(Attachment II B)

Saint John Hospital
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April 22, 1983

Mr. Wayne J. Slawinski
United States Nuclear Regulatory Commission
Region #3
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Slawinski:

During our recent enforcement conference on April 19, 1983, there was some uncertainty as to the radiation dose received by Dr. Ling. This letter is to clarify our feelings on this matter. My original report dated August 6, 1982 indicated a "skin dose." At our meeting, it was indicated that any civil penalty would depend on a "total body dose." Your definition of total body dose was "the dose received by a point of tissue located 1 cm. depth below the skin." The dose estimate given below will be a total body dose as indicated above. In addition, there was some uncertainty as to the total time the applicator was in Dr. Ling's pocket and the distance of the applicator to the skin.

Since Dr. Ling wore his ring badge clipped to his film badge and both monitors read approximately the same dose, it can be safe to assume that the area to his left upper pocket received and exposure of approximately 185 mRem (the average of the two readings). In a standing position, the location of the radiation monitors are 30 cm. from the center of the applicator located in his left pocket. In a sitting position, this distance is approximately 25 cm., however, to stay on the conservative side, we will assume a distance of 30 cm. At that distance, the exposure rate is 370 milli-roentgens/hour. In addition, it was noted that in either the sitting or the standing position, there is no soft tissue attenuation. There is a direct line-of-site between the applicator and the film badges in both instances. Therefore, the dose estimate assumes that the applicator was in the pocket for exactly one-half hour. Again, to remain on the conservative side, this ignores exposure received by the badges when the applicators were located either in or on the desk.

The distance the center of the applicator was from the surface of the skin was measured in both the standing and the sitting position. In the standing position it was 8 cm. In the sitting position it was 10 cm. Again, to remain on the conservative, the distance of 8 cm. was used. The attached polaroid photographs show how the measurements were performed.

The total distance from the center of the applicator to the point of interested located 1 cm. below the skin was 9 cm. The dose at this point was calculated using a computer program. The computer program claculates the dose to various points, given an assumed spatial distribution of the sources involved. The dose rate at 9 cm. from the center of the applicator was given as 4.3 rads/hour. The 1 cm. tissue attenuation is ignored. During one-half hour, the maximum radiation dose received at this point could, therefore, be 2.15 rads.

It is highly unlikely that the applicator remained in exactly one location during the entire one-half hour. The applicator most likely moved considerably around the thigh area, therefore, reducing the radiation dose to any one point below that given above.

If you require further information, please feel free to contact me.

