



**Missouri Baptist**  
MEDICAL CENTER

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May 28, 2015

To Sarah Forster, Health Physicist Licensing Reviewer

Subject: Contaminated Ra226 Box

The purpose of this document is to provide you with some information about a contaminated box Missouri Baptist Medical Center has in decay-in-storage. I started employment at Missouri Baptist Medical Center in November of 1987. I believe at this time the wood box was considered decay-in-storage in the radiation oncology department. Radiation Oncology service was provided by Washington University at this time frame. This relationship stopped in the nineties. I do not have any recollection of Ra226 procedures being performed in the eighties or nineties or of discussion of it in radiation safety meetings. This isotope was not listed on quarterly inventory documents. This is why I believe it was prior to 1987. I was told the box was a container for Ra226 sources used to treat patient's eyes. I have never seen any original Ra226 sources in the box. I am speculating the sources were returned to the supplier.

The box measures 7.5 inches by 7.5 inches and 6 inches tall, this includes the hinged lid. The box was placed into a long term decay-in-storage location in August 2012. This is the current location, a secure room in a parking garage. This is when the quarterly inventory of the box started to assure the source was tracked, monitored and not misplaced. The reading of a survey meter at 1 cm is .06 near a hinge when the box is open. The background for this room is .02 mR/hour. The box is double bagged to prevent the spread of contamination and labeled as radioactive. See attached report MBMC Radium Contamination Activity Estimate. A wipe test smear was performed May 27, 2015 of the outside bag. The smear was measured by an Atom Lab multichannel analyzer; the channel windows are set from 20 to 1500 keV. The background normally reads 430 to 460 cpm, this unit is used routinely to measure incoming packages for contamination. The background measurement was 434 cpm and the wipe test smear measurement was 443 cpm, no detectable contamination on the wipe test smear.

The plan for this box is to transfer it to a licensed radioactive materials broker. Missouri Baptist Medical Center is planning to transfer some cesium sources in June of 2015. We would like to include this box as part of the shipment.

Sincerely,

Tom Moenster, RSO

Missouri Baptist Medical Center

## MBMC Radium Contamination Activity Estimate

The activity of a contaminated box in radioactive storage was estimated using survey meter readings and simple calculations. The contaminant is assumed to be Ra-226. The maximum reading with a survey meter at 1 cm was 0.06 mR/hr and background reading was 0.02 mR/hr giving a net reading of 0.04 mR/hr.

From:

$$\Gamma_{\text{Ra-223}} = 9.1 (R \text{ cm}^2) / (\text{mCi hr})$$

The activity was estimated using:

$$0.04 (\text{mR/hr}) = A(\text{mCi}) 9.1 (R \text{ cm}^2) / (\text{mCi hr}) 1000(\text{mR/R}) / (1\text{cm}^2)$$

And

$$A = 4.4 \times 10^{-6} \text{ mCi} = 4.4 \text{ nCi}$$

David Nelson, PhD DABMP  
February 19, 2015



**Forster, Sara**

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**From:** Thomas Moenster <tjm0476@bjc.org>  
**Sent:** Thursday, May 28, 2015 1:09 PM  
**To:** Forster, Sara  
**Subject:** Information Concerning Ra226 Box  
**Attachments:** NRC Follow-up Ra226 Box 5-28-15.pdf

Please see attached for a document on the contaminated Ra226 box. There is a radioactive material broker scheduled to come to Missouri Baptist Medical Center the week of June 8th. It would be nice to have the Amendment to show the broker. Please contact me if you should have questions.

Thank you.

Tom

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