



University of Medicine & Dentistry of New Jersey  
Robert Wood Johnson Medical School

Office of the Associate Dean  
for Research  
201/463-4687

675 Hoes Lane  
Piscataway, New Jersey 08854-5635

April 7, 1994

Dr. Mohamed M. Shanbaky, Chief  
Research & Development Section  
Division of Radiation Safety and Safeguards  
US Nuclear Regulatory Commission  
Nuclear Material Safety Branch  
Region I  
475 Allendale Road  
King of Prussia PA 19406-1415

Dear Dr. Shanbaky:

UMDNJ-RWJMS License:	29-15188-01	29-15188-02
Docket No:	030-08709	030-30939
Inspection No. 94-001		

We have reviewed the inspection report and Notice of Violation dated March 8, 1994. The violations were discussed in detail at meetings of the Laboratory Safety Committee (Radiation Safety Committee) on February 25 and March 25, 1994. We have already initiated actions to address the violations. Detailed below is our response with the anticipated dates of compliance for each violation.

**VIOLATION A** -- Security of licensed materials at the Medical Education Building (MEB). All authorees in the MEB will be required to provide for the security of the radioactive materials in their possession by one or more of the following:

- o Keep licensed source material in a locked freezer, refrigerator, or cabinet
- o Challenge anyone entering the laboratory
- o Lock doors to the laboratory when leaving for the night and/or if the room is left unattended.

All Authorees at RWJMS have been reminded of the requirements for security through the distribution of a special RADIATION NOTES on April 6, 1994. (See Att. 1) The security arrangements will be reviewed during the periodic audits by REHS. We anticipate complying with this requirement by October 1, 1994.

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Dr. Mohamed M. Shanbaky, Chief

- 2 -

April 7, 1994

**VIOLATION B** -- Contamination Surveys. Authorees at Robert Wood Johnson Medical School (RWJMS) are required to perform monthly contamination surveys. All users are strongly encouraged to perform surveys on a more frequent basis, depending on the specific radionuclide and the nature of the work. Authorees have been fully informed of the requirements for performing and documenting the surveys, proper units, and the levels requiring decontamination. (See Att. 2 RADIATION NOTES dated September 1993.) We again informed the users through a distribution of a special RADIATION NOTES on April 6, 1994. We will also stress this issue in our training sessions.

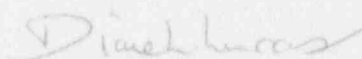
REHS has recently obtained an NaI probe for the detection of low energy gamma emitters. This instrument is distributed with the other equipment required for iodinations (sampling pumps and source material). This allows those individuals using  $^{125}\text{I}$  to detect adequately personal or surface contamination.

We have also detailed the use of survey instruments in a recent RADIATION NOTES distributed to all Authorees in March, 1994 (See Att. 3)

We anticipate complying with this requirement by July 1, 1994.

Please contact Mr. Michael Quinlan or Ms. Deborah Silva (908) 932-2550, if you have further questions.

Sincerely yours,



Diane Lucas, PhD  
Acting Associate Dean

Atts.

cc: M. Quinlan  
M. Sanders, Chair Radiation Safety Committee

MQ:le GN/jms/NSP

# RADIATION NOTES



Rutgers Environmental Health & Safety Department  
 4127 Livingston, New Brunswick, New Jersey 08903-5077 (908) 932-2550

DEBORAH A. SILVA  
 University Health Physicist

April 1994

## RADIATION SAFETY ORIENTATIONS

May 4  
 Wednesday 1:30 - 4:30

Room 101  
 Thompson Hall, COOK

The subject matter includes the basics of radiation and radioactivity, the nature and magnitude of the biological risks, the elements of radiation protection, and the legal aspects of using radiation. Anyone using a radiation source in the University is required to attend one of these orientations by University policy and Federal regulation. Those who have not been to an orientation within the last two years must attend for a refresher. Call Deborah Silva at 932-2550 for further information.

