U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 030-09209/96002(DNMS)

Docket No. 030-09209

License No. 34-01329-07 Category F1A Priority II

Licensee: Miami University
Oxford Ohio 45056

Inspection Conducted: April 26, 1996 with continuing NRC review through May 31, 1996

Inspector: Inge L. Simmons 6/13/96
T. L. Simmons Date
Radiation Specialist

Approved By: B. J. Holt 6/13/96
B. J. Holt, Chief Date
Nuclear Materials Inspection Branch 1

Inspection Summary

Inspection on April 26, 1996 with continuing NRC review through May 31, 1996 (Report No. 030-09209/96002(DNMS))

Areas Inspected: This inspection was conducted to review a reported incident involving a missing shipment which contained 578 microcuries (21.4 MBq) of phosphorus-32. The areas reviewed included interviews with personnel, and the University's processes for ordering and receipt of licensed material, as well as its specific procedures.

Results: Two violations of NRC requirements were identified: (1) 10 CFR 71.5/49 CFR 173-421-1 - failure to provide a certifying notice regarding the package condition; and (2) 10 CFR 30.41 - transfer of licensed material to unauthorized persons.

In view of the circumstances the licensee conducted an appropriate investigation of this matter and instituted corrective actions which should preclude a similar event from happening in the future.

DETAILS

1. Persons Contacted

*Sue Summers, Associate Vice President
*Phyllis Callahan, Ph.D., Chair of Radiation Safety Committee
*Don Cox, Member of the Radiation Safety Committee
*David M. Coons, Radiation Safety Officer
*Mary Stone, Radiation Safety Technician
*Gary Janssen, Ph.D., Primary Investigator
J. R. Liston, Laboratory Safety Officer
Julie Martin, Laboratory Assistant
Sandhya Parshionikar, Laboratory Assistant
Bill Van Etten, Laboratory Assistant
Julie Pfeiffer, Laboratory Assistant
Angela Walker, Laboratory Assistant
Chi-Ju Wu, Laboratory Assistant

*Denotes those individuals present during the exit summary conducted on April 26, 1996.

2. Program Summary and Inspection History

Miami University is authorized pursuant to License No. 34-01329-07 to possess and use certain radioactive material for research and development purposes as defined by 10 CFR Part 30, Section 30.4. Primarily the licensee uses microcurie quantities of carbon-14, hydrogen-3, iodine-125, phosphorus-32 and sulfur-35. Currently there are 25 primary investigators authorized to use licensed material and 30 laboratories where these materials can be used.

A routine safety inspection was conducted on January 23, 1996; no violations of NRC requirements were identified. On July 8, 1993, a routine safety inspection was conducted and one repeat violation was identified: failure to always perform wipe test surveys. In addition, one area of concern was expressed regarding the housekeeping and general cleanliness of a laboratory using microcurie quantities of unsealed cobalt-57. The licensee's corrective actions for the violation and the concern were reviewed during the January 1996 inspection and found to be adequate.

3. Organization and Management Controls

The responsibility for overall licensee operations rests with the University's president with oversight by the associate vice president of finance and university services. The licensee's radiation safety officer and the radiation safety committee are responsible for the implementation of the radiation safety program.

4. Incident Review

On February 21, 1996, the licensee received a shipment of 578 microcuries (21.4 MBq) of phosphorus-32 (P-32) from DuPont/NEN of Boston, MA. Phosphorus-32 is a beta emitter with a maximum energy 1.71 Mev and a half-life of 14.4 days. The radioactive material was packaged in dry ice within a styrofoam cooler which was inside a cardboard box. Receipt surveys performed by the radiation safety staff revealed no contamination of the package exterior, the interior flaps, the exterior of the cooler lid, or the exterior of the lead shielding. The measured radiation level at the surface of the shipping container was 0.19 millirem/hour (1.9 microSv/hour). Laboratory worker #1 picked up the package from the radiation safety office and took it to a laboratory in Pearson Hall. Since the worker was late for a meeting, he asked his co-workers to take care of the package. Lab worker #2, a declared pregnant worker, surveyed the box and found one area on the box where the radiation level appeared to be above background (no numbers were recorded, background is about 0.05 mR/hr). Lab worker #2 asked lab worker #3 to handle the package. At this point there was apparently a misunderstanding. Lab worker #3 thought that lab worker #2 said the contents of the box had been taken care of but, there was concern that the packing material might be contaminated. Lab worker #3 consulted with lab worker #4, who surveyed the package with a Mini Monitor 900. No radiation levels above background were found. Since the lab participates in a recycling program to return the styrofoam containers, lab worker #4 defaced all radioactive labels, taped the box shut, and affixed a Dupont/NEN supplied label addressed to Tuscarora Inc., Putnam, CT, the recycling plant. The box was placed in the departmental secretary's area for mail out via the U. S. Postal Service on the same day of its receipt. The package was picked up by campus mail room staff and mailed third class on or about February 22, 1996.

