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June 1, 2011

Ms. Farrah C. Gaskins
Nuclear Materials Licensing Section
U.S. Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406-1415

03001183

Re: Renewal of license 52-01986-04

Dear Ms. Gaskins:

Enclosed you will find the application for renewal of our license 52-01986-04 which expires on June 30, 2011.

Please do not hesitate to contact us should you require any further information.

Sincerely,

Ana R. Guadalupe, Ph.D.
Chancellor

University of Puerto Rico
Río Piedras Campus
Chancellor's Office

PO Box 23300
San Juan PR 00931-3300
Tel. 787-763-3877
787-764-0000, Exts. 2424, 3240
Fax 787-764-8799

575299

NMSS/RGN1 MATERIALS-002

NRC FORM 313 (3-2009) 10 CFR 30, 32, 33, 34, 35, 36, 39, and 40

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0120 EXPIRES: 3/31/2012

Estimated burden per response to comply with this mandatory collection request: 4.3 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

APPLICATION FOR MATERIALS LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

OFFICE OF FEDERAL & STATE MATERIALS AND
ENVIRONMENTAL MANAGEMENT PROGRAMS
DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

LICENSING ASSISTANCE TEAM
DIVISION OF NUCLEAR MATERIALS SAFETY
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MISSISSIPPI, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
612 E. LAMAR BOULEVARD, SUITE 400
ARLINGTON, TX 76011-4125

03001183

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S.NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*

- [ ] A. NEW LICENSE
- [ ] B. AMENDMENT TO LICENSE NUMBER
- [x] C. RENEWAL OF LICENSE NUMBER **52-01986-04**

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include ZIP code)*

University of Puerto Rico
Environmental Health and Safety Office
PO Box 22785
San Juan, PR 00931-2785

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

Departments of Biology and Chemistry
College of Natural Sciences
University of Puerto Rico
Rio Piedras Campus, San Juan, Puerto Rico

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Jorge Ramos-Feliciano

TELEPHONE NUMBER

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
a. Element and mass number; b. chemical and/or physical form; and c. maiximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSE FEES *(See 10 CFR 170 and Section 170.31)*
FEE CATEGORY **Exempt** AMOUNT ENCLOSED $

13. CERTIFICATION. *(Must be completed by applicant)* THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39, AND 40, AND THAT ALL INFORMATION CONTANED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE	SIGNATURE	DATE
Ana R. Guadalupe, Chancellor	Ana R. Guadalupe	06/03/2011

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED $	CHECK NUMBER	COMMENTS
APPROVED BY				DATE	

NRC FORM 313 (3-2009) PRINTED ON RECYCLED PAPER

575299

5. Radioactive Material

	Elements and Mass No.	Chem./ Physical form	Maximun amount at any time(mCi)
A.	Hydrogen 3	Any	30
B.	Carbon 14	Any	10
C.	Phosphorous 32	Any	30
D.	Phosphorous 33	Any	20
E.	Sulfur 35	Any	25
F.	Calcium 45	Any	8.5
G.	Iodine 125	Any	5
H.	Krypton 85	Sealed Source	2

The above maximum amounts (A-H) are authorized in the license expiring Jun 30, 2011.

6. Purpose for which license material will be used.

Licensed material (A-H) will be used only in laboratory research and development, and for teaching purposes.

7. Individuals responsible for radiation safety program and their training experience

A. Radiation Safety Officer: Jorge Ramos Feliciano

B. Radiation Safety Technician: Lymari Orellana, M.S.

C. Authorized users: Drs. Carlos Gonzalez, Jose Lasalde, Reginald Morales, Sandra Peña, and Irving Vega.

Ms. Lymari Orellana received training November 17-21, 2003 at a course offered by the Radiation Safety Associates, Inc that includes radiation sources, units, concepts, biological effects, measurement techniques, dosimetry, monitoring, management and disposal of radioactive waste, and requirements of EPA, NRC and DOE. Ms. Orellana is being trained by the RSO on the particularities of our current license.

All the individuals listed in 7C appear as authorized users in the license expiring Jun 30, 2011.

8 Training for individuals working in or frequenting restricted areas

A. Housekeeping personnel

Janitors are instructed on the dangers of radiation, and have been taught to recognize the symbols that denote radioactivity. They have been warned not to get close to or touch anything that is labeled with the radioactivity symbol; specifically they are shown the working and storage areas and are instructed not to approach and/or touch them. Janitors have no access to the decay-in-storage facility on the roof of Julio Garcia-Diaz building or to the Radioimmunoassay facilities in JGD 217. If there is ever a need for them to come into the latter facilities, it would be under the direct supervision of the RST or an authorized user. This rule is easily applied since housekeeping personnel do not know the combination to enter Room 217.

