

Region I
NMSS Licensee Event Report

Licensee	Altoona Hospital		
Event Description	Investigation of Over-Exposure of Rtg of Film Badges		
License #	37-11826-01	Docket #	03003150
Event Date	10-21-04	Report Date	10-26-04
		MLER-RI	2004-059

1. REPORTING REQUIREMENT

<input type="checkbox"/> 10 CFR 20.2201 Theft or Loss <input type="checkbox"/> 10 CFR 20.2203 30 Day Report <input type="checkbox"/> 10 CFR 30.50 Report <input checked="" type="checkbox"/> Other <u>Information provided at licensee's discretion</u>	<input type="checkbox"/> 10 CFR 35.33 Misadministration <input type="checkbox"/> License Condition
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2. REGION I RESPONSE

<input type="checkbox"/> Immediate Site Inspection <input type="checkbox"/> Special Inspection <input type="checkbox"/> Telephone Inquiry <input type="checkbox"/> Preliminary Report <input checked="" type="checkbox"/> Information Entered in RI Log Report referred to: _____	<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 50%;">Inspector/Date</td><td></td></tr><tr><td>Inspector/Date</td><td></td></tr><tr><td>Inspector/Date</td><td></td></tr></table> <input type="checkbox"/> Daily Report <input checked="" type="checkbox"/> Review at next inspection	Inspector/Date		Inspector/Date		Inspector/Date	
Inspector/Date							
Inspector/Date							
Inspector/Date							

3. REPORT EVALUATION

<input checked="" type="checkbox"/> Description of Event <input checked="" type="checkbox"/> Levels of RAM Involved <input checked="" type="checkbox"/> Cause of Event	<input type="checkbox"/> Corrective Actions <input checked="" type="checkbox"/> Calculations Adequate <input type="checkbox"/> Additional Information Requested from Licensee
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4. SPECIAL INSTRUCTIONS OR COMMENTS

Cause of event and unknown and corrective actions not
required because event beyond control of licensee.
Follow up at next inspection

Public ☒

Non-Public ☐

Completed by:	<div style="border: 1px solid black; padding: 5px; text-align: center;">Stuart R. Courtemanche</div>	Date	<div style="border: 1px solid black; padding: 5px; text-align: center;">SRC 11/8/2004</div>
Reviewed by:	<div style="border: 1px solid black; padding: 5px; text-align: center;">Doreen J. Hender 11/8/04</div>	Date	<div style="border: 1px solid black; height: 40px;"></div>

TELEPHONE CONVERSATION RECORD		Date: October 26, 2004	Time: 16:00
Mail Control No.: N/A Inspection No.: N/A		License No.: 37-11826-01	Docket No.: 030-03150
Person Calling: Michael Vince, Radiation Safety Officer		Licensee: Altoona Hospital	Telephone No.: 814-946-2400
Person Called: Steven Courtemanche/(610) 337-5075			
Subject: LER regarding radiation monitoring dosimetry.			
<p>Summary: Mr. Vince called to inform the NRC about the results of radiation dosimeter reports. He stated that all of the dosimeters came back from processing with a reading of between 500 millirem and 1.0 Rem for the entire hospital except for one person's dosimetry. The person's dosimetry had been sent to the licensee separately from all of the other dosimeters but was sent for processing with all of the others. Based on the above, Mr. Vince surmised that the dosimeters received the radiation exposure enroute to the licensee prior to being worn by licensee personnel. The controls, thermoluminescent ring badges and Luxel whole body badges all fell within the same range of 0.5 to 1.0 Rem. Mr. Vince described the means of transportation as USPS truck from Glenwood to Chicago and Pittsburgh to Altoona and air transport from Chicago to Pittsburgh. He also stated that the exposures were described by the processor as being "static" in nature. He will continue to investigate the cause of the exposure to the dosimeters and will perform an evaluation using the licensee's past exposure history and use of material to adjust the radiation exposure records of personnel.</p>			
Action Required/Taken: Place into ADAMS via the LER System.			
Prepared by Steven Courtemanche		Date: October 26, 2004	



altoona hospital

CENTER FOR CANCER CARE

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814 / 946-2400 • 800 / 870-4660 • Fax: 814 / 946-2048

DEPARTMENT OF RADIATION ONCOLOGY

Jack D. Schocker, M.D., *Chairman*
John A. Clemens, M.D.
Michael A. Vince, Ph.D.
Gregory M. Price, M.S.

