

Lankenau Hospital
100 Lancaster Ave
Wynnewood PA, 19096

April 8, 2005

NRC Operations Center
NRC Region One Office
NRC Document Control Center

Dear Sir or Madam:

I am writing to notify the NRC of an incident involving the performance of our Nucletron V2 microselectron High Dose Rate Afterloading device. We are filing this report according to the requirements of 10 CFR 21.21(d). While it is our belief that we are not required to do so, we are following the suggestion of Michelle Beardsley of NRC Region 1, Medical Branch in filing this report. The information that we are supplying here has all been provided to Nucletron Corporation of Columbia, MD for their analysis. It is our belief that they, if anyone at all, should be the party responsible for the management of these issues under these regulations and those of the FDA. That viewpoint aside, we are following this Region 1 interpretation. Additionally, I am attaching a copy of the Nucletron Service Report from this incident.

Required Information under reporting in 10 CFR 21.21(d)(4):

- i) Informing Individual – Nathan Anderson, Authorized Medical Physicist, Lankenau Hospital, Department of Radiation Oncology, 100 Lancaster Ave., Wynnewood, PA 19096
- ii) Identification of the facility, the activity, or the basic component supplied for such facility or such activity with in the United States which fails to comply or contains a defect – The supplier of the treatment device and the transfer tube is Nucletron Corporation, of Columbia MD. The item which had the initial breakdown in performance was a Nucletron microSelectron GYN transfer tube for channel 1. This item developed an internal constriction that caused the source's inability to retract. We are contending that the classification of the component performance as failing to comply or containing a defect is not something that we as end users are able to determine. This may or may not be true. Nucletron Corporation would be the determinate of that.
- iii) Same as above

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- iv) The situation described here created the situation whereby we were required to initiate our emergency procedures. During routine daily quality assurance testing, the HDR treatment device was set up with two GYN transfer tubes connected between the treatment device and the autoradiograph device. All pieces are manufactured and supplied by Nucletron Corporation and their use here is within the intended uses. After transfer tubes were attached and locked in place, the morning QA treatment delivery to the autoradiograph device was initiated. During initial runs through the tube, a number of daily checks were performed to verify the functionality of the emergency stops and interruption buttons. Finally, on the last iteration, the check cable went out through transfer tube one and returned. This indicated that the tube was clear. Then the source went out into transfer tube one. It dwelled in the tube for 101.2 seconds. When the cable was being driven back into the safe, it encountered a lag in the stepper motor, indicating that there was either a partial or total constriction of the path. The unit correctly initiated an emergency stop. The source position indicator correctly displayed that the source was stuck in the exposed position. The interrupt button and emergency stop buttons were activated but the source remained in the transfer tube. The room was secured until Nucletron service arrived. When they arrived, they decided to enter the room, and use the emergency source retraction handles to try to drive the source into the safe. The engineer entered the room alone. The manual crank for the source cable functioned correctly and the source was returned to the safe within 17 seconds of entry into the room. The engineer's personal dosimeter indicated an exposure of 5 mR whole body dose. Upon inspection of the transfer tube after removal from the machine, there was no external sign of any wear on the transfer tube. However, when a check wire was run through, it was discovered that there was a constriction or edge that had developed just inside the end that connects to the treatment unit. This constriction is what caused the source drive in to fail. These transfer tubes are measured and inspected on a monthly basis as required. The same transfer tube is used on a daily basis and had in fact been used twice the day before successfully. The nature of the defect in the tube therefore can only be described in my opinion as wear and tear. This transfer tube was approximately two years old. This same opinion was expressed by the on site engineer.
- v) This incident occurred on Wednesday April 6, 2005
- vi) There are transfer tubes for all of our applicators. We possess a total of 22 transfer tubes. Each of them is measured and inspected on a monthly basis for condition according to 10 CFR 35.
- vii) The corrective action taken was that the transfer tube was replaced with a new one. The source and cable were inspected on camera and no

problems were identified. This action has corrected the root problem. Additionally, it should be noted that the procedures for source recovery as described in the Nucletron manuals and the on site emergency procedures were followed and were successful. The final manner of source retraction was the one that was successful, but successful it was.

- viii) Related advice - As I explained to Nucletron, I agree the source retraction failed to retract due to a constriction in the transfer tube. This condition was easily detectable with a test cable once it was removed. Currently we inspect the tubes for length and condition thoroughly on a monthly basis as required by part 35. The tubes are also visually inspected before each use. However, it seems reasonable to expect that the check cable should have identified this constriction; it did not detect this. Additionally, it seems that the emergency stop button should have had enough pull to negotiate this constriction; again, it did not. Without significant testing from Nucletron, we can not know the specifics of the internal circumstances which caused the source cable to encounter a constriction that the check cable did not.

Sincerely,



Nathan Anderson
Medical Physicist
Department of Radiation Oncology
Lankenau Hospital

Cc: Lankenau Hospital Rad Onc Incident File
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