WASHINGTON AND LEE
UNIVERSITY
Lexington, Virginia 24450-0303
www.wlu.edu

Department of Biology
(540) 458-8891
FAX (540) 458-8012

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J-6

July 15, 2005

Docket No. 03030971
Control No. 136921

45-25034-01

Todd J. Jackson, CHP
Senior Health Physicist
United States Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, Pennsylvania 19406-1415

Dear Mr. Jackson:

I am writing this letter in response to your correspondence of June 28, 2005 requesting addition information concerning our application for renewal of license, Control No. 136921. The order and number designation of my responses correspond to the original order of your letter. The number designations of my attachments also correspond to the particular question they refer to.

1. Starting immediately we will on an annual basis send our Victoreen 2000A dosimeters and chargers to a licensed company to be calibrated and checked for proper functioning. Presently we retain the services of Duratek Instrument Services for the annual calibration and check of our Bicron survey meters, and I assume they are qualified to also handle the Victoreen dosimeters. In addition to these we also contract with Landauer Inc. for dosimetry services which include ring, whole body, and room dosimeters which are checked quarterly and dose histories maintained for each individual handling nuclides, either in free form or factory sealed source, on any type of regular basis.

2. The actual model number of the probes we have been using on our Bicron "Surveyor M" survey meters is G1LE which according to Bicron is capable of detecting low energy Gama radiation (10-60 keV). Our statement in the license renewal that rates this particular probe as sensitive to Beta particles > 45 Mev is a typographical error. After

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speaking with Mr. Dennis Lawyer who clarified the inadequacy of this particular probe to detect beta emissions we have agreed to purchase from Thermo Electron a pancake probe (Model # PGM-MHV) which is compatible with our Bicron meters and will enhance our ability to detect Beta emissions.

3. Please see Attachment 3 for a description of the training contained in the University of Indiana "Radiation Safety Series". Also please note that viewing of these safety films is only one part of what is a four part safety training program for those handling radioactive materials.

4. It has always been the stated policy of the Radiation Safety Committee that the ordering of and the receiving shipment of all radioactive materials covered by our licenses will be conducted by the Radiation Safety Officer. However, the process dose require the R.S.O. to request from University Services (Purchasing) the assignment of a Purchase Order Number. This allows the university among other things to authorize payment and to debit the correct budget when paying invoices. Once the R.S.O. has the P.O.# he/she can personally make the order and all arrangements of shipment. We specify that delivery be made directly to the office of the R.S.O.. This policy will be reiterated by memo on an annual basis to all heads of science departments and all users designated on our license. Additionally in the process of answering your letter I have met with Alex da Silva the new director of University Services which oversees Purchasing and Mail services, informing him of this policy and its importance and requesting that he in turn notify his assistants in charge of Purchasing and Mail Services. He concurred and agreed to make it standard operating procedure that Purchasing would not assign P.O.#'s to nor the Mail Room take delivery of orders that had not been authorized by the R.S.O.. Please see Attachment 4.

5. The previously mentioned Indiana University training videotapes demonstrate and explain the process of making surveys by use of survey meters and the use of wipes or smears in conjunction with liquid scintillation counters. These procedures are demonstrated in both the context of general preventative hygiene as well as in emergency situations. In addition to these videos as R.S.O. I have the responsibility to train our technicians in the same techniques in hands on demonstrations. Our program uses very small quantities of radioactive materials in free form on such an infrequent basis that it has been the responsibility of the R.S.O. to perform all necessary "wipe tests". Our training however emphasizes personal dosimetry with explanation of the different levels of absorbed dose, the importance of keeping a personal record of exposure to radiation, and the difference between counts per minute and decays per minute. Both our students as well as our technicians are introduced and trained to use the Packard liquid scintillation counter.

Your deficiency letter concluded with an observation that our training and safety manual contained in section III, part C, number 1 several inconsistencies with NRC requirements. I believe after reviewing the regulations you recommended the corrections I made rectify the situation. Please see Attachment 6 which is a copy of the corrected page from our Radiation Safety Manual.