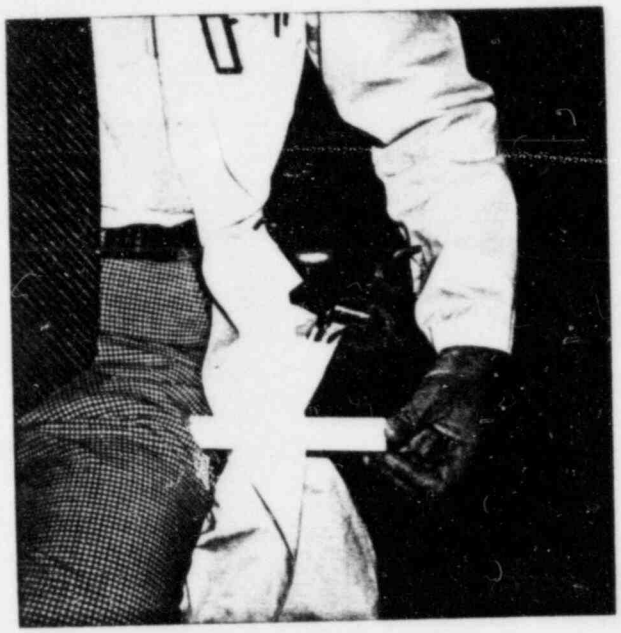
Respectfully submitted,

Walter Nikesch PhD

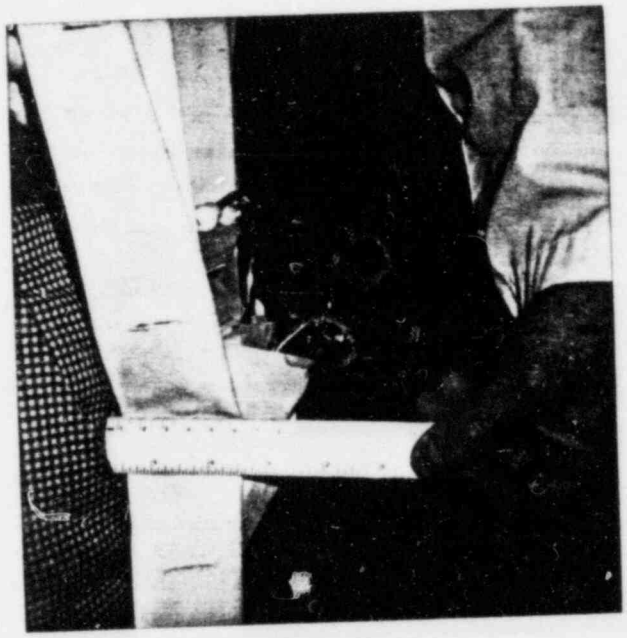
Walter Nikesch, Ph.D.
Radiation Therapy/Nuclear Medicine

WN:daz
Attachments - 2

cc: J. Griffin, M.D. - Chief, Department of Radiology
J. Ling, M.D. - Radiation Therapy
D. Markiewicz, Vice-President - Administration
D. Silwester, Associate Administrator
R. Sebo - Michigan Department of Public Health



Sitting



Standing

#Execution begins--
RADIUM ISODOSE CURVES JOHN LING M.D. 3-17-83
NEEDLES MM. MM.

NO	AL	TL	WALL	DIAM	COORDINATES	
A	12.60	1.5	2.1	0.6	3.00(0.0 , 4.20, 1.20)	(0.0 , 2.30, 0.40)
B	8.30	1.5	2.1	0.6	3.00(0.0 , 2.00, 0.30)	(0.0 , 0.0 , 0.0)
C	8.30	1.5	2.1	0.6	3.00(0.0 , 0.0 , 0.0)	(0.0 ,-2.10, 0.0)
D	12.60	1.5	2.1	1.0	3.00(-1.00, 0.0 ,-1.00)	(-1.00, 0.0 , 1.00)
E	12.60	1.5	2.1	1.0	3.00(1.00, 0.0 ,-1.00)	(1.00, 0.0 , 1.00)

X Y Z

THE DOSE AT POINT A,(0.0 , 0.0 , 1.00) IS 175.04 R/HR
THE DOSE AT POINT B,(0.0 , 0.0 , 1.50) IS 107.20 R/HR
THE DOSE AT POINT C,(0.0 , 0.0 , 2.00) IS 69.25 R/HR
THE DOSE AT POINT D,(0.0 , 0.0 , 3.00) IS 34.83 R/HR
THE DOSE AT POINT E,(0.0 , 0.0 , 4.00) IS 20.75 R/HR
THE DOSE AT POINT F,(0.0 , 0.0 , 5.00) IS 13.66 R/HR
THE DOSE AT POINT F,(0.0 , 0.0 , 6.00) IS 9.61 R/HR
THE DOSE AT POINT F,(0.0 , 0.0 , 7.00) IS 7.10 R/HR
THE DOSE AT POINT F,(0.0 , 0.0 , 8.00) IS 5.45 R/HR
THE DOSE AT POINT F,(0.0 , 0.0 , 9.00) IS 4.30 R/HR
THE DOSE AT POINT G,(0.0 , 0.0 ,10.00) IS 3.48 R/HR — 12Cm
THE DOSE AT POINT H,(0.0 , 0.0 ,15.00) IS 1.52 R/HR
THE DOSE AT POINT J,(0.0 , 0.0 ,30.00) IS 0.37 R/HR
THE DOSE AT POINT K,(0.0 , 0.0 ,35.00) IS 0.27 R/HR
THE DOSE AT POINT L,(0.0 , 0.0 ,40.00) IS 0.21 R/HR
THE DOSE AT POINT Y,(0.0 ,10.00, 0.0) IS 4.80 R/HR
THE DOSE AT POINT Y,(0.0 ,20.00, 0.0) IS 1.01 R/HR
THE DOSE AT POINT R,(0.0 ,30.00, 0.0) IS 0.44 R/HR
THE DOSE AT POINT F,(0.0 ,35.00, 0.0) IS 0.32 R/HR
THE DOSE AT POINT D,(0.0 ,40.00, 0.0) IS 0.24 R/HR
Y ISODOSE CURVES X

ATTN!
@@@ FORTRAN Monitor @@@
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