## US NRC INSPECTION AT UMDNJ-RWJMS

The Nuclear Regulatory Commission conducted a routine safety inspection at the Robert Wood Johnson Medical School from January 31 through February 3, 1994. The inspection consisted of an overall review of the radiation safety program and pertinent records, interviews with laboratory personnel, and walk-through inspections of the MEB, Research Towers and MRA. The two violations identified are as follows:

1. Lack of Security and Control of Licensed Material:

10 CFR 20.1801 requires the licensee to secure from unauthorized removal or access licensed materials that are stored in unrestricted areas. 10 CFR 20.1802 requires that the licensee control and maintain constant surveillance of licensed material not in storage. Contrary to the above, the NRC observed labs in the MEB containing radioactive materials that were unsecured and were not under surveillance. Also, the inspector was not challenged by lab personnel when entering many of the labs. A simple solution to prevent a recurrence is to install a hasp and padlock on the refrigerator/freezers that are used to store radioactive materials and to close and lock the lab doors upon leaving. Anyone entering a lab should be challenged by lab personnel.

2. Failure to Conduct Adequate Surveys:

This repeat violation was observed during the September 1991 inspection and could have resulted in a monetary fine. It is a well-known fact that it is the responsibility of all authorees to perform MONTHLY wipe tests and to document the results. Upon inspection in the labs, the NRC noted the following: monthly surveys not being consistently performed, no resurvey data after decontamination, survey data reported in units of cpm, not dpm or uCi, failure to detect contamination because of the use of inappropriate instrumentation. The attached "Guidelines for Radiation Surveys" should be followed by all authorees.

-----Please Circulate Among Radiation Workers and then POST-----

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THE STATE UNIVERSITY OF NEW JERSEY  
**RUTGERS**

# RADIATION NOTES



Rutgers Environmental Health & Safety Department  
4127 Livingston, New Brunswick, New Jersey 08903-5077 (908) 932-2550

September, 1993

## RADIATION SAFETY ORIENTATIONS

October 6, Wednesday, 1:30 - 4:30, Room 1001, Waksman Institute, BUSCH

November 2, 1993, Tuesday 1:30 - 4:30, Room 204, Ruth Adams Language Bldg., DOUGLASS

The subject matter includes the basics of radiation and radioactivity, the nature and magnitude of the biological risks, the elements of radiation protection, and the legal aspects of using radiation. Anyone using a radiation source in the University is required to attend one of these orientations by University policy and Federal regulation. Those who have not been to an orientation within the last two years must attend for a refresher. Call Deborah Silva at 932-2550 for further information.

## QUALITY CONTROL OF LIQUID SCINTILLATION COUNTERS

All Nuclear Regulatory Commission licensees are required to determine the counting efficiency (E) and minimal detectable activity (MDA) of Liquid Scintillation Counters in order to properly evaluate wipe test results. **Monthly laboratory wipe tests must be recorded in units of disintegrations per minute (DPM) as per NRC regulations.** To ensure compliance with the regulations, the following procedure must be performed MONTHLY for each isotope that is used in the lab.

NOTE: Only check sources or standards of known activities that have been certified by an accredited laboratory, such as NIST, shall be used.

### A. Determination of Efficiency (E):

1. Use a check source or standard of known activity (A).  
Remember that  $1 \text{ uCi} = 2.2 \times 10^6 \text{ DPM}$ .
2. Set the gain and discriminator levels according to the manufacturer's recommendation for the isotope to be counted.  
Such information can be found in the operator's manual.
3. Count the source for ten minutes; determine CPM by dividing by 10.
4. Count background for ten minutes; determine CPM by dividing by 10.
5. Determine the net sample CPM by subtracting the background CPM from the source CPM.
6. Calculate the efficiency (E):  
 $E = \text{Net Sample CPM} / \text{Activity (DPM)}$   
 $\%E = E \times 100$
7. Repeat the above procedures for other isotopes used in the lab; use counting channels and standards appropriate for each radioisotope(s) of interest.

### B. Determination of Minimal Detectable Activity (MDA):

1. Count background for one minute.
2. Determine MDA:  
 $MDA = 4.653 \sqrt{\text{Background CPM}}$
3. To obtain results in DPM:  $MDA/E$
4. Record all calculations and results in the lab notebook. The MDA of the instrument should be  $< 100 \text{ DPM}$ . If not, the above procedure should be repeated.

**Failure to comply with the above procedure will result in the issuance of a Notice of Violation (NOV).**

## GUIDELINES FOR RADIATION SURVEYS

### RESPONSIBILITY

Prevention of spread of contamination and the consequent radiation exposure is the RESPONSIBILITY of the author. The authorized user is also responsible for providing the appropriate radiation detection equipment to monitor removable contamination.