B. Animal caretakers

There are no animal caretakers involved directly in isotope work.

C. Students and laboratory technicians

These are instructed on the nature and chemical basis of radioactivity, potential biohazards and safe handling of radioisotopes by means of:

1. A workshop on radiation safety that is offered at least once a year, more commonly once per semester (an outline of the workshop is included as Appendix 1). In this workshop we also discuss the particularities of our license and problems that we have had in the past that could result in violations. The participating faculty comes from our campus and from other institutions such as University of Puerto Rico Medical Sciences Campus. Attendance of this workshop is required for all personnel working with radioisotopes including passing a written test (70% or above is considered a passing grade). This test includes questions about every topic covered; it also includes real life situations that have been shown in the past to be conducive to violations. If a trainee fails the examination, he or she will not be allowed to work with radioisotopes. However, assessment of training does not end here (see below).

2. Instruction under the direct supervision on each of the professors involved in this type of research on:
    a. the safe handling of radioactive materials
    b. what to do in case of a spill or contamination
    c. the proper disposal of radioactive waste
    d. common decontamination procedures

3. Assessment of training in the periodic inspections carried out by the RST and or/RSO: personnel working with isotopes are routinely questioned about the procedures established in our license and about issues of radiation safety. Any significant gap detected is corrected by either retraining or by assignment of additional reading material.

9. Facilities and equipment

A. Survey meters:

Qty	Model
12	Ludlum Geiger Counters (Model 3) with pancake detector (model 44)
7	Ludlum Geiger Counters (Model 3) with scintillation detectors (model 44)
1	WM B Johnson GSM-110 Geiger Counter with Ludlum scintillation detector
1	Rad-monitor Geiger Counter (Model-GMZ)
1	Technical associate Geiger (Model TBM-3S)

These instruments are distributed in the laboratories of Drs. Gonzalez, Morales, Lasalde, Peña and Vega, Radioimmunoassay facilities, decay-in-storage facility and at the office of the RST. Calibration is performed annually by an authorized company for example Radiation Safety and Control Services, Inc: Stratham, NH.

B. Radioactivity counters:

Qty	Model	Location
1	Beckman liquid scintillation Counter LS 5000	JGD 217
1	Beckman liquid scintillation Counter LS 6000LL	JGD 217
21	Perkins Elmer gamma counter (Wizard 2)	JGD 217

There is a service contract with Bioanalytical Systems, Inc. for servicing and calibrating Beckman liquid scintillation Counter and Perkin Elmer for the gamma counter. These instruments; calibration is performed every 6 months.

C. Facilities:

The facilities for storing and/or working with radioactive isotopes had already been described in the license expiring May 31, 1995 (application received by NRC November 9, 1989; and in letters dated February 15, 1995 and July 6, 1998). However, areas of Dr. Candelas (JGD 213 and 216), Dr. F. Gonzalez (FB 136), Dr. Toranzos (JGD 104), Dr. Garcia-Arraras (JGD 220), Dr. Bayman (JGD 205) and Dr. Giray (JGD 201) are modified and did not work with radioactivity.

10. Radiation safety program

Unless otherwise stated this application supersedes all documents submitted as part of the license expiring on Jun 30, 2011.

I. Administration of the Program

The President of the University of Puerto Rico is the person responsible for radiation in all campuses. The Radiation Safety Board, composed all the RSOs of the university system plus several members appointed by the President, advises the President on matters pertaining to radiation safety. The President delegates on the Chancellor of each campus the responsibility for radiation safety, who then delegates this responsibility on the campus RSO. The RSO then reports on all matters pertaining to radiation safety both to the Chancellor and to the Isotope Committee (IC). The IC is composed of all authorized users and a representative of the Chancellor, which could be the Dean of Natural Sciences, or the Associate Dean for Academic Affairs of Natural Sciences. Since the program is small, the RSO currently chairs the IC. Were it to increase in the future, we would strongly consider separating the positions of RSO and President of the IC. The RST, who reports to the RSO, is in charge of day-today running of the radiation safety program. The organizational chart showing the relationship between the RSO, the RST and the university administration is enclosed as Appendix 2.