Please let me know if I can provide you with any additional information.

Sincerely Yours,

John A. Hufnagel
Radiation Safety Officer

Three Attachments (#3, #4, and #6)

ATTACHMENT 3

Indiana University Radiation Safety Series

Tape I - Introduction

This program discusses the properties of radiation, its biological effects, and the regulations governing the use of radioactive materials in the laboratory.

I. Three Categories Of Nuclides Commonly Used In The Research Lab. Low Energy Beta Emitters, High Energy Beta Emitters, And Thirdly X Rays And Gamma Rays.

- Characteristics
- Decay Mechanisms
- Ionization Effects
- Dangers Posed To Biological Life

- Techniques of Contamination Control, Shielding, Maintaining Distance, And Limiting Time

- Comparison Of X Rays And Gamma Rays To Beta Emitters - Bremsstrahlung Radiation

II. Absorbed Dose

- Explanation Of REM Units
- Natural And Normal X Ray Amounts

- Danger Of Increasing Ionization Density With Increasing Dose - Disruption Of Biological Molecular Bonds
- Risks Of Cancer And Genetic Effects
- ALARA

III. Adapting Experimental Procedures To Reduce Exposure In Radiation Experiments

A) Contamination Control

- Handling Techniques (Practicing Protocols)
- Protective Clothing, Gloves, Glasses, Etc.
- Preventing Ingestion And Inhalation
- Use of Hoods And Absorbent Paper

B) Reducing Exposure Time, Increasing Distance, And Employing Shielding

- Types of Shielding Material
- Checking Effectiveness Of Shielding With A Survey Meter

IV. Additional Safety Procedures

- Reading Radiation Safety Manual
- Warning All Of Radiation Presence And Danger, General Public And Services As Well As Laboratory Personnel
- Labeling

- Securing
- Conducting Surveys
- Keeping Records Of Use, Disposition, And Transfer Of Nuclides

Tape II - Laboratory Techniques

This tape discusses the safety mandate that requires routine laboratory procedures be adapted to prevent contamination and limit exposure when working with radioactive materials.

A) Careful Prior Planning

- Developing Protocols That Minimize Exposure, Contingency Plans For Emergencies
- Securing Necessary Dosimetry And Monitoring Equipment
- Designing And Constructing Shielding
- Providing For Proper And Convenient Disposal Of Contaminated Waste
- Insuring Through RSO That Nuclides And Amounts Are Licensed For Use

B) Safe Work Habits

- Check Hoods For Proper Functioning
- Arrange Equipment For Convenient Accessibility
- Designate And Label Areas For Contaminated

Instruments And Waste

- Wearing Protective Clothing, Gloves, Glasses, And Face Shields
- Using Dry Runs To Modify Procedures
- Consulting And Utilizing Radiation Personnel

C) Monitoring

- Using Dosimetry Badges And Rings Without Contaminating Them
- Using Survey Meters To Check For Work Area And Personal Contamination
- Labeling Radioactive Sources And Their Activity Levels

D) Disposal Of Radioactive Waste

- Proper Labeling, Securing, And Disposal
- Surveying
- Inventory And Record Keeping

E) Utilizing Expertise Of Radiation Safety Office

- Types Of Monitoring Equipment, Their Sensitivity, And Their Appropriate Application
- How To Conduct Surveys With a Geiger Counter
- How To Conduct "Wipe Tests"

Tape III - Emergency Procedures

I. General Principles For Coping With Laboratory Accidents Involving Radioactive Materials

A) Assist People First

- If Injured, First Aid Is A Priority
- If Situation Permits And Warrants, Decontamination Can Be Initiated

B) Monitor Personnel

- Survey Hands, Feet, And Clothing

C) Control The Area

- Inform All Pertinent Personnel
- Mark And Secure Room

D) Alert Radiation Safety Officer

II. Minor Spills

- Assessing The Spill Area With "Smears" And Survey Meters
- Techniques Using Spill Kit
- Surveying Personnel And Area
- Securing Area