FAX COVER SHEET

DATE: November 8, 2004TIME: 12:50 P.M.TO: Richard McKinleyU.S. NRCFAX #: 610-337-5269

PHONE: _____

FROM: Michael A. Vince

Altoona Hospital
620 Howard Avenue
Altoona, PA 16601-4899

FAX#: 814-946-2048

PHONE: 814-946-2400 (In case of transmission problems)

NUMBER OF PAGES FAXED INCLUDING THIS PAGE: 5INFORMATION FAXED: Report of investigation of over-exposures of package of
film badges.

NOTICE OF CONFIDENTIALITY

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MEMORANDUM

November 3, 2004

To: Altoona Regional Radiation Safety Committee

From: Michael A. Vince, Ph.D.
Radiation Safety OfficerSubject: Investigation of Over-Exposures of Radiation Dosimetry Program
Participants' Film Badges & TLD RingsRe: Landauer, Inc. Radiation Dosimetry Report for Period 08/01/04 –
08/31/04, dated 10/12/04.**A. Description of Event**

The referenced Radiation Dosimetry (film badge) Report was received on or about October 21, 2004. The Luxel whole body (WB) and collar badges (118) and TLD rings (8) worn by the participants listed, plus the Luxel controls (11) and the TLD controls (8), were exposed to radiation doses from photons ranging in energies from medium to high (40 keV to greater than 200 keV). There were two exceptions in the cohort of exposures reported. Participant No. 583, Series Code X, was a late returned badge from and Participant No. 1015, Series Code C, was assigned to a new employee for whom the badge had been mailed separately to us in August. Neither badge had an abnormally high dose recorded on it. The median dose recorded on the 118 WB, collar badges & controls was 448 millirem ($\sigma = \pm 134$, confidence level = 68%), with a maximum recorded dose of 948 mrem and a minimum of 247 mrem. It is inconceivable that the high exposures recorded in this population of badges occurred in the hospital. One obvious piece of evidence supporting that observation is that six of the control badges (exposed to high doses ranging from 598 mrem to 948 mrem) were stored in a secure drawer of a secretary's desk located in an area where there are neither X-ray machines nor radioactive materials. The question is, where and when were they exposed?

B. Investigation

The U.S. Nuclear Regulatory Commission was notified and advised of this incident. The NRC representative recommended that an investigation be conducted to some acceptable conclusion. He felt reasonably certain that the package containing the badges had been X-rayed accidentally by either the U.S. Postal Service or by airline inspectors. The result of the investigation is as follows:

1. It was ascertained, with the help of the Health Physicist employed by Landauer, Inc. that the route of packages containing radiation dosimeters

from the Landauer, Inc. laboratory in Glenwood, IL to the Altoona Hospital Campus (AHC) is as follows. The box, which contained five separate plastic bags containing badges (one for each series code), was transported from Glenwood IL to Chicago-O'Hare International Airport via Postal truck. From Chicago-O'Hare it was transported to Pittsburgh International Airport via airplane. From Pittsburgh airport to the main Post Office in Duncansville PA it was transported via Postal truck. Finally from the main Post Office it was carried in a postal truck to AHC. The Postmaster at the main Post Office in Glenwood was contacted to find out if packages are X-rayed en route to O'Hare. They are not. The postal service in Glenwood has no X-ray equipment. The Postal Authority at O'Hare International Airport also stated that cargo and postal bags containing mail and small packages for national destinations are not X-rayed either. The Air Transport Authority at O'Hare stated that they do not X-ray cargo and mail being loaded on airplanes since they have no X-ray equipment for that purpose. The only equipment that is X-rayed is passenger carry-on luggage prior to boarding, which would have no affect on mail loaded into the cargo compartment of airplanes. The Post Master at the main Post Office in Pittsburgh stated that mail unloaded from airplanes and transported by postal trucks to destinations within Pennsylvania are not X-rayed, nor do they have X-ray equipment for that purpose. Likewise, the main Post Office in Duncansville does not have X-ray equipment. Hence, there was no opportunity for the badges to be exposed to X rays for the purpose of inspection between Landauer, Inc. and AHC.

