November 14, 2007

NMED No. 070614

Michael Wiemann, M.D.
Senior Vice President & Chief Medical Officer
St. Vincent Hospital & Health Care Center
2001 West 86th Street
Indianapolis, IN 46240-0970

SUBJECT: NRC REACTIVE INSPECTION REPORT NO. 030-01579/2007-001(DNMS)
ST. VINCENT HOSPITAL & HEALTH CARE CENTER

Dear Dr. Wiemann:

This refers to the reactive inspection conducted on October 15, 2007, at your facility located in Indianapolis, Indiana, with continued NRC in-office review through November 6, 2007. The in-office review included receipt and review of your event report dated October 31, 2007. The purpose of the inspection was to review the circumstances, root and contributing causes, and proposed corrective actions to a reported potential overexposure event that occurred in August 2007. The findings of the inspection were discussed with you and members of your staff at the conclusion of the onsite inspection. The enclosed report identifies areas examined during the inspection and presents the results of the inspection.

The inspector examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions in your license. Within these areas, the inspection consisted of a selected examination of procedures and representative records, observations of activities, and interviews with personnel. Based on the results of this inspection, no violations of NRC regulatory requirements were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter will be available electronically in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). The NRC's document system is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

We appreciate your cooperation and will gladly discuss any questions you have concerning this inspection.

Sincerely,

/RA/

John R. Madera, Chief
Materials Inspection Branch

Docket No. 030-01579
License No. 13-00133-02

Enclosure:
Inspection Report 030-01579/2007-001(DNMS)

cc w/encl: Edward Wroblewski, Radiation Safety Officer

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.:	030-01579
License No.:	13-00133-02
Report No.:	030-01579/2007-001(DNMS)
Licensee:	St. Vincent Hospital & Health Care Center
Location Inspected:	2001 West 86th Street, Indianapolis, Indiana
Inspection Date:	October 15, 2007
Inspector:	Robert G. Gattone, Jr., Senior Health Physicist
Approved By:	John R. Madera, Chief Materials Inspection Branch

NMED No. 070614

Enclosure

EXECUTIVE SUMMARY

St. Vincent Hospital & Health Care Center
NRC Inspection Report 03001579/2007-001(DNMS)

An inspector conducted a reactive inspection to review the circumstances associated with a radiation exposure event that occurred in August 2007. The event involved a physicist who inadvertently left his optically stimulated luminescence whole body dosimeter (dosimeter) in a linear accelerator room. The exposure event resulted in dosimeter readings of 113,165 millirem Deep Dose Equivalent (DDE), 113,165 millirem Lens Dose Equivalent (LDE), and 107,506 millirem Shallow Dose Equivalent (SDE) from exposure to the linear accelerator's direct radiation beam sometime between August 1 and August 31, 2007; however, nobody wore the dosimeter during the exposure event. Therefore, the exposure event did not result in an individual receiving a radiation dose in excess of regulatory limits. The licensee estimated that the actual radiation dose received by the physicist in August 2007 was 2 millirem DDE, 2 millirem SDE, and 2 millirem LDE, based on the average of the last 19 months of the individual's dosimetry history.

The inspector did not identify any violations of NRC regulatory requirements. The physicist wore his dosimeter while participating in licensed activities.

The licensee's corrective actions to prevent a similar exposure event included: (1) informing the physicist that he should immediately notify the Radiation Safety Officer (RSO) if he identifies a lost or found dosimeter; (2) issuing a memo to all recipients of personnel dosimetry reports reminding them to immediately notify the RSO if they identify a lost or found dosimeter; and (3) planning to discuss the event at the next Radiation Safety Committee meeting scheduled for November 20, 2007.

Report Details

1 Program Overview

Licensed Activities and Inspection History

The Nuclear Regulatory Commission (NRC) License No. 13-00133-02 authorizes St. Vincent Hospital & Health Care Center (licensee) to conduct diagnostic and therapeutic nuclear medicine, manual brachytherapy, in-vitro testing, high dose rate afterloader (HDR) brachytherapy, instrument calibration, and sealed source leak testing at several locations of use. The licensee routinely conducted licensed activities.

Two non-cited violations and one Severity Level IV violation of NRC regulatory requirements were identified during the last NRC inspection of the licensee that was conducted on March 28 through 30, 2007. No violations were identified during the previous inspection that was conducted on June 10, 2005.