III. Guidelines For Accidents Involving Volatile Radioactive Substances

- Heightened Security
- Intensive Monitoring
- Nose And Skin Smears
- Taking Air Samples
- Skin Decontaminating Techniques
- Responsibility Of RSO To Supervise Cleanup
- Reporting To Licensing Agencies

IV. Planning To Avoid And Minimize Accidents

- Personal Protection
- Spill Control
- Safer Protocols And Experimental Techniques
- Planned Safety Program

Washington and Lee
Biology Department

[redacted]

Memo

To: Alexandre M. da Silva

From: John A. Hufnagel

CC: Fontanne Bostic, Lawrence Hurd, Steven G. Desjardens, Kenneth E. Van Ness, Elizabeth Knapp, Robert E. Stewart, Maryanne Simurda, and Jack Wielgus

Date: 7/11/2005

Re: Ordering of new radioactive material

Alex, as per our conversation on 7/ 6 / 05 I am taking this opportunity to emphasize an already established policy of the Radiation Safety Committee that only the Radiation Safety Officer has the authority to order and receive directly any purchase of radioactive materials. Our use of these materials both by type and quantity is strictly controlled by licenses from the U. S. Nuclear Regulatory Commission and the State of Virginia Radiological Health Program. This and reasons of safety make it mandatory that we make every effort that this policy not be circumvented .

In our meeting I explained that simply having the policy would prevent neither the intentional or accidental unauthorized purchase of these materials, and that enforcement of this policy would require the cooperation your department, The University Services Office. You concurred and agreed it would be the policy of University Services that all purchases of radionuclides would be processed by my request or by my approval as Radiation Safety Officer. And further that University Mail Services would not accept any delivery of said materials that had not been authorized by the Radiation Safety Officer. In order in insure compliance you agreed to explain these policies to your administrative assistant in charge of purchase orders Fontanne Bostic and David Weeks, the mail services supervisor.

I am circulating this memo in addition to you and the above mentioned members of your department to all science department heads and to all the specified users designated on our license from the U.S. Nuclear Regulatory Commission. I t will be the policy of The Radiation Safety Committee to reissue this memo on a yearly basis. Thanks for your help and cooperation.

ATTACHMENT 4

6. The use of radioactive materials which emit high energy beta particles (e.g. 32-P) or gamma rays requires the simultaneous use of a dosimeter. Limits for absorbed dosages will be set for each procedure by the Radiation Safety Committee in accord with this section as part of the protocol review process.

C. Marking and Labeling

Rooms, areas, and equipment where radioactive materials are used or stored shall be clearly marked with appropriately worded and designated Health Physics signs whenever required under the conditions set forth in this section.

1. Each area or room where radioactive materials are used or stored in quantities in excess of 10 times the quantities listed in Appendix C of Part 20 shall be posted with the standard sign and the words CAUTION - RADIOACTIVE MATERIALS. Exceptions to this rule are in cases where:

   a) The radioactive material is in the form of a sealed source such that the radiation level at 30 centimeters from the surface of the source container does not exceed 5 millirems/hour.

   b) The radioactive material is used in a RESTRICTED AREA and is in use for less than eight hours and is constantly attended during the period by a person trained in radiation safety. (Restricted area means any area, access to which is controlled by Washington and Lee University for purposes of protection of individuals from exposure to radiation and radioactive materials; however, residential quarters cannot be included in a restricted area.)

2. Each container in which radioactive material is used, stored, or transported shall be labeled with the radiation symbol, the words CAUTION - RADIOACTIVE MATERIALS, and the isotope, quantity, and date of measurement if the quantity involved exceeds those listed in Appendix C of Part 20. Exceptions to this rule are in cases wherein:

   a) The concentration of the material in the container is less than the quantities listed in Appendix C of Part 20.

   b) The containers are used transiently in lab work with the user present.