A. Isotope Committee.

The Committee will meet at least annually to discuss matters pertaining to radiation safety such as:

1. of inspections carried out by the NRC, the Radiation Safety Board of the UPR, or by the Radiation Safety Technician
2. violations and measures taken to correct them, including disciplinary actions
3. license amendments and addition of new users
4. and other activities related to radiation safety
5. problems that could potentially result in health hazards and violations
6. modifications of procedures that would optimize radiation safety
7. acquisition of equipment

B. Radiation Safety Officer

His (her) duties consist of:

1. training the RST in the particularities of our license
2. directly supervising the RST
3. calling meetings of the IC at least once per year, or more often if necessary.
4. evaluating reports submitted by the RST and enforce corresponding corrective actions decided by the IC
5. being available for consultation and advise related to radiation safety
6. meeting and escorting the NRC Inspectors during their visits

C. Radiation Safety Technician

His most important duties include:

1. informing the RSO of any activity or procedure that could affect the security of the personnel in terms of radiation
2. evaluating purchase orders for radioactive material to ensure that requested isotopes and the amounts ordered are within the limits authorized in our license
3. verifying that researchers fill the corresponding forms and records for receiving and handling radioactive material: including inventories, inspections after experiments and the waste. She will submit a report to the RSO including all findings and any corrective actions that need to be taken
4. receiving and inspecting isotope shipments for leakage and/or contamination, if requested to do so by users.
5. inspecting laboratories of users at least once a month to ascertain that there is no detectable contamination that could result in a health hazard.
6. inspecting the decay-in-storage facility regularly to ascertain that the proper records are being kept and that below background waste is disposed of properly
7. in addition to the monthly inspection, the RST will be available for additional inspections when requested to do so by users
8. helping to clean any radioactive contamination when requested to do so by users
9. being available to give advise or information related to radiation safety
10. train housekeeping personnel to recognize the emblem that identifies radioactive material and instruct them on the dangers of radiation and on radiation safety measures.
11. collaborating with the RSO in implementing compulsory training in radiation safety for all students and personnel that will work with radioactive material.
12. ascertaining that monitoring instruments are calibrated
13. sending dosimeters to be read, keeping dosimetry records, investigating any important findings and notifying users of the results obtained.
14. keeping minutes of the RSC meetings and submitting them for approval
15. assist the RSO when the NRC inspectors visit our facilities

D. Duties of authorized users:

The duties and responsibilities of the researchers involved in the use of radioisotopes (stated in Item 7 of Form NRC 313) under this license are (the user may delegate some of these tasks on a member of his staff with the proper training but will still retain primary responsibility):

1. to ensure that radioactive material is used only by, or under supervision of, authorized users.
2. to keep inventories and ensure that radioactive materials are properly secured against unauthorized removal at all times when they are not in use.
3. to ascertain that personnel under his/her supervision is properly trained on the safe handling of radioisotopes and on the requirements of our license

4. to ensure that personnel working with ^{32}P, ^{33}P, ^{45}Ca, ^{35}S and millicurie amounts of $^{125}1$ wear dosimeters and use the appropiate shielding, and to ensure that personnel working with millicurie amounts of $^{125}1$ have a urinalysis assay done within 12-24 hrs of the work.
5. to place the proper warnings about radioactivity on the door of the room where radioactive material is being used or stored, an to ascertain that they are placed in working areas. In addition he/she is responsible for keeping the form Notice to Employees (NRC Form 3) posted in a visible place in these areas.
6. to ascertain that no food or drink is consumed in restricted areas, and that no cigarettes, cigars or pipes are smoked in them
7. to perform routine inspections of laboratories under his/her supervision where radioactive material is being used or stored and to keep records of these inspections.
8. to ensure that radioactive wastes are disposed of properly.
9. to ensure that all the procedures in his laboratory involving radioactivity are in compliance with the rules, stipulations and regulations of our license.

II. Ordering and receiving radioactive materials

The procedures for ordering and receiving radioactive materials are the following:

A. All orders for radioactive materials require written approval (Appendix 3) of the RST or the RSO, to ascertain that the requested materials:
   1. are authorized by the license
   2. do not exceed the limits stipulated by our license.

   Authorization by the RST can be obtained by telephone if and only if a written confirmation of the approval is obtained within 24 hrs. This document is to be kept on file to be shown by request during inspections. Standing orders do not need written authorization until a shipment of the isotope is going to be requested from the supplier. In addition, all orders for radioactive material that involve special instructions are strongly recommended to be marked "RADIOACTIVE MATERIALS".

