

**NUCLEAR MEDICINE  
INSPECTIONS-WHAT  
PROBLEMS DO WE FIND  
AND WHY**

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**Nuclear Medicine-then and now**

- ☐ Many procedures and techniques are the same
- ☐ Recordkeeping has evolved and become more electronic
- ☐ Personnel comes and goes
- ☐ Training- DOTD, in house, annual

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**Posting Requirements**

- ☐ Louisiana Radioactive Material(s) License
  - Radiation Safety Officer (RSO)
  - Authorized Users & Types of RAM
- Louisiana Regulations
  - Chap. 1, 3, 4, 7, &10 (available online at LDEQ.la.gov)
- Operating and Emergency Procedures
  - Approved procedures from RAM Application
- DRC-3 " Notice to Employees"
  - DEQ Emergency Telephone Numbers

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## ALARA

### As Low As Reasonably Achievable

- Must have written ALARA program

-How is the licensee going to maintain doses and releases of RAM to unrestricted areas ALARA?

-Commitment by management to keep occupational doses ALARA.

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## Radiation Officer &

### Radiation Safety Committee

- Radiation Safety Officer (RSO) - is the individual responsible for the day-to-day radiation program.
- Write and implement a RAM program.
- Is usually a Doctor or a Physicist.
- The RSO must be listed on the Louisiana RAM license.
- Radiation Safety Committee (RSC) is only required to form a membership if the facility is a medical institution. (In-patient)
- Must meet quarterly and consist of at least an authorized user, the RSO, and a representative of management.

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## Authorized Users

- Must be listed on the RAM License
- Must be immediately available to communicate with the supervised individual.
- Must be able to be physically present and available to the supervised individual on one hours notice.

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## Personnel Monitoring

- ☐ CNMT must wear dosimeters to determine his/her monthly exposure.
- Whole body badge is worn on the outside of the shirt collar.
  - Sometimes called Film, TLD or Luxel Badges.
- Extremity badge is worn on the finger most likely to receive the highest exposure.

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## Radiation Safety

- ☐ Annual training must be provided for all technologists
- ☐ DOTD training must be done every three years for anyone packaging material for shipment
- ☐ An annual review of the program including the types of RAM used is required for all nuclear medicine licensees
- ☐ Number and types of procedures performed at the facility

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## Initial inspection issues

- ☐ Important to update the license to add and DELETE authorized users
- ☐ Must have an RSO listed who can be available
- ☐ Annual Radiation Safety Training and program review required for ALL licensees
- ☐ Department procedures should be accurate
  - Update with new equipment
  - Update with new personnel (including monitoring)
  - Update with new testing procedures
  - Update with facility changes (including additional sites of use)

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## Receiving and Opening Packages

- ☐ The technologist must monitor the external surface of the package before opening.
  - visually inspect it for damage
  - measure radiation levels < 10m<sup>r</sup>/hr @ 1 Meter
  - < 200m<sup>r</sup>/hr @ surface
  - wipe test for removable contamination < .001μCi
- If a package is delivered after hours the tech has no later than three hours from the beginning of the next work day to check it.

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## Dose Calibrators

- ☐ Dose calibrators are used to check activity of prescribed dose.
- ☐ The calibrator must be checked for constancy with a dedicated check source before it is used for the day.
- ☐ Quarterly linearity checks.
- ☐ Annual accuracy checks.
- ☐ Geometry- must be checked and installation and after any move or repair.

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## Assay of Radiopharmaceutical Doses

- ☐ The activity of each dose must be measured, using the dose calibrator, 30 minutes before medical use. - for doses above 10μCi
- ☐ Records must include:
  - Name or Abbreviation of RAM
  - Lot #
  - Expiration Date
  - Radionuclide
  - Patents Name and ID#
  - Time and date of administration
  - Prescribed Dose
  - Activity at Time of Assay
  - Time of Assay
  - Initials of person performing it

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## Daily Surveys

- ☐ A survey shall be made of all areas where RAM is prepared and used by the end of each day.
- ☐ Must be done with a calibrated survey meter. (annual calibration sticker can be found on the side the meter)
- ☐ Sketch of areas surveyed.
- ☐ Survey storage areas weekly.
- ☐ Records should contain:
  - Date
  - Areas Surveyed
  - Sketch of the area
  - Background
  - Meter Used
  - Results in mR/hr
  - Action Levels (usually 2X Background)
  - Initials of Surveyor

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## Weekly Wipes

- ☐ A wipe, for removable contamination, shall be done once a week.
- ☐ Instrument used to count the wipe is usually a well-counter.
- ☐ Some pharmacies provide this service for the hospital/clinic.
- ☐ Records should include:
  - Date
  - Action levels
  - Wipe results in dpm/100 cm<sup>2</sup>
  - Sketch of Areas wiped
  - Instrument used to count wipes
  - Initial of Person

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## Camera Quality Control

- ☐ Quality control of image equipment (gamma camera) must be performed at the recommendation of the manufacturer or by approved procedures.
- ☐ Usually floods are performed daily and bars are performed weekly.
  - Floods (Daily)- checks uniformity of image
  - Bars (Weekly)- checks the resolution of image

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## Disposal of Radioactive Waste

- ☐ Most waste is sent back to the nuclear pharmacy.
- ☐ The left over waste is usually decayed in storage, then thrown in ordinary trash or bio-hazard trash cans.
  - Hold RAM trash for 10 ½ lives.
  - Can't be distinguishable from background.
  - All labels have to be removed.
  - Must keep records of disposal.
  - Background usually varies from 0.001-0.01mR/hr. Could be much different depending where you are.

