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# Saint Joseph's Radiation Oncology Center

May 5, 1997

Robert G. Gattone, Jr.  
Nuclear Materials Inspector  
US NRC, Region III  
801 Warrenville Road  
Lisle, IL 60532-4351

RE: Clarification for Case #1, from 8-23-95

Dear Mr. Gattone:

This clarification is a response to your call this morning.

A. My exposure calculation is based on the following:

I used  $x = \Gamma \cdot (A / r^2) \times T$ . Where x-exposure, in R.

$\Gamma$  - Gamma constant =  $4.69 \text{ mR} \times \text{cm}^2 / (\text{mCi} \times \text{hr})$

A - activity in mCi, 35 mCi

r - distance in cm. (200cm).

T - time hours (2hrs) (see calculation sheet).

I overestimated the exposure because:

- 1) I used a shorter distance, 6 feet instead of 10 feet.
- 2) I ignored the portable radiation shield (1" Pb) HVL for Ir-192 is 3 mm. This will reduce the exposure by more than 95%.
- 3) Time of exposure I used 2 hrs. This will be correct for the patient himself, but not for his family members (see next note)

B. My Dosimetrist - Jodie Wells, CMD- confirmed the following:

- When she arrived at 21:30 to return the radioactive seeds to the shipping container, there was no family member around. The notes from the nurse charting indicated that the patient tried to call his wife, but the phone was busy at 18:20 that p.m. The family lives in Knox, one hour driving from South Bend. The wife and daughter are mentioned in the nurse's note only when patient had been discharged at 22:00. It may be that the family members arrived after the Dosimetrist returned the active seeds to the shipping container.
- The active tube was in the trash can above the toilet in the bathroom.
- The portable radiation shields were used to protect the patient room.



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- There was a container in the room and she used it to transform the seeds to the safe room.
- She put the seeds into the shipping container-Alpha Omega Service's container.

I hope that I have answered your questions, please feel free to contact me if you have any further information.

Sincerely,

Atef Omari, M.S.  
Radiation Physicist

Enclosure: Copy of exposure estimate

## Exposure estimate

$$\dot{X} = \frac{T A}{r^2}$$

$$\dot{X}(200 \text{ cm}) = 4.69 \frac{\text{R cm}^2}{\text{m} \cdot \text{hr}}$$

$$r = 200 \text{ cm} \quad (6 \text{ ft})$$

$$A = 35 \text{ m}^2$$

$$\dot{X} = \frac{4.69 \times 35}{(200)^2} \times 1000 \frac{\text{m}^2}{\text{R}} = 4.1 \frac{\text{mR}}{\text{hr}}$$

for 2 hrs the exposure  
is 8.2 mR.

2 exposure is less than  
10 mrem for any person that  
stayed 2 hrs at distance of 6 feet.  
Note that this does not take into  
account the the portable shielding that  
will reduce the exposure drastically.

AO 8/27/95