### LABORATORY SURVEYS

Laboratories should be inspected periodically to monitor radiation exposure rates and removable contamination levels. An appropriate survey meter should be used when handling penetrating radiation emitters (e.g.  $^{32}\text{P}$ ) and gamma emitters. Wipe tests are the only practical method for the detection of  $^3\text{H}$ ,  $^{14}\text{C}$ , and  $^{35}\text{S}$ .

### FREQUENCY

The frequency of surveys is determined by the quantity of radioactivity being used, results of previous surveys, and general compliance with radiation safety regulations. Wipe tests must be performed AT LEAST MONTHLY and the results recorded in a log book. It is prudent to check for contamination after every use of radioactive material.

### INSTRUMENT SURVEY

- Monitor hands, arms, shoes, front of lab coat, and other potentially contaminated areas following handling of radioactive solutions, especially  $^{32}\text{P}$ .
- Monitor bench top, floor areas, and equipment following each use of millicurie quantities of radioactive material.
- Monitor hands and clothing before leaving the laboratory when radioactive materials have been used.

### WIPE TESTS

- Locations to be checked should be numbered on a room diagram, to be kept in the log book. Bench tops, hoods, equipment used, peripheral and common use surfaces (e.g. door knobs, telephones, etc.) and floors (especially exit portals to assure that spills are not being tracked out of the laboratory) should be checked.
- Wipes should be taken with a circle of filter paper moistened with water or other appropriate solvent. Wipe an area approximately  $100\text{ cm}^2$  ( $4'' \times 4''$ ) with each filter.
- Count the wipes in a LSC [on the appropriate channel(s)] for one minute each. You may want to store the LSC samples overnight after you add the wipes to minimize the chance of spurious counts by chemoluminescence. Do not forget to count for background activity.
- If you use gamma emitters exclusively (i.e.  $^{125}\text{I}$ ), you may also count the filters in your gamma counter. Record the values of the wipes in your log book.
- If there is any significant contamination ( $> 100\text{ dpm}$  over background), decontaminate and rewipe to assure that the contamination is removed. The results of the rewipe should also be recorded in the log book.

### RESULTS

Results should be recorded in disintegration per minute (dpm). Remember:

$$\text{dpm} = \frac{\text{CPM}}{\text{Counting efficiency}}$$

# RADIATION NOTES



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 4127 Livingston, New Brunswick, New Jersey 08903-5077 (908) 932-2550

DEBORAH A. SILVA  
 University Health Physicist

March 1994

## RADIATION SAFETY ORIENTATIONS

April 5  
 Tuesday 1:30 - 4:30

Room 201/2  
 RWJMS, BUSCH

May 4  
 Wednesday 1:30 - 4:30

Room 101  
 Thompson Hall, COOK

The subject matter includes the basics of radiation and radioactivity, the nature and magnitude of the biological risks, the elements of radiation protection, and the legal aspects of using radiation. Anyone using a radiation source in the University is required to attend one of these orientations by University policy and Federal regulation. Those who have not been to an orientation within the last two years must attend for a refresher. Call Deborah Silva at 932-2550 for further information.

## PORTABLE SURVEY INSTRUMENTATION

The use of a survey meter with a detector (probe) is an expedient way to determine the presence of radioactive contamination on hands, clothing, etc. However, one should be aware that pancake Geiger-Mueller detectors are not 100% efficient. A pancake probe will not detect H-3 due to its low beta energy, and it is only 10% efficient for the detection of C-14/S-35. The detection efficiency of P-32 is approximately 70% with a pancake probe, and REHS requires all laboratories that use P-32 to have a survey meter available to them.

Because of the low photon energies associated with I-125, a Geiger-Mueller probe is less than 1% efficient for I-125 detection. The recommended detector for those who work with I-125 is a low energy gamma scintillator (NaI probe). REHS is now providing a "loaner" survey meter with a NaI probe to all those who perform radioiodinations. This instrument will be delivered with the air sampling pump and I-125 and must be returned to REHS after the radioiodination. REHS will provide instruction on its use, upon delivery.

All authorees are reminded that survey instruments are to be used in addition to, and not in place of, the monthly wipe test. Please call Deborah Silva at 932-2550 for further information on survey instruments.

## QUARTERLY INVENTORIES ARE DUE APRIL 4

-----Please Circulate Among Radiation Workers and then POST-----