

Haverkamp, Trisha

From: Usha Mistry <umistry1@jhmi.edu>
Sent: Monday, August 19, 2019 3:14 PM
To: Seeley, Shawn
Cc: Janda, Donna
Subject: [External_Sender] Sibley Memorial Hospital NRC Inspection - Email #2
Attachments: 20190816_105857.jpg; 20190816_105933.jpg; 20190816_122802.jpg; JHSibley.SkinContaminationDoseEstimate.0819.pdf

Importance: High

Good afternoon Mr.Seeley,

Please see second set of attachments for the items you requested from the inspection performed on August 13,2019.

Usha Mistry

Usha Mistry ARRT(N),CNMT,PET

Lead Nuclear Medicine Technologist

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August 16, 2019

Alan Kronthal, M.D.
Radiation Safety Officer
Sibley Memorial Hospital
Johns Hopkins Medicine
5255 Loughboro Road NW
Washington DC 20016

RE: Dose Estimate for Skin Contamination Incident (NRC License 08-07398-03)

Attention: Alan Kronthal, MD, Radiation Safety Officer,

On Friday August 16, 2019 I was contacted by Usha Mistry ARRT(N), CNMT, PET (lead nuclear medicine technologist) with a request to complete a dose estimate for a skin contamination that occurred at your licensed facility on August 13, 2019.

I considered the information provided by Ms. Mistry, additional information I received during a phone call with Mr. Shawn W. Seeley, Health Physicist, USNRC which was present at the time of the incident, and reasonable assumptions to complete the dose estimate. Please bear in mind that my conclusion is based on calculations that are estimates. These estimates are an approximation due to various factors which may increase or decrease the potential dose values involved in your incident and my subsequent conclusion.

The following NRC regulatory requirement was reviewed and was not exceeded based on the information provided to me.

- 10 CFR 20.1201 - Occupational Dose Limits for adults

As the Radiation Safety Officer, you should review the spill incident report. The report should include an interview of all persons present to ensure the incident is documented properly and corrective actions can be implemented. I have outlined some areas of your radiation protection program that should be addressed. I recommend Sibley Memorial Hospital complete a root cause analysis and implement corrective measures to prevent similar incidents in the future. The analysis should be presented at the next Radiation Safety Committee meeting. A copy of this report shall be maintained on site for inspection.

Sincerely,

A handwritten signature in black ink that reads "Michele Loscocco".

Michele Loscocco, MS, DABR
Diagnostic Medical Physicist

cc: Ron McKee, MBA, BSMT, RVT, RDMS, EMT (Director of Imaging)
Usha Mistry, ARRT(N), CNMT, PET (Lead Nuclear Medicine Technologist)

Known Data

1. A Ludlum 2401 Pocket Survey Meter detected skin contamination on the Technologist's hands and other areas with a reading of approximately 1 mR/hr (information provided by Mr. Seeley)
2. The technologist had just finished an injection of F-18

Reference Data [1][2]

1. F-18 gamma constant = $1.879\text{E-}04$ mSv/h per MBq at 1 m
2. Single droplet of F-18 with uniform deposit ($1 \text{ kBq}\cdot\text{cm}^{-2}$) results in 1.95 mSv/h of skin contamination dose
3. Half-Life = 1.83 hours

Assumptions

1. Technologist's whole body was exposed to contaminated area for 15 mins
2. Technologist washed hands approximately 15 mins after contamination occurred

Calculations (Estimates)

1. Activity spilled = 1 kBq
 - This is based on activity associated with 1 droplet [2]
2. Occupational Dose (DDE) = 0.25 mrem ($1 \text{ mR/hr} * 0.25 \text{ hr}$)
 - This is lower than the regulatory limit in 10 CFR 20.1201 section (a)(1) of 5 rems
 - **Technologist's dosimeter should be returned for immediate processing. The measured results from dosimeter should be ultimate determining factor for this requirement.**
3. Occupational Dose (SDE to skin) = $0.49 \text{ mSv} = (1.95 \text{ mSv/h} * 0.25 \text{ h}) = 49 \text{ mrem}$ [2]
 - This is lower than the regulatory limit in 10 CFR 20.1201 section (a)(2)(ii) of 50 rems
 - **Technologist's dosimeter should be returned for immediate processing. Differing results may result in re-evaluation of assumptions.**
 - **After review of dosimetry results, a skin dose must be assigned to the technologist and officially added to their record.**

Discussion

Although the analysis of the incident indicates that regulatory requirements were not exceeded, the incident should be reviewed and used to develop corrective action to reduce the incidence of recurrence. There were multiple radiation safety program failures which I have outlined below.

- Failure of staff to wear protective gloves while handling RAM
- Failure of staff to monitor hands after injection was completed
- Failure to record all surveys results; including technologist hands and area contaminated
- Failure of technologist to begin decontamination procedure immediately after discovery
- Failure to record survey results after decontamination procedures were completed

It is understood that failures occur in stressful situations such as spill incidents. Failures can be mitigated by proper planning and staff training. I recommend the following be instituted immediately.

- A root cause analysis be performed.
- Technologist's dosimetry devices be returned for processing.
- The RSO ensure that all staff understand that gloves are to be worn by individuals handling RAM.

- Place a survey meter in PET injection area to facilitate hand monitoring after injections.
- Spill and decontamination procedures be reviewed and revised as deemed appropriate by the RSO.
- Staff training be completed to ensure they understand the spill and decontamination procedures.

References:

- [1] F-18 Nuclide Safety Data Sheet. www.nchps.org
[2] Radionuclide and Radiation Protection Data Handbook (2002) for Fluorine-18