B. All isotope orders are to be delivered directly to the laboratory of the user whose requisition was previously approved; or, by arrangement, to the office of the RST.

C. The rules for receiving and inspecting packages of radioactive material are the following:

   1. Receiving the package

      a. If the package is received by the RST within working hours, he/she will proceed to inspect it immediately (within 3 hrs) as described below, and if no contamination or leakage is detected, he will deliver

it with a copy of the inspection results to the user's laboratory.

b. If the package is received by the user during working hours. he/she or his/her representative will inspect it for any outward sign of damage and then either:

    1) notify the RST as soon as convenient (within 24 hrs) and proceed with the inspection of the package as described below or:
    2) notify the RST so that he/she may perform the inspection of the package as soon as possible (within 3 hrs)

c. If the package is received by the user outside working hours, or at the end of a working day, or if for some unforeseen reason the RST is not available, the package is first inspected by the user or his representative for any outward sign of damage and then either:

    1) the RST is notified that the package needs to be inspected within the first 3 hours of the next working day or:
    2) the inspection procedure is performed as described below, either immediately, or within the first 3 hrs of the next working day. The RST is also notified within the next 24 hrs that the package has been received.

2. Inspecting the package

a. with gloves on, the outer package is opened following the manufacturer's instructions. The packing slip is removed and compared with the requisition. The inner package is opened with great care to check the integrity of the first source container.

b. the surface of the first source container is assayed for contamination with a cotton swab. The swabs are then read with the appropiate radioactivity counter. If any contamination is found, a similar treatment is also given to the packing material. If the packing material is uncontaminated it is discarded in the regular trash with the radioactive labels obliterated.

c. the isotope receiving and inspection form (Appendix 4) is filled and filed; this form is also to be used by the RST when he/she performs the inspection

III. Handling of Radioisotopes

This can be done only by the authorized user or by personnel from the laboratory authorized and trained in safe isotope handling. The authorized user always bears the primary responsibility for radiation safety in his/her laboratory. As stated previously, the user is also responsible for ascertaining that radioisotope inventories are kept up-to-date in his laboratory, and that the amounts utilized in each experiment are subtracted from the inventory form for that particular isotope (Appendix 5). The following are general rules to be followed when handling radioisotopes. These rules are non-exhaustive and therefore each particular case requires discussion with the user, the RSO and/or the RST. In case of extraordinary experimental protocols they should be discussed and approved by the Radiation Safety Committee.

A. general rules for safe handling of isotopes

1. eating, drinking and smoking in a restricted area is absolutely forbidden
2. at no time should the area be left unattended (open with no one in it)
3. always label the working area clearly; if the experiment will last more than one day, label the area with the date and the isotope being used
4. do not pipette anything by mouth
5. plan ahead; good planning is as important as shielding in an experiment
6. do not clutter your area with unnecessary materials or equipment
7. always keep receptacles for liquid and solid waste at hand
8. always place your materials on paper sheets with plastic backing, with the plastic surface facing the surface of the working table or bench
9. use shielding appropiate for the isotope you are working with
10. minimize your exposure time as much as possible; increase the distance from high energy beta emitters or gamma emitters as much as possible (use the ALARA principle: as low as reasonably achievable)
11. personnel working with ^{32}P, ^{33}P or millicuries amounts of $^{125}1$ have to use wrist film dosimeters. In the case of ^{33}P we may decide to make dosimeter use optional in the future, once we are convinced that no exposure is detected with them, as up to now.
12. inspect your area when you are finished (see below)
13. follow the waste management rules that apply to the isotope you are using (see below).

B. Actions to be taken in case of a spill

1. Minor Spills

a. NOTIFY: Notify persons in the working area that a spill has occurred.
b. PREVENT THE SPREAD: Cover the spill with absorbent paper.
c. CLEAN UP: Use disposable gloves and remote handling tongues, carefully fold the absorbent paper pad. Insert into a plastic bag and dispose of in the solid radioactive waste container. Also insert into the plastic bag all other

contaminated materials such as disposable gloves.

d. SURVEY: If the isotope spilled is a high energy beta emitter such as ^{32}P, check the area around the spill, hands, and clothing for contamination with a Geiger Counter. With all isotopes make swabs of the area and clean any contaminated areas until you reach DPMs below the standards for contamination indicated in the Inspections section (1000 DPMs/100cm^2).
e. REPORT: Report incident to the supervisor to ascertain that corrective actions will be taken to prevent future incidents. No permanent record record needs to be kept of these incidents beyond the inspection form showing that the area is free of contamination.

