have all the information that you need.

**Haven Lake Animal Hospital**
**300 Milford-Harrington Hwy**
**Milford, DE 19963**

## Pre-administration Screening Questionnaire/Consent Form

Please answer the following questions based on the **"normal" conditions and behavior** for your animal. We recognize that after boarding or some procedures, the animal's behavior may change temporarily and it may seek more or less attention for a brief time.

Are there children in your household or who frequent your home? ____Yes ____ No

If yes, do the children often play directly with your pet? ____ NA ____Yes ____ No

Would you describe your animal as affectionate? ____Yes ____ No

Does the pet seek "lap time" with you or others? ____Yes ____ No

Does your pet have any difficulty being transported in,
or spending time in a carrier or cage? ____Yes ____ No

Does your pet often have "accidents" or vomit? ____Yes ____ No

Are there any other behaviors that you think may be worth noting? ____Yes ____ No
Please describe:

**The Treatment Plan Overview has been discussed with me, and I:**

**_____ Consent** **_____ Do NOT Consent**

**to the Iodine-131 Treatment for my animal.**

_____ Printed Name

_____ Pet's Name

_____ Signature

_____ Date

**Haven Lake Animal Hospital**
**300 Milford-Harrington Hwy**
**Milford, DE 19963**
**Phone: (302) 422-8100**

## Written Instructions for Animal Home Care After I-131 Treatment

Our licensing commitments require us to provide you with written instructions for your pet's home care. The goal is to minimize any radiation exposure to you and other individuals from the treated animal while the radioactive iodine is still present and to do this with the least amount of stress possible to you and your pet.
The guidance provided to us has shown that, individuals who follow these instructions will maintain exposure to themselves and others to less than 100 mRem. Your cooperation will help to maintain exposures **As Low As Reasonably Achievable**. Following the instructions below, except as noted by our staff, will ensure the best care for your pet while minimizing exposure to all individuals:

1. Transport animal in a carrier placed in the back seat/area of the vehicle. (Maintain maximum distance possible from driver and passengers.)
2. Minimize direct physical contact during the first 4 days at home. (Occasional petting / grooming / affirmation at arms length is OK, but, ... lap-time and extended close contact should be avoided.)
3. Do not allow the animal to sleep in bed with any individuals during the first 8 days at home.
4. Understand that taking one step away (approximately 3 feet) from the pet during the first few days will significantly reduce exposure.
5. Use disposable plastic gloves when handling litter, urine, feces, vomit or other body fluids from the animal during the first four days at home.
6. Carefully transfer used litter or potentially contaminated animal waste in a manner that does not generate airborne dust particles to a trash bag for storage. Using litter pan liners or plastic trash can bags will facilitate the transfer.
7. Store the litter and other waste in a remote location such as the garage for three weeks to allow for radiological decay before disposing of it in the municipal trash.

Other Notes:

Instructions Provided By: _____ Date: _____

For (Pet Name): _____

## Spill Procedures

The following program is based on Appendix J to Reg. Guide 10.8, Rev. 2

### Minor Spills of Liquids and Solids

1. Notify persons in the area that a spill has occurred, and control access.

2. If practical, perform a dose rate survey to assess radiological conditions.

3. Prevent the spread of contamination by covering the spill with absorbent paper.

4. Clean up the spill using disposable gloves and absorbent paper. Carefully fold the absorbent paper with the clean side out and place in a plastic bag for transfer to a radioactive waste container. Also put contaminated gloves and any other contaminated disposable material in the bag. Work efficiently to minimize exposure (gather material first and plan the work).

5. Survey the area with a low-range radiation detector survey meter. Check the area around the spill. Also check your hands, clothing, and shoes for contamination.

6. Report the incident to the Radiation Safety Officer, and record data.

7. The RSO will follow up on the cleanup of the spill and will complete the Radioactive Spill Report as necessary.

### Major Spills of Liquids and Solids

1. Clear the area. Notify all persons not involved in the spill to vacate the room. Control access.

2. If practical, perform a dose rate survey to assess radiological conditions.

3. Prevent the spread of contamination by covering the spill with absorbent paper, but do not attempt to clean it up. To prevent the spread of contamination, limit the movement of all personnel who may be contaminated.

