DEPARTMENT OF THE ARMY
WALTER REED ARMY MEDICAL CENTER
WASHINGTON, DC 20307-5001

REPLY TO ATTENTION OF:

October 1, 1996

License No. 08-01738-02
Docket No. 030-01317
MLER-RI - 96-57

Health Physics Office

SUBJECT: Missing Radioactive Material

U.S. Nuclear Regulatory Commission, Region I
Medical Licensing/Mr. Richard W. McKinley
475 Allendale Road
King of Prussia, Pennsylvania 19406-1415

Dear Mr. McKinley:

Walter Reed Army Medical Center (WRAMC) uses radioactive material authorized by U.S. Nuclear Regulatory Commission (NRC) Byproduct Material License Number 08-01738-02 with an expiration date of June 30, 2004. This is a medical broadscope Type A license for human use and research.

On September 4, 1996 at 0910, a telephonic report of missing radioactive material was made to the NRC Operations Center, Washington, D.C. by Colonel William B. Johnson, Radiation Protection Officer (RPO), WRAMC, Washington, D.C. Mr. Richard McKinley, Health Physicist, NRC Region I, King of Prussia, PA, contacted COL Johnson on September 4, 1996 at 1000 and was provided more detailed information regarding the loss of materials. An NRC investigation was conducted at WRAMC September 5-6, 1996, by Mr. McKinley. The following information is provided as required by 10 CFR 20.2201(b).

Description of Licensed Material. Eight ^{14}C sources with a total activity of 1.128 mCi and three ^{3}H sources with a total activity of 1.342 mCi were discovered to be missing from a locked freezer belonging to the Hematology Department, Walter Reed Army Institute of Research (WRAIR). Information regarding activity and chemical form of each source is enclosed.

Circumstances of Loss. A quarterly inventory of radioactive material was conducted for sources used by Dr. Jayasree Nath about June 20, 1996. Dr. Nath states that all sources on her authorization were accounted for. Dr. Nath had requested a termination of her authorization and a transfer of all her sources to Dr. Thomas Reid's authorization. On July 3, 1996, Dr. Nath discovered that the radioactive sources listed in the enclosure were missing from a locked freezer located in a hallway outside of the Hematology Laboratory area. This refrigerator freezer was secured with a cable locking system. The key was located in the hematology laboratory. The freezer was an authorized storage

OCT - 7 1996

RETURN ORIGINAL TO
REGION I

location for radioactive material. On July 8, 1996, the issue of the lost sources was discussed at a Hematology Staff Meeting. Dr. Reid, Acting Department Chief, organized a Department wide search for the missing isotopes and directed Dr. Nath to contact the Health Physics Office. An extensive search of all Hematology areas failed to find the missing materials. Dr. Nath did not contact the Health Physics Office about the missing sources. Interim approval to terminate Dr. Nath's authorization and transfer all sources was granted on July 19, 1996. Final approval was granted by the WRAMC Radiation Control Committee (RCC) on August 29, 1996. On August 30, 1996, Ms. Cox, Health Physics Office, met with Dr. Reid and Dr. Nath to obtain an up-to-date signed inventory, which included all sources previously on Dr. Nath's authorization. Dr. Nath indicated the sources were missing. The next working day, September 3, 1996, a listing of the missing sources was provided COL Johnson, RPO. COL Johnson met with the Hematology staff the afternoon of September 3,1996, to verify the loss of the sources and actions that had been taken to locate the sources. COL Johnson informed the Hematology staff that the missing sources should have immediately been reported to the health physics staff to provide assistance in locating the sources and ensure all NRC reporting requirements were met. At 0910 on September 4, 1996, COL Johnson notified the NRC Operations of the loss of the sources.

Probable Disposition of the Material. Extensive searches of the Hematology area and adjacent departments have been made. All departments within WRAIR were notified of the loss and asked to search their areas. The material has not been found. How the material was lost is a mystery. Interviews with all members of the hematology staff by Mr. McKinley, NRC, and separate interviews conducted by COL Johnson, RPO, and COL Scovill, investigative officer, WRAIR, have failed to discover anyone who had any knowledge of the disposal of these sources. All summer hires working in Hematology were also interviewed to ensure that they had not inadvertently cleaned the freezer out. The sources were in sealed vials inside of tube containers with radioactive labels. It seems likely that the sources were disposed of as radioactive waste and the turn-in was not properly documented. We were unable to search the accumulated radioactive waste, since all radioactive solid waste was shipped to Barnwell, SC, in August 1996. Another probability is that somehow the freezer was cleaned out and the sources were placed in the regulated medical waste stream. A third possibility is that the sources went to normal trash. It seems unlikely that the sources were stolen; the actual health risk, given the activity of the sources, is not significant.