2. Major Spills
   a. CLEAR THE AREA: Notify all persons not involved in the spill to vacate the room.
   b. PREVENT THE SPREAD: Cover that spill with absorbent pads, but do not attempt to clean it up. Confine the movement of all personnel potentially contaminated to prevent the spread.
   c. SHIELD THE SOURCE: If possible, the spill should be shielded but only if it can be done without further contamination or without significantly increasing your radiation exposure.
   d. CLOSE THE ROOM: Leave the room and lock the door(s) to prevent entry.
   e. CALL FOR HELP: Notify the RST and/or the RSO and the researcher immediately.
   f. PERSONNEL DECONTAMINATION: Contaminated clothing should be removed and stored for further evaluation by the Radiation Safety Technician. If the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water. Do not use abrasive soaps or brushes on skin areas.

NAMES AND TELEPHONE NUMBERS OF RESEARCHERS:

Dr. Carlos Gonzalez
Office Phone: 764-0000 (Ext. 2482)
Cell Phone: [redacted]

Dr. Irving Vega
Office Phone: 764-0000 (Ext. 4896)
Cell Phone: [redacted]

Dr. Jose Lasalde
Office Phone: 764-0000 (Ext. 3020/4887)
Cell phone: [redacted]

Dr. Reginald Morales
Office Phone: 787-764-0000 (Ext. 4752)
Home Phone: [redacted]

Dr. Sandra Peña
Office Phone: 764-0000 (Ext. 5875)
Cell Phone: [redacted]

IV. Work, storage and waste area inspections

Surveys of storage and waste areas in the laboratory will be performed on a monthly basis. Surveys of work areas will depend on the duration and amount of the radioactive material. The survey program will be as follows:

A. Experiments involving less than 100 Ci of radioactive materials will have surveys performed at the end of the experiment to ensure that the working areas are free of contamination. However, if the experiment lasts more than one month surveys will be performed monthly and at the end of the experiment. Storage areas will also be surveyed on a monthly basis.

B. Experiments using more than 100 Ci of radioactive materials will also be surveyed at the end of the experiment. However, if the experiment lasts more than one week, surveys will be performed weekly and at the end of the experiment.

C. Experiments involving multiple repetitions of the same technique, such as DNA sequencing experiments, and performed in exactly the same area and by the same researcher, will be treated as a single experiment and inspected according to A or B above depending on the total amount of isotope involved.

D. Surveys will consist of a series of wipe tests over an area of 100 cm2. Areas will be considered contaminated if levels of removable radioactivity exceed 1000 dpm/ 100 cm^2. Contaminated areas will be cleaned until removable radioactivity levels are below 1000 dpm/ 100 cm^2. Areas where ^{32}P is used can be surveyed with a survey meter with a scintillation detector calibrated with a mock-32P-source. If no contamination is detected with this instrument, no swabs will be performed. However, contaminated areas (1000 dpm or above detected with the monitor) need to be tested by means of swab test before and after cleaning to ensure that decontamination has taken place. If necessary, the procedure will be repeated and results recorded.

E. Cleaning will consist of treating the affected area with a strong detergent solution, such as Count-Off (Du Pont) or equivalent, wiping the area with absorbent paper using of gloves, and re-testing with swabs. Materials used in cleaning (gloves, etc.) will be stored with solid waste.

F. Record. A permanent record will be kept of all survey results, including negative ones (Appendix 6). Records will include:

a. location, date and name of person conducting the survey
b. a sketch of area surveyed, identifying relevant features such as storage, waste and working areas
c. detected contamination levels, referring to locations in sketch and results of corrective action taken in case of contamination.

V. Waste management

No radioactivity is discarded in the sewer because it is not allowed by the laws of the Commonwealth of Puerto Rico.

A. Waste from isotopes with a half life of less then 65 days: and from sulfur 35

The rules and regulations that govern the use of the decay-in-storage room are included in Appendix 7:

1. waste from isotopes with a half life less than 65 days may be held for decay-in-storage in the room designated for this purpose on the roof of Julio Garcia-Diaz building
2. sulfur 35 waste will be the only isotope of half life greater than 65 days but less than 120 days that will be held for decay-in-storage
3. all radioactive waste disposed off in this manner will be held for decay a minimum of 10 half lives
4. all waste stored in this room will be recorded in the appropiate form (Appendix 8 and 9) and incorporated in the master log book provided for that purpose.

