PURDUE UNIVERSITY

Follow-up
next inspection
1997
JRM
10/18/96
13-02812-04

DEPARTMENT OF
RADIOLOGICAL AND
ENVIRONMENTAL MANAGEMENT

October 2, 1996

Regional Administrator
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4351

Dear Sir:

Pursuant to 10 CFR 20.2201 we are filing this report notifying you of a lost or missing package of radioactive material. On September 5, 1996 the incident was reported to B.J. Holt , Region III and notification was made to the NRC Operations Center. The details of the incident follow below:

Material Involved

The material missing is 1.0 millicuries of C-14 formaldehyde in aqueous solution with an approximate total volume of 0.1 milliliters in two flame sealed ampoules.

Description of Circumstances

The material was ordered from Sigma Chemical Company (Sigma) on August 26, 1996. At that time the company stated that the material would not be shipped for five working days. On September 4, 1996 , Sigma was called to determine the status of the material and stated that the material had been shipped. Sigma then contacted Federal Express (FedEx) to track the package to determine the time and location of delivery. On September 5, the tracking information indicated that the material was delivered on August 27 to the Civil Engineering Building of Purdue University (CIVL). Although we received and processed other radioactive materials packages that day there was no record of the package from Sigma. Extensive checks with Purdue personnel, other delivery locations, and FedEx have not located the package.

1662 CIVIL ENGINEERING BUILDING, B173 • WEST LAFAYETTE, IN 47907-1662
1371 • FAX: (317) 494-7403

Statement of Disposition or Probable Disposition

The byproduct material involved was a limited quantity of radioactive material therefore, no radioactive label was required. The box size was 5 in. by 8 in. by 10 in. and therefore would not easily be misplaced. The most likely occurrence is the disposal of the material accidentally or by someone who may have picked up the package and discovered its contents. This individual then thought of the "problems" he might encounter and disposed of the material.

Exposure of Individuals to Radiation

The likelihood of exposure to any individual is very low. The factors that serve to minimize this possibility are: multiple containers (two boxes, one plastic tamper-proof sealed container, and a flame-sealed ampoule in a plastic bag), radioactive label on both the plastic container and flamed sealed ampoule , lack of exposure from any sealed container, the lack of any value of the material to untrained individuals, and the small volume which minimizes the chance for ingestion. Therefore, the exposure route of ingestion is remote. The possibility of inhalation is unlikely since the material would only be somewhat volatile (boiling point 96° C) and be dispersed prior to reaching the breathing zone.

Although unlikely, the maximum credible case would involve an individual opening all the protective containers (See Attachment I) and breathing 5 percent of the formaldehyde vapor. However, the individual would probably open only one ampoule and therefore the maximum uptake by inhalation would be 25 microcuries. This would result in an effective dose equivalent of approximately 62 millirem.

Actions Taken to Recover Material

Efforts were made to examine all the possible locations of the material including other buildings on the campus and occupants of the Civil Engineering Building. The process was difficult since the material may have been missing for up to a week before it came to our attention. Searches were conducted in and around the loading dock area where materials are delivered and staff members continue to look for signs of the package.

Procedures to Protect Against Recurrence

The Radiation Safety Committee has reviewed the events surrounding this missing radioactive material. Although the committee agrees that the current system is adequate in assuring that material is secure from loss or theft they have recommended a change in procedure. The committee feels that upon delivery of radioactive materials packages, a signature should be obtained from an individual (such as a receiving clerk). When an individual at the loading dock is not available, the packages should be delivered to the REM office in the Civil Engineering Building and signed for at that location. We believe that these measures will protect against a recurrence of this type of incident.

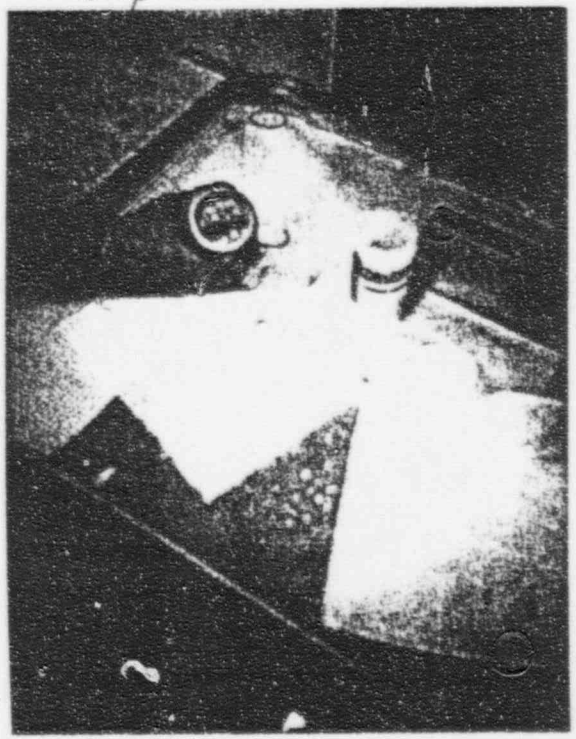
If you should have any questions regarding this report please call me at 317-494-2350.

Sincerely,

James F. Schweitzer, Ph.D., CHP
Radiation Safety Officer

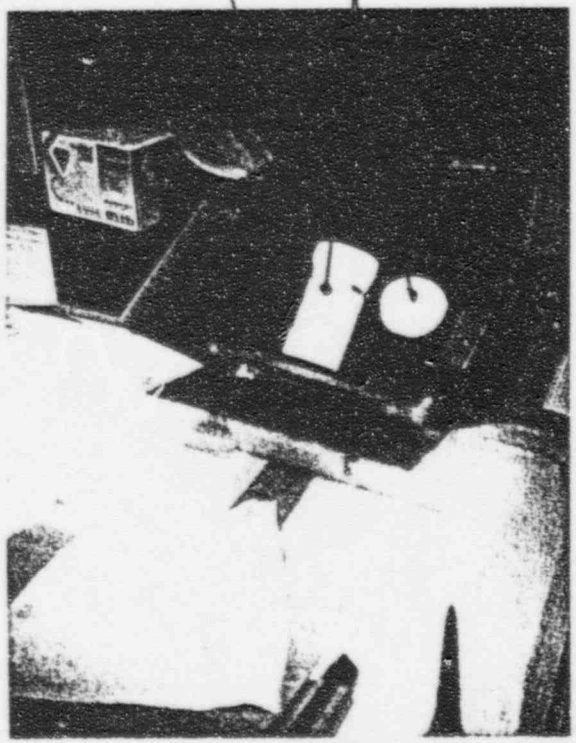
Attachment I

Opened plastic containers with plastic bags and ampoules



Inner box

Sealed plastic containers



Replacement shipment (outer box)