4. Shield the source if possible. This should be done only if it can be done without further contamination or a significant increase in radiation exposure.

5. Close the room and lock or otherwise secure the area to prevent entry.

6. Notify the RSO immediately.

7. Decontaminate personnel by removing contaminated clothing and flushing

contaminated skin with lukewarm water and then washing with mild soap. If contamination remains, induce perspiration by covering the area with plastic. Then wash the affected area again to remove any contamination that was released by the perspiration.

8. The RSO will supervise the cleanup of the spill and will complete a Radioactive Spill Report and the Radioactive Spill Contamination Survey.

## Spill Procedures

The following is not part of the model spill procedure:

### Major Spills and Minor Spills

The decision to implement a major spill procedure instead of a minor spill procedure depends on many incident-specific variables such as the number of individuals affected, other hazards present, likelihood of spread of contamination, and types of surfaces contaminated as well as the radiotoxicity of the spilled material. For some spills of short-lived radionuclides the best spill procedure may be restricted access pending complete decay.

The following Table may be used as general guidance to determine whether a major spill procedure or minor spill procedure should be implemented.

### Table J-1

### Relative Hazards of Common Radionuclides

Estimate the amount of radioactivity spilled. Initiate a major or minor spill procedure based on the following dividing line. Spills above these millicurie amounts are considered major, below are considered minor.

| Radionuclide | Millicuries | Radionuclide | Millicuries |
|---|---|---|---|
| P-32 | 10 | Tc-99m | 100 |
| Cr-51 | 100 | In-111 | 10 |
| Co-57 | 100 | I-123 | 10 |
| Co-58 | 10 | I-125 | 1 |
| Fe-59 | 10 | I-131 | 1 |
| Co-60 | 1 | Yb-169 | 10 |
| Ga-67 | 100 | Hg-197 | 100 |
| Se-75 | 10 | Au-198 | 10 |
| Sr-85 | 10 | T1-201 | 100 |

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### Spill Kit

You May also want to consider assembling a spill kit that contains:

Pairs disposable gloves,
disposable lab coats
paper shoe covers
plastic trash bags with twist ties
housekeeping gloves
paper hats
absorbent paper with plastic backing
"Radioactive Material" labeling tape

china pencil or marking pen
Supplies for contamination wipe samples
Radioactive Spill Report Form and Pencil
or "Radioactive Material" labeling tags
Instructions for "Emergency Procedures"

**James G. Fongheiser**
1019 Nicholas Drive
West Chester, Pa. 19380 (610) 431-4027

## Highlights:

- 25 plus, years hands on experience developing and coordinating technical and operational programs.
- Advanced personnel development and training experience.
- Advanced technical training including courses offered by Harvard School of Public Health,University of Michigan, and Northwestern University.
- Course work includes managing performance, interactive management, and quality management classes.
- Member of the Pa Radiological Assistance Program.
- Power Plant Emergency Response Dose Assessment Team Leader
- Frequent Speaker for the DVSNMT and other organizations.

## Experience:

Independent Consultant
**Health Physicist, Radiation Protection / Licensing Specialist** Dec.1999 to Present
- Providing assistance and consulting services to start-up facilities, in various industries, serving as Radiation Safety Officer on multiple licenses, performing annual program reviews, resolving compliance issues.

PET Scans of America
**Radiation Safety Officer, Health Physicist, / Licensing Specialist** 2000 to 2003
- Providing assistance and consulting services to a start-up company, expanding it's growth to 15 States, serving as RSO on multiple licenses, performing annual program reviews, resolving compliance issues.

Nuclear Imaging Systems, Inc.
**Health Physicist, Radiation Protection / Licensing Specialist** Jan. 1995 to April 2000
- Oversee all aspects of licensing for over 30 mobile and fixed nuclear medicine operations in 7 different states (NRC and Agreement States), served as RSO for 7 sites.
- Maintain / improve all aspects of the operational health physics program for the above labs, including site inspections, inservice training and program review.