B. Method used for disposal after decay-in storage:

1. After at least ten half-lives, byproduct material shall be monitored at the container surface with a radiation survey meter set on its most sensitive scale and with no interposed shielding before disposal as ordinary trash, so as to ascertain that its radioactivity cannot be distinguished from background radiation.
2. Before final disposal as ordinary trash all radiation levels will be removed or obliterated.
3. A record of each disposal shall be retained for three years. The record most include:
   a. date of disposal
   b. date in which byproduct material was placed in storage.
   c. radionuclide disposed
   d. background dose rate dose rate
   e. measured at the surface of each waste container
   f. name of individual who performed the disposal.

C. Calcium 45 waste

Long-term, storage of this isotope was authorized in the license expiring Jun 31, 2011. Waste from this isotope will be held in long term storage for the next 5 years.

D. 3-H and ^{14}C waste.

Waste from these isotopes will be held in long term storage for the next 4 years. This should not cause any undue burden on our storage facilities, because our current stores of ^{3}H and ^{14}C waste are less than 7 (30 millicuries maximal amount allowed) and 0.075 mCuries (10 millicuries maximal amount allowed) respectively, and we do not expect a large increase in these isotopes during the next four years. The volume occupied by this waste can be easily accommodated within the laboratories of investigators using these isotopes. In the eventuality that that our stores of these isotopes approach the maximal allowed limit, we shall contract a company for disposing of our tritium and Carbon-14 waste.

E. Records

Records have to be kept of all liquid and solid waste stored in each laboratory, and of their eventual disposal. It is suggested that users utilize the forms in Appendix 10 and 11 for waste management.

VI. Annual Audit of Radiation Safety Program.

The aim of this program is to keep occupational and public radiation doses as low as reasonably achievable (ALARA). An annual audit of the program shall be performed to ensure that:

1. We are abiding by NRC regulations and the terms and conditions of the license
2. The radiation protection program content and implementation achieve occupational doses and doses to members of the public that are ALARA
3. We maintain records in compliance with NRC requirements.

The audit will be carried out by a special subcommittee appointed by the Radiation Safety Board. All members of the Board are qualified to perform these audits; some have graduate degrees in Biophysics (Ph.D.), Health Physics (M.S.) and Environmental Health (M.S.). The scope and extent of the audit will include determining if there is:

1. Proper warning to the public about restricted areas and proper limitation of access to these areas

2. Proper record maintenance for receiving isotopes, inspection reports and waste disposition

3. Safety in the work area including labeling, shielding when appropriate, availability of functional and calibrated survey meters, and contamination monitoring and handling

4. Proper storage of radioisotopes, including an up-to-date inventory, complete labeling, appropriate containers and contamination inspections;

5. Inspection of radioactive waste area in order to ascertain that waste is properly labeled and packed, and that it has been inspected for contamination.

6. In addition: Monthly inspection reports for each individual laboratory or restricted area will be available to the auditors (a translation of the form used for this is included as Appendix 12)

7. The inventory of radionuclides in the possession of users will also be available to the auditors, including those in long-term storage or in decay-in storage.

8. Any violations or procedures that could result in potential violations will be discussed at a special meeting of the IC to discuss possible sanctions or corrective actions. A copy of this audit will be sent to the Chancellor and, if necessary, discussed with him or his representative.

9. These audits will be conducted at intervals not to exceed 12 months and records of these audits will be kept on file for three years.

10. The Chancellor is committed to review the documented results of the audit after its completion, and to take prompt action to correct any identified deficiencies and to inform all personnel of these deficiencies and the action that should be taken expected to avoid their recurrence. The Chancellor may delegate the implementation of corrective actions on the

11. RSO who will report to him on the outcome of these actions.

Appendix 1

Isotope Handling Workshop

Faculty:

Dr. Carlos Gonzalez
Dr. Orestes Quesada
Dr. Warner Ithier
Sr. Jorge Ramos, RSO
Sra. Lymari Orellana, RST

Morning session:

