



December 29, 2016

James Thompson  
Senior Health Physicist  
US NRC Region IV  
1600 East Lamar Boulevard  
Arlington, Texas 76011

Dear James:

This letter serves as official notification of a contamination event at Community Medical Center (License No.: 25-18361-01). Please note that the NRC Operations Center was notified by phone less than 24 hours after the discovery of the contamination event. The Event Notification Number is 52417.

On December 7, 2016, the quarterly source exchange for the Nucletron MicroSelectron afterloader was scheduled. Hal Archibald, the field service engineer (FSE) from Elekta flew in from Salt Lake City to perform this routine task. The source to be exchanged was an Ir-192 seed that is encapsulated in a 316L stainless steel capsule. The capsule dimensions are 0.9 mm in diameter and 4.5 mm in length. The capsule is welded onto a very flexible wire. The source and wire are approximately 1500 mm in overall length.

During a source exchange the old source is remotely sent in to the transport container (pig), and then manually disconnected from the afterloader. At this time, a wipe test is performed on the tail end of the wire on the new source as well as the old source. Wipe tests are also performed on other internal areas of the afterloader unit. The results of these tests are listed in Table 1.

Background	214 counts
Background (2 <sup>nd</sup> check)	220 counts
Drum Wipe	238 counts
New Source	216 counts
Old Source	2538 counts
Old Source (2 <sup>nd</sup> check)	472 counts
Check Cable	4448 counts
Check Cable (2 <sup>nd</sup> check)	2046 counts

Table 1: Initial wipe tests performed by Hal Archibald with a five minute count window.

Areas of the afterloader were clearly contaminated. The wipes for the check cable were transported to the nuclear medicine department and analyzed on their equipment as well. The result also showed contamination.

Subsequent testing on peripheral equipment (interior of the transfer tubes, source position sensor) showed low levels of contamination (approximately 470 counts). Anything that had come into contact with the interior of the afterloader was likely contaminated. At this time, the Radiation Safety Officer was contacted and apprised of the situation.

Additional wipe tests of the cleaning tray for the vaginal cylinder and other surfaces in the HDR suite did not show contamination. A wipe test of the autoclave where the vaginal cylinder was sterilized the previous day was performed and also showed no contamination. No contamination has been found on any external surface of the HDR unit that is accessible to patients. The one external location where contamination was found is the source position simulator (SPS) which was lightly contaminated at approximately twice background. Please note, the SPS is only utilized by the medical physicist for testing purposes. Therefore, the contamination appears to be localized to the source itself and the interior of the transfer cable.

The contamination appears to be Ir-192 based on its energy spectrum. The amount of contamination is much less than the radioactive source. Currently the source is at approximately 162,800,000,000 Bq. The hottest wipe test was around 14 Bq/cm<sup>2</sup> assuming a 50% counting efficiency and a 10% wipe efficiency. In addition, while these items show contamination via a wipe test, surveys with a GM survey meter on the transfer tubes and applicators do not show much difference from background radiation.

Following discovery of the contamination, the equipment was gathered together and kept in the HDR vault. The door to the vault was powered down, and a sign posted to warn against entry. The FSE, Hal Archibald, is scheduled to return and box up the contaminated items for return to the manufacturer. It is expected that all contaminated equipment will be returned to the manufacturer by the end of the year.

The following equipment was gathered together to return to Nucletron:

- Fletcher tandem (x2)
- Fletcher ovoid (x2)
- Vaginal cylinder center channel
- Transfer tubes for GYN applicators (x3)
- Source position simulator
- Ruler check
- Transfer tube for ruler check
- Afterloader head

At this time, it is unclear when the initial contamination of the transfer cables occurred. However, as the results of the September source exchange procedure were within normal limits, the contamination occurred since then. Three patients have been treated with the unit since the

September source exchange, and no patients have been treated since the contamination was discovered. Due to the fact that contamination was present only on the internal surfaces of the transfer cables and the very low levels of surface contamination in comparison to the activity of the Ir-192 source itself, any excess risk to patients is expected to be negligibly small. In light of this, we do not believe it is a necessity to notify the three patients to such a low level of excess risk.

The origination of the contamination is most likely from the old source and wire (Serial No.: D36P3870, Lot No.: 16-2549). As stated, the last source exchange was in September 2016. Wipe tests during the September exchange of the new source were conducted and found to be within acceptable limits of two times background (Background: 195 counts, Source wipe: 213 counts). In this wipe, the tail end of the wire is tested. It is possible that the wire closer to the source was contaminated with some Iridium dust. With the source moving through the different channels, it spread the dust through the afterloader and into the connected transfer tubes and applicators.

Another possible scenario is that the actual source was damaged, and it spread the radioactive material through the interior of the cables. This situation seems less likely as the source is encapsulated by stainless steel and is well protected. No equipment malfunction, source jams or damage to the unit or transfer cables was reported by staff at any time following the September source exchange.

If you have any questions, please contact me.

Sincerely,



Dan Dugan, MS, DABR  
Medical Physicist  
Radiation Safety Officer

cc: Kim Ryan O'Hara