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## Recordkeeping Issues

- ☐ Frequency of testing not met
- ☐ Use of part time and contract technologists
  - Electronic QC programs-do the fill in techs have a password and know how to use/access the system
- ☐ Computer programs/back up and failures
  - Must be able to demonstrate compliance to the inspector at the inspection (pull up old records)
  - What happens when the system fails

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## Recordkeeping Issues

- ☐ Testing procedures not the same as those outlined in the O & E's (not updated to reflect new equipment)
- ☐ What about tests not kept in the online system
  - Disposal records
    - What is returned to the pharmacy
    - What is held at the facility

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## Caution Signs

- ☐ Posting of areas or rooms where licensed sources are stored or used. "Caution Radioactive Material(s)" -Post if amount is 10X the amount in Appendix C

Tc-99m 1000µCi = 1mCi

Caution Sign required if amount is over 10mCi of Tc-99m

- do not need signage if RAM is used or stored for less than eight hours provided:

Source is constantly attended to

Is not a radiation area >5m/ hr @30cm

- In a radiation area the posting should read "Caution, Radiation Area" and "Caution, Radioactive Material(s)

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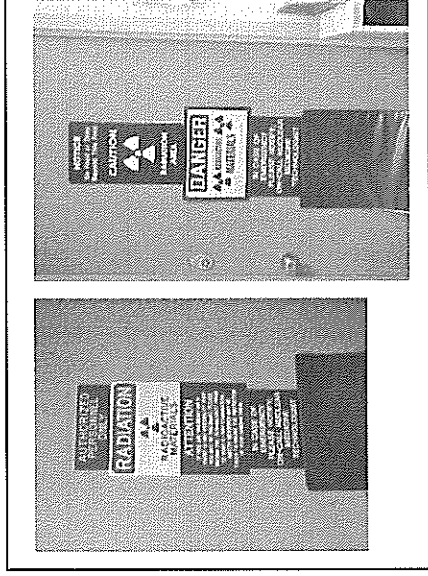
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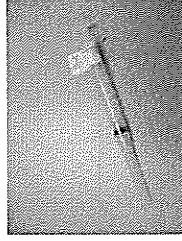
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## Labels

- ☐ All sources must be labeled with the:

- Caution Symbol
- Kind of RAM
- Amount of RAM

(This includes syringes from the pharmacy.)



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## Security of Stored Sources of Radiation



- ☐ Licensee shall secure licensed radioactive material (RAM) from unauthorized removal or access.

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## Sealed Sources

- ☐ Hospitals use sealed sources, not liquids, for calibrating equipment such as the gamma camera and the dose calibrator. Sealed sources are also used for patient therapy.
- ☐ Leak tests must be performed every six months if required
- ☐ There must be an annual inventory on all sealed sources.
  - Even if the facility only has one or two sources

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## Administering the Dose

- ☐ The Certified Nuclear Medicine Technologist should be wearing protective clothing and personnel monitoring badges while administering a dose to a patient. This includes:
  - Gloves
  - Lab Coat
  - Film, TLD or Luxel Dosimeter Badge
  - Use of syringe Shield

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## Release of Patients

- ☐ Most patients who receive doses for diagnostic purposes can be released with little instructions
  - Exposure levels to other people would not exceed regulated exposure levels.
- General rule for releasing patients:
  - If patient dose is less than 30 mCi
  - If patient dose rate is less than 5 mR/hr

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## Xenon 133

- ☐ If a facility uses Xe-133 for lung ventilation studies then room ventilation rates must be measured semi-annually.
- ☐ Records shall include:
  - the measured evacuation time.
  - must be posted in area of use.
- Some hospitals/clinics use DTPA-Tc99m for this study. DTPA is an aerosol, so there is no need for ventilation rates. Aerosols, which is more of a liquid than a gas, doesn't disperse like Xe-133 gas.

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## Mobile Nuclear Medicine

- ☐ Shall transport to each address only prepared syringes and vials.
- ☐ Bring RAM to be used and take all unused and RAM waste before leaving.
- ☐ Keep under constant surveillance of RAM when in transit or at location of use.
- ☐ Must have RAM license and follow all regulations in chapters: 1, 3, 4, 7, 10 and 15.
- ☐ Exceptions can be made by the Department, but must be in writing.

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### Therapy Doses

- The patient is usually hospitalized if the patient receives a therapy dose.
- Must have private room
- Instructions for nurses
- Lots of surveys
- Inventory and utilization logs kept on all sealed sources.
- Before patient release the patient's dose rate must be below regulated rates. ~5mR/hr

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### Food and Drinks

- There is no Eating or Drinking where RAM is prepared or used.

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### Facility Problems

- Wrong signage used
- Door to hot lab open and not secure with sealed sources inside
- Locks/codes not changed after employee changes
- Technologist does not follow protocol (wear lab coat, use syringe shield, etc)
- Evacuation times not posted for Xe
- Food/Drink in the hot lab (Refrigerator)

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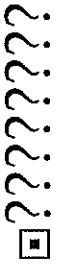
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Questions



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Thank you!

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