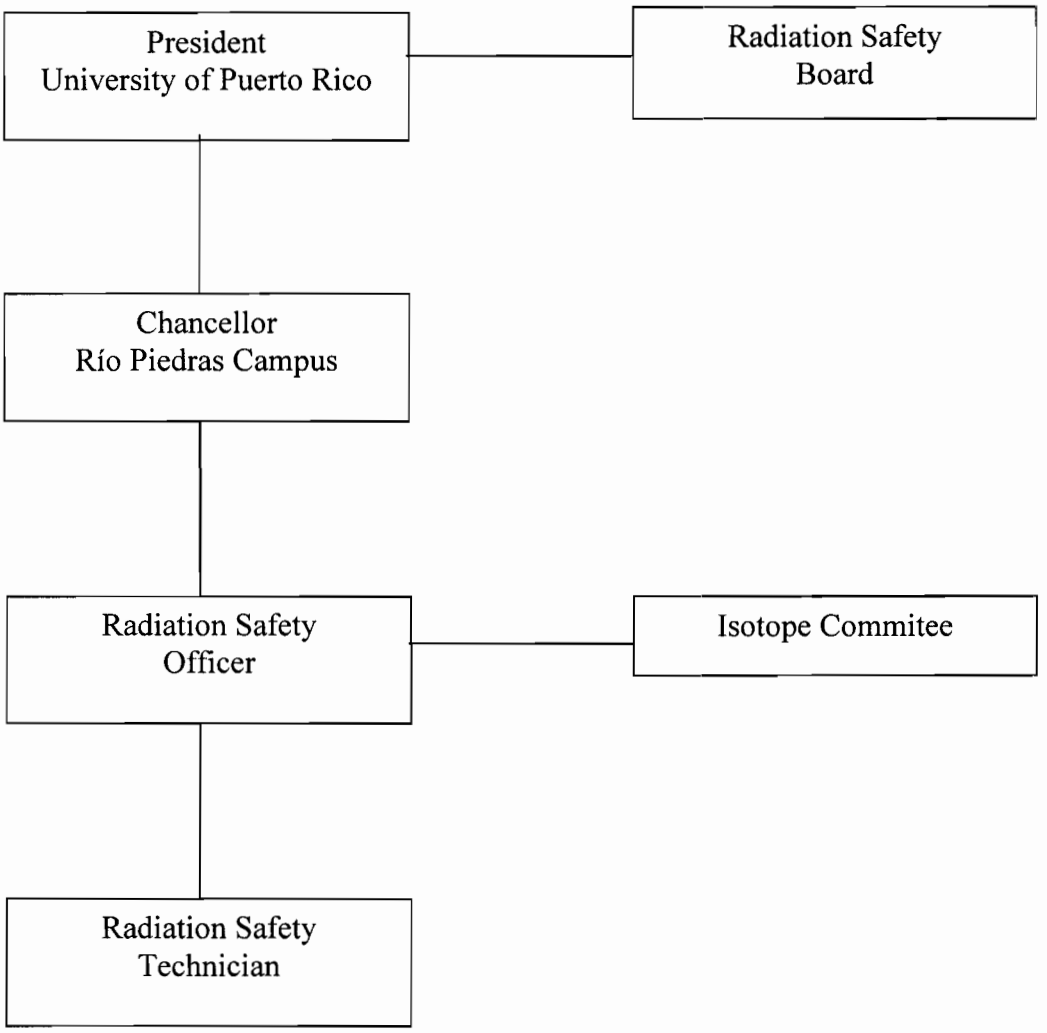
1. theory of radioisotopes: definition of radiation; types of radiation; units of measurements (including mathematical calculations); radioisotopes most commonly used in research
2. instruments used to measure and detect radiation: Geiger counter; scintillation counter -
3. biological effects of radiation
4. specifications of our license

Afternoon session:

1. placing an order for radioactive material
2. receiving an isotope
3. safe isotope handling during an experiment (demonstration)
4. disposition of isotope waste
5. short written test

Appendix 2

Management of the Radiation Safety Program at the University of Puerto Rico, Rio Piedras Campus



Appendix 3

UNIVERSITY OF PUERTO RICO
RIO PIEDRAS CAMPUS
RADIATION MATERIAL ORDERING FORM

DATE_____

PRINCIPAL INVESTIGATOR: _____

LABORATORY _____

We hereby notify that on the _____ of _____ of 201___ we will order by telephone

the amount of _____ μCi of the isotope _____ as part of (mark one):

_____ Standing Order

_____ Regular Order

with the requisition number _____ and the Purchase Order (PO) number _____.

_____

Principal Investigator or Authorized User

****

I herby certify that the ordering of this material does not exceed the established maximum limits for the isotope in our license.