2. The new badge (No. 1015) that had been ordered for a new employee in August, as well as No. 583, which had been from the month of May but returned late, are particularly important to this investigation. The first was sent to us by ordinary mail after the rest of the badges had been received. So it was not subjected to the same environment as the other badges. That particular badge did not have an extraordinarily high radiation dose recorded on it, although it was shipped back to Landauer with the rest of the badges at the end of the report period for August. Similarly Badge No. 583 was not exposed. Consequently the other badges had to be exposed before they were delivered to the Altoona Hospital Campus on July 21st. That is, through the month of August everyone wore badges that had been pre-exposed before arriving at the hospital.
3. A question was raised concerning the possibility of the radiation exposures originating from a package, or group of packages, containing radionuclide generators, such as molybdenum/technetium generators. Packages containing the highest level of radioactivity that is permitted to be transported by commercial carrier bear diamond shaped labels that have a yellow background on the upper half of the label and are marked with three white stripes, i.e., the roman numeral III. Highway or rail

vehicles carrying Yellow III packages must be placarded. The labels are also marked with a Transport Index that indicates the maximum radiation exposure rate in mrem per hour measured at a distance of three feet from any exterior surface. No package transported by commercial carrier may have a transport index that exceeds 10, nor a maximum surface dose rate exceeding 200 mrem per hour. The total Transport Index of any collection of packages in any single commercial transport vehicle cannot exceed 50. Regulations require that the carrier maintain a certain distance between radioactive materials packages and other areas that may be occupied by persons or photographic film. Radioactive packages bearing the Yellow-III label that might be transported by air would be segregated from other cargo. The package of film badges sent by Landauer to AHC was clearly stamped on all surfaces "Do Not X-ray." Generator packages received from Cardinal Health normally have a maximum surface dose rate of 100 mrem per hour, and are delivered via Federal Express or UPS on Saturday or Sunday, never during the workweek. Furthermore, according to Cardinal Health, packages containing radioactive generators are normally delivered to them by highway vehicle, not air. Therefore, it appears reasonable to rule out the possibility that the exposure of the badges could have come from generator packages, or that they were exposed in an airplane.

4. On November 5, 2004, the Health Physicist at Landauer contacted us with two more reports for the month of August of extraordinarily high doses for participants that had returned their badges later. Those badges did not accompany the rest of the badges when they were returned to Landauer, thus strengthening the argument that the shipment of badges was exposed after leaving Landauer, Inc. but before reaching AHC. They are both from Series Code N, participant numbers 706 and 790.

C. Conclusions

1. Since there apparently is no X-ray inspection of mail or cargo done between at any of the postal distribution centers from Glenwood IL to Duncansville PA, or at Chicago-O'Hare International Airport and Pittsburgh International Airport, the package of film badges was not X-rayed.
2. One badge was received at AHC in August after the other film badges under investigation had been delivered in July. The Radiation Dosimetry Report indicated that particular badge did not have an abnormally high radiation dose recorded on it after having been returned to Landauer, Inc. with the rest of the badges. In addition, two badges that had been received with the rest of the badges in July but were returned to Landauer on a later date than when the rest of the badges were. Consequently, it

may be concluded that the bulk of the rest of the badges were, in fact, exposed prior to initially arriving at AHC in July.

3. It appears that the badges may have been initially exposed to a rogue radioactive package emitting relatively intense, high-energy photons somewhere en route from Landauer to AHC. The package of badges could not have resided at any particular locale for more than a few hours, even in an airplane since the average flight time from Chicago to Pittsburgh is 2.5 hours. Hence, whatever the source of the radiation was, it had to be quite intense.
4. It would seem prudent, in these days of threats of terrorism, that all Postal Centers and airplanes should be equipped with simple, radiation detectors with warning alarms.

CC: Richard W. McKinley, Health Physicist, U.S. Nuclear Regulatory Commission