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HONOLULU, HAWAII 96826 PHONE 949-5936

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PHILIP J. W. LEE, M.D., F.A.C.R.
RADIOLOGY
NUCLEAR MEDICINE

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July 12, 1985

B. A. Riedlinger
Health Physicist (Licensing)
Materials Radiation Protection
Inspection & Licensing Section
U.S. Nuclear Regulatory Commission
Region V
1450 Maria Lane, Suite 210
Walnut Creek, Ca. 94596

Dear Ms. Riedlinger:

The enclosed is in response to your May 22, 1985 request for additional information (Mail Control No. 70154). I hope the revisions made to our application are suitable.

Mr. Pedring Dumalo is my chief technician and assists me in nuclear medicine. He replaced my former chief technician, William Hornig, on May 1, 1985. Mr. Dumlao received 4 hours of instructions from me. (May 6, 1985 2 hours and May 20, 1985 2 hours). He also receives on the job training. His reference is NUREG-1134, "Radiation Protection Training for Personnel Employed in Medical Facilities".

Your prompt response will be appreciated.

Sincerely,

Philip J. W. Lee, M.D.

CALIBRATION OF RADIATION DETECTION INSTRUMENTS

1. SURVEY METERS

Survey meters will be calibrated annually by Mid-Pacific Medical Physics located at 1301 Punchbowl St., Suite 307, Honolulu, HI 96813. The calibration procedure used is on file with the NRC (License No. 53-23207-01). Survey meters will be checked for constancy against a built-in sealed source or other sealed source prior to each use. Readings differing greater than 20% will be cause for investigation and recalibration, if necessary.

2. LABORATORY INSTRUMENTS

1. The thyroid uptake counting system will be tested semi-annually with a known quantity of I-131 to insure that the minimum detectable thyroid activity is less than 0.04 uCi.

3. DOSE CALIBRATORS

1. The dose calibrator will be tested for response to geometrical variation of samples upon installation.

A 30 ml vial containing 2 mCi of Tc-99m in a volume of 1 ml will be used. The vial will be assayed at the appropriate setting, then the volume of liquid will be increased to 2, 4, 8, 10, 20, and 25 ml. After each addition, the vial will be gently agitated and reassayed. The 10 ml vial will be used as a standard, and the ratio of measured activities calculated for each volume to the reference volume. This is the volume concentration factor (F). The correction factors will be plotted against the volumes on linear graph paper. This graph will be used to select proper volume correction factors for routine assays if variations are greater than +/- 2%.

2. The dose calibrator will be checked daily for instrument constancy with a source of Cs-137. The Cs-137 will be used to check the instrument settings for Cs-137 and I-131. The dose calibrator will be adjusted or repaired whenever the results of the daily constancy checks vary from the true values by more than +/- 5%.

a. Place a clean empty "blank" vial in the dose calibrator and observe the background reading. If the background is not higher than normal adjust the "zero adjust" to give a reading of zero.

b. Assay the Cs-137 source at each of the settings listed above. Record the readings.

c. Variations in the daily readings greater than +/- 5% require repair or adjustment of the dose calibrator.

d. Investigate higher than normal background levels to determine their origin and to eliminate them if possible by decontamination, relocation or other means.

3. Prior to initial use and quarterly thereafter, the instrument shall be checked for linearity. Checks for linearity shall be made by assaying a vial of Tc-99m of activity at the maximum activity normally used, then reassaying the same vial at 6, 24, 30, and 48 hours after the initial assay. Instances where the measured activity is more than 5% different from the calibrated activity shall be investigated.

4. Prior to initial use and annually thereafter, each dose calibrator shall be tested for accuracy using calibrated sealed sources certified traceable to NBS.

NUCLIDE	NOMINAL ACTIVITY	CALIBRATION ERROR
Cs-137	200 uCi	+/- 5%
Ba-133	250 uCi	+/- 10%
Co-57	5 mCi	+/- 10%

Measured activity differing from the decayed activity of the reference source by greater than +/- 10% shall require adjustment or repair of the dose calibrator.

a. Take a background reading with a "blank" vial and zero adjust.

b. Assay the reference standards in the dose calibrator at the appropriate settings.

c. Take three readings with each source and determine the average reading. Record the average reading of each source.

d. Correct the activity of each reference to determine the source activity at the day of the test. Record the corrected activity of each source.

e. Calculate the percent difference between the measured activity and the corrected activity. Record the percent difference.

f. Calibration checks that do not agree within +/- 5% indicate that the instrument should be repaired or adjusted. If this is not possible, calculate a correction factor to be used during routine assay of radionuclides.

g. Keep a log of these calibration checks.

PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL

1. The Nuclear Medicine Technologist will place all orders for radioactive materials and will ensure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded.

2. During normal working hours, carriers will be instructed to deliver packages containing radioactive materials directly to the office reception area.

3. Delivery personnel will be notified not to deliver packages of radioactive material during off-hours without first notifying Dr. Lee or Mr. Pedring Dumlao (Technologist) of the intended delivery. One of these people will arrive ahead of the delivery time and be on hand to receive the package.

MEMORANDUM FOR: Delivery Personnel

FROM: Philip J. W. Lee, M.D.

SUBJECT: RECEIPT OF PACKAGES CONTAINING RADIOACTIVE MATERIAL

Before attempting to deliver packages of radioactive material outside of normal working hours, first notify one of the individuals below to arrange for receipt of the materials.

