UNIVERSIDAD DE PUERTO RICO, RECINTO DE CIENCIAS MÉDICAS
UNIVERSITY OF PUERTO RICO, MEDICAL SCIENCES CAMPUS
OFICINA DEL RECTOR
OFFICE OF THE CHANCELLOR

COMITÉ DE SEGURIDAD DE RADIACIÓN
RADIATION SAFETY COMMITTEE

April 13, 2011

Penny Lanzisera
US NRC, Region 1

Dear Mrs. Lanzisera:

The items identified during the inspection of March 23, 2011 of the Nuclear Medicine Laboratory at the Oncologic Hospital, Dr. Isaac González were taken care of immediately. The corresponding corrective actions were done and the Nuclear Medicine Technologist's were informed of the findings and discussed with them immediately.

An extraordinary meeting of the Radiation Safety Committee (RSC) was done to inform all the members of the inspection done by Mrs. Penny Lanzisera, Nuclear Regulatory Commission Inspector. Also all the corrective actions were informed to the RSC.

Item#1. Depleted uranium disposal

We have exhausted all possible sources to find information regarding the disposal of the linear accelerator and the depleted uranium. I left messages with Varian, the company that ....to contact Varian but have received no answer. If they provide us with new information, I will contact you immediately.

Item#2 Iodine-131 waste disposed of prior to decay

The Nuclear Medicine Staff was instructed to dispose of radioactive waste generated from long half lives isotopes, such as I^{131} , after ten half-lives. A separate inventory sheet for this matter was developed, discussed with personnel and implemented. A similar procedure has been in place to segregate radioactive waste with different half-lives. Personnel was instructed to dispose of waste generated from I-131 procedures after 3 months and to be certain that the readings are equal or less than that of the detectible background. Attached is the new form ***Disposition of Radioactive Long Half Life Waste (Iodine-131).***

Model Procedure for Decay-In-Storage and disposal waste generated from the administration of Iodine -131 were reviewed with the Nuclear Medicine Technologist's.

Model Procedure for Decay-In-Storage (this now includes decay-in-storage of accelerator-produced radioactive materials)

Section 10 CFR 35.92 describes the requirements for decay-in-storage. Storage should be designed to allow for segregation of wastes with different half-lives (e.g., multiple shielded containers). Containers should have shielded covers to maintain occupational exposure at ALARA levels. Storage areas must be in a secure location.

- Store radioactive waste by segregating them according to their different half-lives (e.g., multiple shielded containers). The container must be identified with a radioactive label with the phrase of *Radioactive Waste* and with the name of the isotopes stored.
- If possible, use separate containers for different types of waste (e.g., needles and syringes in one container, other injection paraphernalia such as swabs and gauze in another, and unused dosages in a third container). Because the waste will be surveyed with all shielding removed, the containers in which the waste will be placed must not provide any radiation shielding for the material. This container must be labeled with the universal radiation symbol and phrase of "Radioactive Waste".

- All radioactive waste must be stored in appropriate containers until its disposal and the integrity of the waste containers must be assured. Radioactive waste containers must be appropriately labeled. All radioactive waste must be secured against unauthorized access or removal.

- When the container is full, seal it and attach an identification tag with the universal radiation symbol and phrase of *Radioactive Waste* and include:
  - the identification number of the container
  - date sealed
  - the name of the longest-lived radionuclide in the container
  - the initial GM readings in mR/hr
  - the initials of the person who performed this procedure.
  -

  Transfer the container to the decay-in-storage area and document all the information that is on the identification tag of the container in the waste log book.

  Waste containing radioactive material with short half lives may be stored in designated areas until it decays to background radiation levels for ultimate disposal with non-radioactive medical waste. Waste containing longer-lived radioactive material is stored or sent to a low-level radioactive waste storage area. Low-level waste may be stored to allow short-lived radionuclides to decay to innocuous levels and to provide safekeeping when access to disposal sites is not available. The NRC believes storage can be safe over the short term as an interim measure, but favors disposal rather than storage over the long term.

- Prior to disposal as in-house waste, monitor and record the results of monitoring of each container as follows:
  - Use a survey instrument that is appropriate for the type and energy of the radiation being measured.
  - Check the radiation detection survey meter for proper operation and current calibration status.
  - Monitor in a low-level radiation (<0.05 millirem per hour) area away from all sources of radioactive material, if possible.
  - Remove any shielding from around the container or generator column.
  - Monitor, at contact, all surfaces of each individual container.
  - Remove or deface any radioactive material labels (unless the containers will be managed as biomedical waste after they have been released from the licensee as described in 10 CFR 35.92).

- Discard as in-house waste only those containers that cannot be distinguished from background radiation. Containers may include trash bags full of waste, generator columns, and biohazard (needle) boxes.
- Record in the waste disposal log book the disposal date, the survey instrument used, the background dose rate, the dose rate measured at the surface of each waste container, the name of the individual who performed the disposal and check for the removal or defacing of any radioactive material labels.

Containers that can be distinguished from background radiation levels must be returned to the storage area for further decay or transferred to an authorized byproduct material recipient.

Item # 3 Dose calibrator in nuclear medicine not tested on commonly used settings

The Nuclear Medicine Technologist's were instructed to perform a constancy test using a long-lived source (such as Cs^{137}) at each one of the commonly used settings according to the manufacturer's guide. During the inspection, NRC recommended that it be performed on a monthly basis. The frequency for conducting this test is in accordance with nationally recognized standards and/or the manufacturer's instructions.