2 Exposure Event Summary

2.1 Inspection Scope

The inspector reviewed the circumstances surrounding the potential overexposure event by touring the event location, reviewing selected licensee records, and interviewing selected licensee personnel; including two physicists, the Radiation Safety Officer (RSO), and a radiation therapist.

2.2 Observations and Findings

A physicist periodically conducted quality assurance activities on a linear accelerator that was used to treat patients. These activities included measuring the linear accelerator's radiation output and performing mechanical checks. In addition, the physicist participated in NRC-licensed activities, including HDR brachytherapy and manual brachytherapy. No equipment malfunctions or unusual events had occurred since October 2005 involving the linear accelerator or NRC-licensed activities.

The licensee assigned the physicist an optically stimulated luminescence whole body dosimeter (dosimeter) that was exchanged monthly for processing. The physicist wore his dosimeter near his keycard badge on a lanyard. The lanyard was positioned around his neck whenever he worked with the linear accelerator or participated in NRC-licensed activities. The physicist used the keycard badge to access the licensee's facilities as needed to work with the linear accelerator and participate in NRC-licensed activities.

The physicist routinely wore his lanyard (with his attached dosimeter) home and stored it at his residence when he was not working for the licensee. The physicist did not leave his dosimeter in the car when he was not wearing it nor did he put it through the laundry.

As of July 31, 2007, the highest dose received by a dosimeter worn in 2007 by the physicist was 3 millirem. The 3 millirem dose was typical because the physicist was located outside of a shielded treatment room whenever the linear accelerator produced radiation and whenever HDR brachytherapy was performed.

In August 2007, the physicist conducted quality assurance activities on a linear accelerator. The physicist inadvertently left his dosimeter in the linear accelerator room.

Beginning at approximately 7:00 a.m. the day after the physicist left his dosimeter in the linear accelerator room, some patients received linear accelerator treatments in the room. At approximately 8:30 a.m. that day, a radiation therapist found the physicist's dosimeter on a countertop that was about 12 feet from the linear accelerator's gantry near the foot of the patient positioning table. The dosimeter was not on a lanyard. The radiation therapist promptly notified the physicist that she had found his dosimeter near the linear accelerator and she returned it to him. However, the radiation therapist did not notify the RSO that she had found the physicist's dosimeter near the linear accelerator. In addition, the physicist did not notify the licensee's RSO that his dosimeter was found near the linear accelerator because he did not believe that it was exposed to radiation. Nonetheless, the physicist made a note to himself that he would notify the RSO if his dosimeter readings show atypical results.

On October 8, 2007, the dosimeter processor notified the licensee that the physicist's dosimeter received 113,165 millirem Deep Dose Equivalent (DDE), 113,165 millirem Lens Dose Equivalent (LDE), and 107,506 millirem Shallow Dose Equivalent (SDE) between August 1 and August 31, 2007.

2.3 Conclusions

The inspector determined that a physicist inadvertently left his dosimeter in a linear accelerator room and the dosimeter was exposed to radiation produced by a linear accelerator when it was not worn by an individual.

3 Licensee Event Response

3.1 Inspection Scope

The inspector reviewed the licensee's response to the exposure event by interviewing selected licensee staff, including the physicist and the RSO, and reviewing selected records including the licensee's event report dated October 31, 2007.

3.2 Observations and Findings

In response to the dosimeter processor's notification on October 8, 2007, regarding the physicist's dosimeter results, the RSO notified the NRC Operations Center and the Indiana Department of Health of the event by telephone that day. The RSO promptly informed the physicist and some licensee managers about the dosimeter results. In addition, the RSO initiated activities to estimate the radiation dose received by the physicist.

The RSO implemented actions to prevent a similar exposure event including: (1) informing the physicist that he should immediately notify the RSO if he identifies a lost or found dosimeter; (2) issuing a memo to all recipients of personnel dosimetry reports reminding them to immediately notify the RSO if they identify a lost or found dosimeter; and (3) planning to discuss the event at the next Radiation Safety Committee meeting scheduled for November 20, 2007.

3.3 Conclusions

The licensee's response to the exposure event was adequate. Licensee staff notified the NRC Operations Center of the event and submitted the written event report as required by 10 CFR 20.2202 and 20.2203, respectively. In addition, the licensee implemented actions to prevent a similar exposure event.

4 Dose Assessment

4.1 Inspection Scope

The inspector reviewed the licensee's dose assessment of the physicist by reviewing selected records and interviewing selected individuals, including the physicist, the RSO, and a dosimeter processor representative.