PECO Energy Co.
1980 to 1994

**Project Management** 1993 to 1994
- Implemented NRC's major revision to 10CFR20 for two nuclear power plant sites. Project included coordination of staff from both sites, major revisions to software systems, standardization of 50 operating procedures, development of policies and a communication strategy including training material, brochures and a videotape.
- Other projects include the development of common training programs for chemistry technician progressions, and a common program for qualifying "Advanced Radiation Workers".
- Coordinated other revisions to mainframe integrated software and PC software packages to support projects.

**Radiation Protection Manager** 1992 to 1993
- Responsible for the Radiation Protection program and policies for a two unit, boiling water reactor site. Supervised a staff of 75 employees.
- Interacted with regulatory agencies and reported department assessments to senior management.
- Managed contracts with consultants and vendors.
- Coordinated interdepartmental activities and prepared and managed department budget.
- Served on station management committees.
- Developed strategies for reducing outage manpower requirements, while reducing spending by 10%.

**Radiological Engineering Supervisor** 1989 to 1992

- Coordinated Radiological reviews and job planning for all work in a two unit, boiling water reactor site. Supervised a staff of 8 employees.
- Developed station dose goals with all groups and provided tracking, trending, and corrective action plans for radiological performance.
- Supported the development of a Chemical Control Program.
- Reduced spending by 30%.
- Instituted an outage employee orientation program to improve worker performance.
- Served as system administrator for the integrated software system.
  - Taught Nuclear Engineering course at Penn State, Lancaster Center – "Exposure Control in Nuclear Facilities"

**Corporate Health Physicist** 1980 to 1989

- Designed, directed the development, and implemented the company's first integrated personnel, health physics, training, medical, security and processing software package.
- Assisted two nuclear power plant stations in special projects, including coordinating the purchase of new equipment, instrumentation and systems.
- Performed radiological reviews of modifications to the plant.
- Performed assessments of the station health physics, rad waste, radiochemistry, and emergency preparedness functions.

Wistar Institute

**Research Assistant** 1980

- Maintained tissue cultures, performed cell fusions, developed cloned cell lines from fusion results, and supported a variety of ongoing research projects.
- Performed research, including DNA extractions and ran electrophoresis gels in support of gene mapping and splicing research, including the first incorporation of DNA from one mammalian species to another.

Villanova University

**Assistant Professor** 1979 to 1980

- Instruction and some coordination of the zoology and general laboratory courses.
- Data analysis of research by M. E. Desmond.

Harcum Jr. College

**Laboratory Instructor** January 1978 to May 1979

- Anatomy and physiology instructor for the animal technician program.

## Education:

1977 Villanova University Villanova, Pa.
**Bachelor of Science, Biology**

Villanova University
**Master of Science, Biology**

**References:** Available upon request

# ADDITIONAL TRAINING PROGRAMS

| Course | Length | Presented by: |
|---|---|---|
| ALARA Training | 2 Weeks | General Dynamics - Electric Boat Division |
| Radiochemistry | 2 Weeks | Babcock & Wilcox |
| Radioactive waste Packaging and disposal | 2 Days | Chem Nuclear Systems |
| Liquid Scintillation | 1 Week | Packard Instrument Co. |
| Radiological Engineering | 8 Weeks | General Electric Training Services |
| Biological Effects of Ionizing Radiation | 1 Week | Harvard School of Public Health, Dept. of Cancer Biology |
| Medical Emergency Preparedness | 3 Days | Northwestern University |
| Radiation Fundamentals | 4 Weeks | General Physics Corp. |
| Rad Waste Symposium | 3 Days | Chem Nuclear, Barnwell |
| Nuclear Technology | 2 Days | General Physics Corp. |
| International TLD Symposium | 1 Week | International TLD Committees |
| Thermoluminescent Dosimetry | 2 Weeks | University of Michigan |
| BWR ALARA/Rad Protection Committee (Steering Committee) | 2 Weeks/Year | BWR Owner's Group |
| Emergency Medical Assistance Program Seminars | Many | Various |
| Managing Performance | 2 Days | PECO Energy |
| Interactive Management | 1 Week | PECO Energy |
| M.A.R.C. Training | 1 Week | PECO Energy |
| K - T Analysis | 3 Days | PECO Energy |
| Managing Safety | 3 Days | PECO Energy |
| Dose Assessment/ Emergency Response Manager | 3 Days/Yr | PECO Energy |