During the evening of February 26, 1996, the Primary Investigator (PI) and lab worker #3 discovered that the material was not in the laboratory. The licensee initiated an investigation. After contacting Dupont/NEN and Tuscarora Inc., the styrofoam recycling center, in an attempt to locate the package, the licensee reported the incident to the NRC operations center on April 1, 1996.

Pursuant to 10 CFR 20.2201, the licensee submitted a written report dated April 30, 1996 to the NRC Region III office, describing the incident and the actions which have been taken to preclude further problems of this nature.

5. Incident Evaluation

Based upon interviews with the PI, the four lab workers directly involved, and others, the inspector confirmed that loss of the P-32 shipment occurred basically as described above and as outlined in the licensee's written report of the event. The primary causes and contributing factors of this event were:

- Lab worker #1 did not process the package into the lab as required. Processing consists of removing the material from the cooler, placing it in a designated spot in the refrigerator, preparing the inventory log, and preparing the cooler for recycling.

- Lab worker #1 did not ask a specific person to process the package Rather a general statement to anyone who may have been listening. However, no one was really listening.

- There was mis-communication between lab worker #2 and #3. As a result lab worker #3, who had never participated in package receipt, assumed the package was empty.

- The styrofoam container was mailed without removing the dry ice. Had the dry ice been removed, the container of radioactive material would have been found.

10 CFR 71.5 requires each licensee who delivers licensed material to a carrier for transport to comply with the applicable requirements of the Department of Transportation regulations. Miami University received the P-32 as a limited quantity. Limited quantity is defined as a quantity of radioactive material not exceeding the materials package limits specified in 173.423 and which conform with requirements specified in 173.421-1. 49 CFR 173.421-1 requires, in part, that packages containing limited quantities must be certified as being acceptable for transportation by having a notice enclosed in or on the package. This notice must include the statement "This package conforms to the conditions and limitations specified in 49 CFR 173.421-1 for radioactive material, excepted package-limited quantity of material." According to licensee representatives, this statement was removed from the package prior to mailing it through the U. S. postal service. Sending a limited quantity without this certification is an apparent violation of 10 CFR 71.5/49 CFR 173.421-1.

As previously stated the P-32 was sent to Tuscarora Inc. in Putnam, Connecticut on or about February 22, 1996. The Tuscarora facility has contracted with Dupont to recycle the styrofoam coolers and is not expected to receive radioactive material so it does not have an NRC license authorizing possession of licensed material. 10 CFR 30.41 (a) and (b)(5) require, in part, that no licensee transfer byproduct material to any person unless they are authorized by the Commission or an Agreement State to receive it. The Tuscarora recycling firm is not authorized by the Commission or an Agreement State to receive byproduct material, therefore, the transfer of 578 microcuries (21.4 MBq) of P-32 to Tuscarora, Inc. is a violation of 10 CFR 30.41 (a) and (b)(5).

Licensee's Remedial Action: All of the PI's staff have been instructed that whoever picks up the package from the radiation safety office must process the package or get a firm commitment from a co-worker who will process the package. The Radiation Safety Officer issued a Radiation Safety Update for all PI's and radiation workers detailing the appropriate procedure for recycling the styrofoam coolers.

In an effort to locate the package, the licensee has been in continual contact with personnel at Dupont/NEN and Tuscarora, Incorporated. Prior to this event, Tuscarora staff had been instructed to shake all coolers upon receipt. If it rattles the package is set aside for shipment to Dupont. As of May 31, 1996, the package had not been found by Tuscarora or Dupont/NEN personnel. Although initially the package contained 578 microcuries of P-32, this quantity does not represent a significant health hazard from direct radiation exposure. Ingestion or inhalation of the entire contents of the vial would deliver a dose less than 5 rem based upon the annual limit on intake for P-32 as referenced in Appendix B of Part 20.

Two apparent violations of NRC requirements were identified.

6. Exit Meeting

The inspector met with the licensee representatives denoted in Section 1 at the conclusion of the onsite inspection, to discuss the root causes, contributing factors, and other findings related to this event.

The licensee did not identify any information provided during the inspection as proprietary in nature.