4.2 Observations and Findings

The licensee had the physicist take a blood test on October 8, 2007. The results showed normal blood cell counts. In addition, the licensee noted that the physicist was in good health.

The RSO asked the physicist to re-trace his steps as a means of determining how the dosimeter received a high dose. Since the dosimeter dose was in excess of the licensee's As Low As Reasonably Achievable (ALARA) action level, the RSO requested the physicist to complete a questionnaire. On October 9, 2007, the physicist signed the questionnaire indicating, among other things, that the dosimeter was not placed or stored near radiation when not in use, the dosimeter was not placed or stored near heat when not in use, the physicist did not hold a patient while a radiograph was being made or during a nuclear medicine procedure, and the physicist did not work more hours or perform more procedures than usual in August 2007. In addition, the RSO interviewed the Chief Medical Physicist to determine whether or not there were any unusual events that might explain the high dosimeter readings, and the Chief Medical Physicist was unaware of any unusual events.

The RSO communicated with the dosimeter processor to determine if dosimeter data could be used to: (1) determine if the dosimeter exposure was static or dynamic, indicating whether or not the dosimeter moved while it was exposed to radiation (i.e., worn by the physicist or not); and (2) indicate whether or not the dosimeter exposure was due to radiation produced from the linear accelerator or from the HDR afterloader source. The dosimeter processor could not confirm whether or not the dosimeter exposure was static or dynamic. However, a dosimeter processor representative suspected it was a static exposure based on a faint image that was seen after dosimeter processing. A static exposure indicates that the dosimeter did not move when it was exposed and that it is unlikely to have been worn by an individual during the exposure. The dosimeter processor representative also concluded that the dosimeter results could not be used to determine whether or not the dosimeter exposure was due to radiation produced from the linear accelerator or from the HDR afterloader source because the differences in energies of the radiation produced from the linear accelerator and the HDR afterloader source could not be discerned.

On October 22, 2007, the licensee placed dosimeters in strategic locations in the linear accelerator room and exposed them to the estimated radiation dose that was produced by the linear accelerator during the time the physicist's dosimeter was left in the room. Two of the dosimeters were positioned in the direct radiation beam. Others were placed at distances from the direct radiation beam, including one that was positioned where the physicist's dosimeter was found (i.e., on a countertop that was about 12 feet from the linear accelerator's gantry near the foot of the patient positioning table).

The RSO reviewed the dosimeter doses after processing and conferred with a dosimeter processor representative about the results. The RSO determined that the physicist's dosimeter was probably in the direct radiation beam when it received the significant dose in August 2007 because the two dosimeters that were positioned in the direct beam on October 22 each received close to 113 rem and the doses to the other dosimeters exposed that day dropped significantly within a short distance from the direct radiation beam. In fact, the dosimeter that was positioned where the physicist's dosimeter was found only received 140 millirem. The RSO also surmised that the physicist's dosimeter was stationary during the exposure to the direct radiation beam because a dosimeter processor representative informed him that the image footprints of the two dosimeters that were positioned in the direct beam on October 22 were very similar to that noted on the physicist's dosimeter.

The RSO surmised that a physicist inadvertently left his dosimeter in a linear accelerator room and it was not worn by anyone when it was exposed to the linear accelerator's direct radiation beam. Therefore, the RSO concluded that the individual did not receive a radiation dose in excess of regulatory limits. The RSO could not determine how the physicist's dosimeter was moved from the direct radiation beam to the countertop where it was found. In addition, the RSO estimated that the actual radiation dose received by the physicist in August 2007 was 2 millirem DDE, 2 millirem SDE, and 2 millirem LDE, based on the average of the last 19 months of the physicist's dosimetry history.

4.3 Conclusions

The licensee's dose estimate for the physicist was adequate. The exposure event did not result in an individual receiving a radiation dose in excess of regulatory limits.

5 Exit Meeting

The inspector discussed the preliminary conclusions described in this report with licensee management during a preliminary exit meeting on October 15, 2007. The final exit meeting was conducted by telephone on November 7, 2007. The licensee did not identify any information reviewed during this inspection and selected for inclusion in this inspection report as proprietary in nature.

PARTIAL LIST OF PERSONS CONTACTED

* Becky Hoberty, Medical Physicist
\# Jean Meyer, Senior Vice President
\# Michael Wiemann, M.D., Senior Vice President & Chief Medical Officer
*# Edward Wroblewski, RSO

participated in preliminary exit meeting on October 15, 2007
* participated in the telephone exit on November 7, 2007