

# HOWARD UNIVERSITY

RADIATION SAFETY OFFICE

August 13, 2018

## MEMORANDUM

To: U.S. Nuclear Regulatory Commission – Region I  
2100 Renaissance Blvd, Suite 100  
King of Prussia, PA 19406 – 2713  
Attn: Donna Janda, Branch Chief

From: Dr. Satya R. Bose, Ph.D., DABR *SB*  
Director & Radiation Safety Officer  
Howard University  
Chief Medical Physicist, Radiation Oncology  
Howard University Hospital

Subject: **NRC inspection and exemption of 10 CFR 35.633 (b)(5)**

This memo is in response to the NRC Inspection conducted on April 10, 2018 as well as the exit interview held on August 07, 2018 including an email response from Ms. Robin Elliott. According to the email from Ms. Elliott, the timer linearity violation as indicated in 10 CFR 35.633 (b)(5) requires linearity test to be conducted over the typical range of use. This issue has been discussed with the Howard University Radiation Safety Committee (RSC) members.

Typical range of treatment time for High Dose Rate (HDR) depends on the prescription dose, source strength, and anatomical treatment sites, which could vary from 4 minutes to 20 minutes. During this inspection period conducted by Ms. Elliott, the range of use for all HDR cases varied from minimum 4 minutes 21 seconds to maximum 11 minutes 15.9 seconds.

The monthly linearity was performed for the timer range of 14.8 minutes including the seven dwell-time positions (10, 20, 40, 80, 120, 240 and 480 seconds). Since the last inspection, the linearity test timer range increased from 14.8 minutes to 18.5 minutes. Per Ms. Elliott's suggestion, I have tried to perform linearity test within the range of 20-minute. However, the Varian HDR afterloader system failed for this allotted time, which was also verified by Ms. Elliott.

According to the AAPM Radiation Therapy Committee Task Group Report # 56, the timer linearity should be performed across the dwell time range. Therefore, if we consider NRC regulation 10CFR 35.633 (b)(5) as well as the AAPM Task Group report #56, there are no issues for monthly linearity test over a typical range of use because the maximum range of use for HDR treatment was about 11 minutes 15 seconds, which falls within the monthly linearity timer range of 14.8 minutes.



During our exit interview on August 07, 2018, Ms. Elliott suggested that we should perform linearity test for 20 minutes during the installation of the new source. It would be helpful if the information is available in NRC regulation.

To avoid any confusion in the future, the RSC is requesting for an exemption to 10 CFR 35.633 (b) (5) for the following reasons:

- The Varian HDR unit model VS 531 has a limitation of performing dwell time of maximum 16 minutes.
- According to AAPM Task Group (TG) report # 56, the timer linearity should be performed over the dwell time range which is acceptable.

Per Ms. Elliott's suggestion, I would like to follow AAPM TG report # 56, instead of 10 CFR 35.633 (b) (5) for monthly linearity test due to the machine limitation.

Cc: Alice A. Mahan  
Management Representative to RSC  
Administrative Director, College of Medicine

Sergei Nekhai, Ph. D., Professor  
Chair, RSC