Dose Information. There is no significant external dose hazard from the material with both isotopes emitting low energy beta particles. The maximum dose could be calculated if an individual ingested all 11 sources, i.e. 1.128 mCi of ^{14}C and 1.342 mCi of ^{3}H. Three different methods were used to calculate a total effective dose equivalent (TEDE); EPA Federal Guidance Report 11, the MIRD methodology, and the ICRP methodology. The TEDE ranged from 2.401 rem to 2.439 rem. The calculated TEDE of 2.4 rem does not represent a significant health hazard to an individual. If the sources were disposed of in the regulated medical waste, the sources would have been

incinerated and no doses in unrestricted areas would be measurable. If the sources were disposed of in normal trash, the final disposal would have been a landfill. Doses off site would not be detectable. If the sources were disposed of in the radioactive waste, the most likely scenario, there would be no radiation doses to any member of the general public.

Actions Taken to Recover the Material. Dr. Nath conducted a search of the entire Department July 3-8, 1996. Dr. Reid and the Hematology staff conducted at least two complete searches of the department during July 1996. Dr. Nath continued to search for the material during August 1996. COL Johnson, RPO, was informed of the loss of materials on September 3, 1996. On September 4, 1996, a memorandum was sent through the Deputy Commander for Clinical Services, through the Director, WRAIR, to LTC Reid, requesting an investigation. The Commander, WRAIR, appointed COL John P. Scovill to conduct a Commander's Informal Investigation pursuant to Army Regulation 15-6. The Commander, WRAIR, informed all Division Chiefs of the missing material and requested that all Divisions search for the missing material. On September 9, 1996, Dr. Reid and his staff completed another search of all areas of Hematology. Mr. McKinley, NRC Region I, conducted interviews of all Hematology personnel September 5-6, 1996, attempting to determine if anyone had any knowledge of the sources. COL Scovill completed his investigation on September 17, 1996. COL Johnson, RPO, and health physics staff have extensively interviewed hematology staff members. All efforts to discover how the sources were removed from the locked freezer and where the material is have been unsuccessful. During the month of September 1996, Ms. Cox, Health Physics Office, conducted joint inventories of radioactive sources during routine six month audits of authorizations. Inventory and source use records are always checked during an audit, but joint inventories are not required. Four authorizations from WRAIR and three authorizations from the Armed Forces Institute of Pathology (AFIP) were audited and joint inventories conducted. All sources on the inventories were accounted for; a total of 110 sources at WRAIR and 49 sources at AFIP. The 110 sources at WRAIR represents about 20-25% of all radioactive sources at WRAIR.

Conclusions. Extensive actions have been taken to located the missing sources. No one interviewed claims to have any knowledge of the disposition of the missing sources. Security of the sources appears to be adequate. The sources were in a locked freezer and the key was maintained in the Hematology laboratory. The most likely scenario is that the sources were disposed of as radioactive waste without the proper documentation. Any dose calculated from the loss does not represent a significant health hazard to any member of the general public. Dr. Nath failed to follow procedures of immediately contacting Health Physics personnel when she discovered the sources were missing. Interviews with some 20 principal users by Mr. McKinley, NRC, indicated all researchers know that if any source is missing, the health physics officer should be called immediately. Based on interviews with researchers and joint inventories conducted in September 1996, the loss of these sources appears to be an isolated case.

Corrective and Follow-Up Actions. Effective immediately, during the six month audit of each authorization, a joint inventory between the researcher and the health physics auditor will be conducted. The next quarterly information letter for all users of radioactive material will discuss this incident and lessons learned. It will emphasize the users responsibility for security and accountability of radioactive sources under their control. The procedures for turn-in and documentation of unsealed sources will be modified to ensure source turn-ins are properly documented. The revised source turn-in procedures will become part of issued conditions on each authorization. A letter signed by the Chairman, RCC, will be sent to Dr. Nath through Command and supervisory channel indicating her failure to notify Health Physics Office personnel immediately of the missing sources is a serious violation of procedures, and resulted in a violation of 10 CFR 20. Had her authorization not been approved for termination on July 19, 1996, it would have been immediately suspended when COL Johnson, RPO, was informed of the missing sources on September 3, 1996. If Dr. Nath applies to use radioactive material in the future, additional training and or periods of probation will be determined by the RCC prior to use of radioactive material. The entire incident and investigation will be discussed and presented at the next RCC meeting in November 1996. All corrective actions will be completed no later than November 30, 1996.

Any questions concerning this report may be directed to Colonel William B. Johnson, Radiation Safety Officer, at (301) 295-7592.

Sincerely,

John R Price Col, MC

Michael J. Kussman
Colonel, U.S. Army
FOR Commanding Officer

List of Radioactive Sources Missing from WRAMC Authorization 626			
Radionuclide	Chemical Form	Supplier	Current Activity (mCi)
^{14}C	Tyrosine	Amersham Corporation	0.250
^{14}C	IMP	Dupont NEN Research Products	0.017
^{14}C	IMP	Amersham Corporation	0.047
^{14}C	Glutamic Acid	Amersham Corporation	0.250
^{14}C	Trifluralin	Eli Lilly	0.232
^{14}C	Lucine	Amersham Corporation	0.232
^{14}C	Trifluralin	Sigma	0.050
^{14}C	Citrulline	Dupont NEN Research Products	0.050
^{3}H	Thymidine	ICN	0.442
^{3}H	Thymidine	ICN	0.442
^{3}H	Arginine	Amersham Corporation	0.458

Enclosure