The form was developed and implemented immediately at the Nuclear Medicine Laboratory at the Oncology Hospital, Isaac González. A copy of this form is attached in this communication.

The following procedures are the manufacturer's instructions and were discussed with the Nuclear Medicine Technologist's. Qualification is the determination of errors associated with the following tests at the indicated frequency. Acceptable errors for each test are indicated in parentheses.

- **Constancy:** Starting at installation and at least once each day before measuring patient dosages (±5 percent).
- **Linearity:** at installation and at least quarterly thereafter (±5 percent).
- **Geometry:** at installation (±5 percent).
- **Accuracy:** at installation and at least annually thereafter (±5 percent).

After repair of the dose calibrator, repeat the above tests as a new installation.

NOTE: A plastic well liner and source dipper must be used in all measurements.

NOTE: If possible, leave the dose calibrator powered-on 24 hours a day, 7 days a week. If not, allow 1 hour warm-up after power-on before performing these procedures.

NOTE: Assay means to place the source container into the dose calibrator so that the dipper is resting in the well liner.

Item # 4 Posting/Labeling in Nuclear Medicine Department

The inspector recommended that the posting of Radiation Material be changed. This was done immediately. The posting were replaced with new ones that read *Caution Radioactive Area.* The labeling protocols in the Nuclear Medicine Laboratory were reviewed with the Nuclear Medicine Technologist's. The shielded containers and the

syringes that are being used for radioactive residual are also now identified with a radioactive label.

We appreciate the recommendations provided as they strengthen our Radiation Safety Program. If you require any further information please do not hesitate to contact us by email or by phone number (787) 772-8300, X-1302.

Cordially,

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CS-137 IN ALL ISOTOPE SETTING

MONTH April- 2011

WEEK april- 4 - april- 8

ISOTOPE SETTING	READING (uCi) MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
Cs-137	104.4	104.0	103.6	104.5	103.7	
Tc-99m	196.4	195.5	194.6	194.8	195.9	
Mo	1049	1044	1041	1038	1041	
Ga-67	176.4	176.3	174.8	174.3	174.9	
I-131	129.8	129.4	128.6	128.2	128.7	
SING	FYMR	FYMR	FYMR	FYMR	FYMR	

WEEK April 11 - april 15

ISOTOPE SETTING	READING (uCi) MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
Cs-137	104.1	104.1	103.4			
Tc-99m	194.4	195.2	194.2			
Mo	1045	1047	1040			
Ga-67	174.9	175.7	175.3			
I-131	128.5	129.3	128.8			
SING	FYMR	FYMR	FYMR			

WEEK

ISOTOPE SETTING	READING (uCi) MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
Cs-137						
Tc-99m						
Mo						
Ga-67						
I-131						
SING						

WEEK

ISOTOPE SETTING	READING (uCi) MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
Cs-137						
Tc-99m						
Mo						
Ga-67						
I-131						
SING						

WEEK

ISOTOPE SETTING	READING (uCi) MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
Cs-137						
Tc-99m						
Mo						
Ga-67						
I-131						
SING						

CS-137 IN ALL ISOTOPE SETTING

MONTH Marzo 2011

WEEK

ISOTOPE	READING (uCi)					
SETTING	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
Cs-137						
Tc-99m						
Mo						
Ga-67						
I-131						
SING						

WEEK

ISOTOPE	READING (uCi)					
SETTING	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
Cs-137						
Tc-99m						
Mo						
Ga-67						
I-131						
SING						

WEEK

ISOTOPE	READING (uCi)					
SETTING	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
Cs-137						
Tc-99m						
Mo						
Ga-67						
I-131						
SING						

WEEK 21 al 25 marzo

ISOTOPE	READING (uCi)					
SETTING	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
Cs-137				103	103.2	
Tc-99m				193	194	
Mo				1044	1044	
Ga-67				174	174.7	
I-131				128	128.4	
SING				[signature]	[signature]	

WEEK 28 marzo – 1 abril

ISOTOPE	READING (uCi)					
SETTING	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
Cs-137	103	103	103	103	103	
Tc-99m	194	194	194.1	194	195	
Mo	1042	1042	1042	1043	1043	
Ga-67	174	174	174	174	175	
I-131	128	128.3	128	128	128	
SING	[signature]	[signature]	[signature]	[signature]	[signature]	

Disposition of Radioactive Long Half Life Waste (Iodine-131)
Nuclear Medicine Laboratory
University of Puerto Rico, Medical Sciences Campus
Dr. Isaac González, Oncologic Hospital

Before Decay						*After decay 10 half life*				
Container ID #	Isotope	Description of Waste	Storage Date	Reading (mR/hr)	Initials	Disposition Date	Reading (mR/hr)	Bkg (mR/hr)	Outgoing Tag OK	Initials

Instrument Used:

_____ GM: S/N: _____, Probe: S/N: _____
_____ GM: S/N: _____, Probe: S/N: _____
_____ GM: S/N: _____, Probe: S/N: _____

NOTE: Radioactive waste material must be retained for at least 10 half lives of the longest half lived isotope. Prior to disposal of waste material in the non radioactive trash if the radiation survey shows a radiation level indistinguishable from background.