



THE HAHNEMANN MEDICAL COLLEGE & HOSPITAL OF PHILADELPHIA
TWO-THIRTY NORTH BROAD STREET PHILADELPHIA, PENNSYLVANIA 19102

IONIZING RADIATION CONTROL COMMITTEE

15 November 1982

Thomas T. Martin
Director, Division of
Engineering and Technical Programs
U.S. Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

Dear Mr. Martin:

RE: License Nos. 37-00467-34 and SNM-1369,
Docket Nos. 30-02959 and 70-01362, Inspection 82-01

This letter is in reply to your letter of 22 October 1982 outlining the results of the routine safety inspection of 12 and 13 August 1982.

Confirmation is given that the ambidextrous nuclear medical technologist has been assigned a TLD ring badge for each hand. The evaluation is still ongoing and will most likely be finished within three months. The length of time is to evaluate different work situations.

Information in regard to Items A and B of your letter is given below. The enclosed check for \$40.00 is for the amendment request detailed in Item A.

Item A

In regard to Appendix X, Item A, records of implants were reviewed and it was found that the patient described had an iridium-192 implant consisting of 63 seeds with an activity of 0.60 mg Ra eq/seed for a total activity of 37.8 mg Ra eq and that the implant was in for 28 hours. Ignoring any scatter and attenuation by the patient and walls, the calculated exposure rate at 10 feet would

Thomas T. Martin
15 November 1982
Page Two

have been 3.4 mR/hour and the total exposure during the implant at 10 feet would have been 94 mR. Using this, radiation levels at 12 and 14 feet from the bed would have been 2.3 and 1.7 mR/hour instead of the 3.5 and 2.6 mR/hour described in your letter. It is realized that a level of 5 mR/hour at 10 feet was recorded on the survey form and that this was the information reviewed by the inspectors.

After the inspection, measurements were made using iridium-192 with no patient attenuation in a typical patient room. As expected measurements taken near a wall are higher than expected readings by about 25 percent due to scatter from the walls and furnishings. Transmission through common walls was measured to be roughly 80 percent under "broad beam" conditions. In general exposure readings taken through walls are roughly within 10 percent of the calculated readings without attenuation considered. The measurements give some support to the feeling that the surveyor in measuring 5 mR/hour may have misjudged the distance from the implant. A review was held with the surveyors in which 10CFR105(b) and the importance of estimating distances and expected readings were discussed.

In any event whether the calculated or recorded readings are used, the 2 mR/hour rule was exceeded, but the 100 mR in any seven consecutive day rule was not since the implant was only in for 28 hours.

An analysis was made of all the iridium-192 implants performed over the last six months from June to October 1982 inclusive. For your information a table is attached. The average total activity was 14.3 mg Ra eq with an implant time of 45.5 hours. The calculated exposure rate at 10, 12 and 14 feet would be for the average implant conditions 1.3, 0.9 and 0.7 mR/hour respectively - again ignoring scatter and any attenuation. These values correspond to 58, 40 and 30 mR at these distances for the average time of implant.

Though on the average, 10CFR20.105(b) is satisfied, we are petitioning the NRC to be permitted to follow 10CFR20.105(a) which essentially states that the permissible levels of radiation in unrestricted areas would be such as not to cause any individual to receive a dose to the whole body in any period of one calendar year in excess of 0.5 rem.

Thomas T. Martin
15 November 1982
Page Three

The average length of stay for a patient at Hahnemann is 10.7 days while the average implant is 1.9 days (45.5 hours). To be extreme, suppose that a non-radioactive patient were in a room next to one containing a series of patients with radioactive material. The average exposure rate at 10 feet is 1.3 mR/hour and the non-radioactive patient would receive during his stay an exposure of 334 mrem (1.3 mR/hour x 24 hours/day x 10.7 days). Of course the table shows that no one room is constantly occupied by implant patients and that there are periods when no implant patients are in the hospital. If additional information is needed for approval of the amendment request, please do not hesitate to contact us.

Item B

On 16 August 1982, a linearity test was begun on the dose calibrator and was completed 55 hours later. The measurements were within ± 5 percent of the expected values.

In order to avoid missing quarterly linearity checks on the dose calibrator, both Nuclear Medicine and the Radiation Safety Office are keeping calendars of the required due dates for these tests.

Yours truly,



John Day, Ph.D.
Radiation Safety Office

JD/cm
Attachment

cc: L. Mills, M.D.
L. Brady, M.D.
M. Croll, M.D.
M. McGoldrick, M.B.A.

Iridium-192 Implant Information - Hahnemann University

<u>Patient Number</u>	<u>Implant Date</u>	<u>Patient Room</u>	<u>Number of Seeds</u>	<u>mg Ra eq/seed</u>	<u>Total mgRaeq</u>	<u>Implant Time (hrs)</u>	<u>Calc. Exp. @ 10' (mR/hr)</u>	<u>Calc. Total Exp @ 10'</u>
01	05/03/82	1664	25	0.55	13.75	49.3	1.2	60
02	05/11/82	1942	19	0.51	9.69	54.0	0.9	46
03	05/26/82	1751	36	0.61	21.96	35.0	2.0	68
04	05/27/82	1965	24	0.61	14.64	50.0	1.3	65
05	06/11/82	1663	19	0.53	10.07	45.8	0.9	41
06	06/16/82	1945	24	0.50	12.00	76.0	1.1	81
07	07/01/82	1964	40	0.44	17.60	46.0	1.6	72
08	07/07/82	1961	24	0.42	10.08	44.5	0.9	40
09	07/07/82	1767	32	0.41	13.12	96.0	1.2	112
10	07/16/82	1942	36	0.46	13.68	48.0	1.2	58
11	07/19/82	1964	20	0.61	12.20	41.0	1.1	44
*12	07/21/82	1964	63	0.60	37.80	28.0	3.4	94
13	07/27/82	2043	26	0.57	14.82	50.0	1.3	66
14	08/06/82	1767	27	0.51	13.77	50.0	1.2	61
15	08/17/82	1965	19	0.47	8.93	57.0	0.8	45
16	08/18/82	1946	26	0.51	13.26	21.0	1.2	25
17	08/31/82	1964	18	0.45	8.10	43.5	0.7	31
18	09/09/82	2067	33	0.40	13.20	57.3	1.2	67
19	09/21/82	1964	24	0.57	13.68	33.3	1.2	41
20	10/05/82	1965	21	0.50	10.50	40.5	0.9	38
21	10/06/82	1971	29	0.53	15.37	47.0	1.4	64
22	10/20/82	1771	26	0.64	16.64	29.0	1.5	43
23	10/20/82	1771	23	0.64	14.72	22.5	1.3	29
24	10/20/82	1765	21	0.64	13.44	28.0	1.2	33
A V E R A G E			27.3	0.53	14.30	45.5	1.3	58

*Case reviewed by NRC.

Note: Not rounding off may change some averages slightly.