COLUMBIA Reston Hospital Center

1850 Town Center Parkway
Reston, Virginia 20190
Phone (703) 689-9000
COLUMBIA's home page is *http://www.columbia.net*

March 2, 2000

Re: Event #36746

NRC Region 2 Administrator
U.S. NRC Region 2 Office
61 Forsyth St., S.W.
Suite 23T85
Atlanta, GA 30303

Dear NRC Region 2 Administrator,

This is the written report for the above noted event. Reston Hospital Centers NRC license number is NRC 45-17898-02, expires 7/31/2003. I spoke with Brian Parker on 3/1/2000 regarding this event and he told me to notify the Maryland NRC Operations Center. This event was reported by phone to Doug Weaver at the Maryland NRC Operations Center on 3/1/2000 at 1422 hours.

As per NRC regulations Sec 20.2201, enclosed is the written report regarding loss of the licensed material.

(i) Description of licensed material:

Missing licensed material: I-125 Brachytherapy Seed

Quantity: 1 seed

Activity: 0.4 millicurie

Seed Model: Nycomed 6711

(ii) Description of circumstances (refer to memo dated 3/1/2000 from Anne S. Patterson, M.S., radiation health physicist, to Dr. Fruman)-additional information:

On Tuesday February 29, 2000, Lou spent approximately two hours clearing off the counters and checking the entire Hot Lab including the floor with both a visual search and using a survey meter. In addition to the search as noted, the sink drain trap was checked on 3/1/2000.

(iii) Statement of disposition or probable disposition of the licensed material:

We believe the seed is in the Nuclear Medicine Hot Lab.

(iv) Exposures of individuals to radiation…:

--We do not believe any individual has been exposed or will be exposed to this seed, provided the seed is still located in the Hot Lab.

--If the seed is in an unrestricted area (i.e. outside the Hot Lab), and a single member of the general public was located 1 meter from the seed for approximately 10 half-lives (60.14 days x 10 = 601.4 days, 1.64 years, or about 20 months, the total exposure to this individual would be as follows:

$$\text{Dose } (\infty) = \frac{34.6 \times \Gamma \times Q_o \times T_p \times (\text{Occupancy Factor})}{100 \text{ cm}^2} \quad *$$

* This formula for calculating exposure from a radioisotope is from the NRC Regulatory Guide 8.39, page 2.

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34.6 = conversion factor of 24 hours/day times the total integration of decay (1.44)

∞ = Infinity (dose over effective life of isotope)

Γ = Gamma Factor, a.k.a. Exposure Rate Constant

T_p = Physical half-life in days

Using this formula, the Total Exposure to a single individual would be:

$$D(\infty) = \frac{34.6 \times 1.11 \text{ R/mCi-h at 1 cm} \times 0.4 \text{ mCi} \times 60.14 \text{ days} \times 1}{100 \text{ cm}^2}$$

= 0.0924 Roentgen (R)

= 0.0924 rem (1R= 1rem)

= 9.24 mrem

This 9.24 mrem exposure to a single individual is several times lower than the regulatory dose limit of 5 millisieverts (0.5 rem) per year.

(v) Actions that have been taken, or will be taken to recover the material:

Refer to memo 3/1/2000, including Hot Lab visual searches and surveys and part (ii) above.

(vi) Procedures or measures that have been, or will be, adopted to ensure against a recurrence of the loss of licensed material:

--Identify any other actions, including presentation to the Safety Committee of Reston Hospital, the Radiation Safety Committee of Reston Hospital and the administration of Reston Hospital.

--Expansion of the Hot Lab.

--Purchase of special equipment for safe seed handling.

Respectfully yours,

Stuart A. Fruman, M.D.
RSO, Chairman Department of Radiology

cc: Deborah S. Weibel, Director Radiology Services, Reston Hospital
William Adams, CEO, Reston Hospital
Ron Galonsky, COO, Reston Hospital
Arnie Able, M.S., Consulting Physicist, Mid-Atlantic Radiation Physics

Enclosure: memo from Anne S. Patterson, M.S., health physicist dated 3/1/2000.

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To: Stuart A. Fruman, M.D., RSO, Reston Hospital
From: Anne S. Patterson, M.S., health physicist ASP
Date: March 1, 2000
Subject: Missing I-125 Seed

The following is a synopsis of events leading to the declaration of a missing I-125 seed:

Monday, February 28, 2000, 8:00 a.m.: During calibration of I-125 seeds for a prostate seed implant, one seed was noticed to be missing. I assume it was either on the countertop or the floor, and started an immediate search for the seed. I spent approximately 15 minutes visually searching for the seed, in the following areas of the hot lab: the countertop adjacent to the L-shield, in the sink, under the lip of the sink (caulking is loose), all areas of the floor, and the upper edge of the mini-refrigerator. I surveyed my clothing and shoes before exiting the hot lab, to make sure that the seed was not stuck on me. Additionally, I visually searched as well as surveyed the seed cartridge, as on occasion the seed gets stuck inside the cartridge. Also, I checked the cartridge holder to see if the seed had fallen into one of the small wells in the holder.

I counted the seeds three times, in order t affirm there was not a seed miscount. All three counts confirmed a seed was missing. The original number of seeds was 111, but I consistently counted 110. Also, during the case in the operating room, I counted the seeds twice. We used 105 seeds for the patient's implant and had 5 remaining seeds for a total of 110.

Monday, February 28, 2000, 11:30 a.m.: I reported to Dr. Fruman that there may be a seed missing, and that I would look further after the last seed implant case of the day, about 5:00 p.m.

Monday, February 28, 2000, 5:00 p.m.: Lou (Nuclear Medicine Technologist had cleared off the countertop and searched for the seed. Dr. Fruman and I also visually searched the countertop, under the L-Shield, the floor, the sink the refrigerator, and the drawers under the countertop. Additionally, I used a survey meter to try to detect the seed. We searched the Hot Lab for about 30 minutes.

Tuesday, February 29, 2000: Lou again took apart the Hot Lab to search for the seed but could not locate it. Dr. Fruman attempted to call the Atlanta office of the NRC at 4:20 p.m., but no one was available to take his call.

Wednesday, March 1, 2000: Dr. Fruman called the Atlanta office of the NRC, and he was directed by that office to call the Maryland NRC office.

According to Part 20 of the NRC regulations, an I-125 implant seed must be reported as missing if the source strength exceed 1.0 microcuries. This seed had a source strength of 0.4 millicuries, so I recommended that we phone the Atlanta office of the NRC for guidance.