RADIATION SAFETY OFFICER:	Philip J. W. Lee, M.D.
OFFICE PHONE:	949-5938
OTHER PHONE:	455-1025
ALTERNATE:	Mr. Pedring Dumlao
OFFICE PHONE:	949-5938
HOME PHONE:	836-4927

Do not attempt to deliver packages of radioactive material without first arranging with one of the above individuals for receipt.

PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS

1. All packages that are labelled with YELLOW II and YELLOW III transportation labels will be monitored for external radiation levels. A survey shall be made around each package (1) at the surface and (2) at 3 feet from the package with a Geiger-Mueller detector. In addition, any package containing quantities of radioactive material in excess of Type A quantities shall be monitored as required by 10 CFR 20.05 (c).

2. If the survey reveals radiation levels greater than 10 mrem per hour at 3 feet or greater than 200 mrem per hour at the package surface, stop the procedure and notify the Radiation Safety Officer or alternate. The RSO or alternate will make and record a more careful measurement of the radiation levels. These results shall be provided to the carrier and the NRC Re ion V as soon as available.

3. All shipments of liquid radioactive materials will be tested for leakage. Visually inspect the package for any sign of damage, i.e., wetness or crushed package. If damage is noted, stop immediately and notify the Radiation Safety Officer.

   a. Wipe the external surface of the package containing liquid radioactive material with a dry filter paper or section of a paper towel and count the wipe in a gamma counter or with a pancake detector and calibrated low level survey meter. If the removable contamination exceeds 0.01 uCi/100 sqcm, put on plastic gloves and seal the package in a plastic bag. Notify the Radiation Safety Officer immediately and do not proceed further. Record the results of this test.

   b. If the package is not contaminated, open the outer package following manufacturer's directions, as supplied. Put on protective gloves and remove the packing slip. Open the inner package to verify the contents against the packing slip. Also inspect the final container to insure it is not broken or leaking, and that all seals are intact.

   c. Wipe the external surface of the final container with a dry wipe held with forceps or a cotton swab on a stick. Count the wipe and record the results. In addition, records of monitoring required by 20.205 (b) and (c) shall be maintained.

4. Monitor packaging materials with a pancake detector and survey meter before discarding. If the packaging material is contaminated, treat it as radioactive waste. If free of contamination, (no reading above background) obliterate or remove all radiation labels before discarding.

RADIATION SAFETY OFFICER: Philip J. W. Lee, M.D.
OFFICE PHONE: 949-5938 OTHER OFFICE: 455-1025
ALTERNATE: Mr. Pedring Dumlao
OFFICE PHONE: 949-5938 HOME: 836-4927

EMERGENCY PROCEDURES
(To be posted in all restricted areas)

MINOR SPILLS

1. NOTIFY persons in the area that a spill has occurred.

2. PREVENT THE SPREAD by covering the spill with absorbent paper.

3. CLEAN UP the spill, using disposable gloves and remote handling tongs. Carefully fold the absorbent paper and wipe from the outer edge to the center of the spill area. Dispose of the absorbent paper into a plastic bag, along with the gloves and treat as radioactive waste.

4. SURVEY the area with a low-range, thin window G-M survey meter. Check the spill area, the area around the spill, and your hands and clothing.

5. REPORT the incident to Dr. Lee.

MAJOR SPILLS

1. CLEAR THE AREA and notify all persons not involved in the spill to vacate the room.

2. PREVENT THE SPREAD by covering the spill with absorbent paper, but do not attempt to clean up. Confine the movement of all personnel potentially contaminated to prevent the spread.

3. SHIELD THE SOURCE if there is a direct radiation source problem, but only if it can be done without further contamination or without significantly increasing your radiation exposure.

4. CLOSE THE ROOM and lock the door behind you.

5. CALL FOR HELP by notifying Dr. Lee.

6. STAND BY FOR MONITORING and decontamination if necessary. Contaminated clothing should be removed and stored for further evaluation by the Radiation Safety Officer or alternate. If the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water.

RADIATION SAFETY OFFICER: Philip J. W. Lee, M.D.
OFFICE PHONE: 949-5938 ANSWERING SERVICE:

ALTERNATE: Mr. Pedring Dumlao
OFFICE PHONE: 949-5938 HOME: 836-4927

PROCEDURES FOR ADMINISTERING I-131 DOSES

1. Personnel administering therapeutic doses of I-131 should wear their personnel dosimeters, including ring dosimeters, with detector towards the palm of the hand.

2. Never handle a therapeutic dose of I-131 directly with the hands. Use forceps or other remote handling devices. Whenever possible, keep the dose in a shielded container.

3. Always wear disposable gloves and a lab coat or other protective clothing when administering a therapeutic dose. After the administration is complete, dispose of the gloves as waste and monitor hands and clothing for contamination.

4. Liquid doses of I-131 may release vapors to the atmosphere when they are opened. Whenever opening a liquid dose, do so in the fume hood with a face velocity of at least 0.5 m/sec so that vapors will be drawn away from you. Capsules do not release vapors and do not need to be handled in this manner unless they are crushed.

5. The number of personnel present in an area where administration of a therapeutic dose of I-131 is performed should be minimized. All personnel present where administration of a greater than 1.0 mCi of liquid I-131 must have bioassays performed of their thyroid burden before and after the administration.

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