_____ _____

Radiation Safety Technician Date

Reference date: _____

Appendix 4

RADIOISOTOPE RECEIVING RECORD

INFORMATION TO BE FILLED BY THE PERSON RECEIVING THE PACKAGE

ORDER INFORMATION

Laboratory_____

Isotope_____ Compound _____ Quantity_____

Reference Date: _____ P.O.#_____

RST NOTIFICATION

Time_____ Date_____

PACKAGE INFORMATION

Name of the person who received the package_____

Name of the supplier who shipped the package_____

Arrival Date_____ Time_____ Carrier_____

Package condition: Good ( ) Crushed ( )

Wet ( ) Damaged ( )

If the condition of the package is other than good, place it in a contained environment and report package condition to the RST immediately for appropriate action. (Ext. 7819)

INFORMATION TO BE FILLED BY THE SURVEYOR

MATERIAL'S CONTAINER CONTAMINATION MONITORING

Swab date_____ Time_____

Background_____ DPM Container _____DPM

- Was the container contaminated?
- The material order and received they agree?

If the answer is **NO**, explain_____

What was the final disposition of the package?_____

CERTIFIED CORRECT

_____ _____

Receiver's Signature Surveyor's Signature

Appendix 5

RADIOISOTOPE USAGE RECORD

LABORATORY____________________________ REFERENCE DATE____________________________

ISOTOPE____________________________ COMPOUND____________________________

QUANTITY____________________________ TOTAL VOLUME____________________________

μCi / μl____________________________ # AND VOLUME OF ALIQUOTS____________________

DATE	USER	VOLUME	BALANCE

Appendix 6

WORK AREA INSPECTION RECORD

Location: JGD_____ FB _____ **Date: _____**

Isotope _____ ☐ **Swab Test** ☐ **Survey**

Position ID #	dpm	Position ID #	dpm

Floor Map Identifying Work Areas

Instrument used:_____

Inspection Performed by: (please print) _____

Signature: _____

Appendix 7

Rules for the use of the decay-in-storage room for short-lived radioisotopes on the roof of JGD Building.

1. The room is to be used exclusively for the decay-in-storage of short lived radioisotopes such as ^{35}S, ^{32}P and ^{125}I. No long-live radioisotopes such as ^{3}H and ^{14}C may be storage there.

2. Only Low Levels (100 μCi or less) of ^{32} P and ^{125} I waste may be stored in the decay room and ^{32}P must only be stored in the wooden cabinets designated for that purpose by the RSO.

3. No flammable liquids or toluene-base cocktails can be stored in this room. Only aqueous liquid waste may be stored here, and this has to be in a leak-proof container (such as those approved for hazardous liquid waste by the Environmental Protection Office), placed preferably on a containing platform or tray. All liquid waste containers are subject to the same rules and regulations stated below for solid waste.

4. All authorized users are required to store their radioisotopes only in the shelves that have been assigned to them. These shelves are to be labeled with the name of the investigator in charge of the authorized laboratory. Storage of isotopes for decay in an area assigned to another user is not permitted.

5. All solid waste should be placed in strong plastic bags such as Fisher 01-815A, and properly labeled in at least two places with the following information:
    a. name of the user
    b. type and amount of radioisotope
    c. date of storage
    d. date when material should be checked to determine if no significant amount of radioactivity remains before being disposed of in the trash.

6. All users are required to keep an up-to-date inventory of the radioactive waste stored in their areas in the Decay Room's log book. A copy of this inventory should also be kept in the researcher, s lab. The accuracy of these records will be checked during periodic inspections by the RSO or the RST.

7. After ten half lives have elapsed, prior to disposal in trash, random samples of the contents of the bag will be taken using gloves and counted in the Beckman LS-5000 or LS- 6000LL or Perkin Elmer Gamma (Wizard 2) radioactivity remains. Radioactivity levels 1000 dpm or more above background will be considered contaminated and storage for further decay; a new check date will be fixed according to the half life of the isotope. All of this information will also be recorded in the log book.

8. Both the stairway door and the door to the room should be kept locked at all times when not in use.

9. Any violation to these rules will be discussed at a Radioisotope Committee meeting for possible actions to be taken. A copy of these rules will be posted permanently in the decay-in-storage room.

This is to acknowledge the receipt of your letter/application dated

6/3/2011, and to inform you that the initial processing which includes an administrative review has been performed.

RENGuth 52-01986-04

☒ There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

☐ Please provide to this office within 30 days of your receipt of this card

_____.

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 575299.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

NRC FORM 532 (RI)
(6-96)

Sincerely,
Licensing Assistance Team Leader