Universidad de Puerto Rico
RECINTO UNIVERSITARIO DE MAYAGÜEZ
Decanato de Administración
Oficina de Salud, Seguridad Ocupacional
y Protección Ambiental
Apartado Postal 9050
Mayagüez, Puerto Rico 00681-9050

University of Puerto Rico
MAYAGÜEZ CAMPUS
Dean of Administration
Health and Safety Office
PO Box 9050
Mayagüez, Puerto Rico 00681-9050

January 28, 2005

Sam Nunn Atlanta Federal Center
U.S. Nuclear Regulatory Commission, Region II
61 Forsyth Street, S.W., Suite23T85
Atlanta, Georgia 30303-8931

030-14313
X

Dear Gentlemen:

Subject: Submittal of Application for Material License

The current U.S. Nuclear Regulatory Commission Material License for the University of Puerto Rico- Mayagüez Campus (No. 52-10510-04) will expire on February 28, 2005.

Enclose you will find the Application for Material License (Form 313) for the renewal of the present license. Others documents as the Radiation Safety Manual are included to complement the information provided in the application.

No significant changes were made to the current Material License. The changes have been specified in the application. However, the Radiation Safety Manual, which describes our Radiation Safety Program, has been revised and renew by the Radiation Safety Committee. With this renewal, the Committee intends to improves and reinforce the Radiation Safety Program.

If you needs any other information please contact the Environmental Health and Safety Office at phone number is (787) 832-4040 ext. 3506 or 3221.

Cordially,

Mr. Roberto Torres Martínez
Radiation Safety Officer
University of Puerto Rico- Mayagüez Campus

cc: Dr. Jorge I. Velez- Chancellor
Prof. Wilma Santiago- Dean of Administration

136379
NMSS/RGNI MATERIALS-002

REC'D IN LAT 1/31/2005

NRC FORM 313 (8-2000) 10 CFR 30, 32, 33, 34, 35, 36, 39, and 40

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR MATERIAL LICENSE

APPROVED BY OMB: NO. 3150-0120 EXPIRES: 08/31/2002

Estimated burden per response to comply with this mandatory collection request: 7.4 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 Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0000), 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.

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:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

LICENSING ASSISTANT SECTION
NUCLEAR MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

SAM NUNN ATLANTA FEDERAL CENTER
U. S. NUCLEAR REGULATORY COMMISSION, REGION II
61 FORSYTH STREET, S.W., SUITE 23T85
ATLANTA, GEORGIA 30303-8931

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
801 WARRENVILLE RD.
LISLE, IL 60532-4351

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, 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 SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-8064

030-14313
X

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 52-10510-04

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

University of Puerto Rico
Mayagüez Campus
P.O. BOX 9050
Mayagüez, P.R. 00681-9050

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Mr. Roberto Torres-Martínez

TELEPHONE NUMBER

(787) 832-4040 XT. 3506, 3221

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. maximum 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 AEAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSE FEES *(See 10 CFR 170 and Section 170.31)*

FEE CATEGORY N/A 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 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: Dr. Jorge I. Vélez Arocho – Rector (Chancellor)

SIGNATURE

DATE: 28 Nov 2001

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
			$		NMSS/RGNI MATERIALS-002
APPROVED BY				DATE	136379

PRINTED ON RECYCLED PAPER

Items 5 through 11

5. Radioactive Material

Element and Mass number	Chemical and/or physical form	Maximum amount that which will be possess at any one time
A. Americium 241	Sealed source	3.7 megabecquerels (MBq) (0.1 millicuries (mCi))
B. Cobalt 60	Sealed source	No single source to exceed 370 MBq (10 mCi)
C. Cesium 137	Sealed source	No single source to exceed 3.7 MBq (0.1 mCi)
D. Strontium 90	Sealed source	No single source to exceed 18.5 kilobecquerels (KBq) (0.5 microcuries µCi)
E. Hydrogen 3	Polymer form	222 megabecquerels (MBq) (6 mCi)
F. Hydrogen 3	Plated foils	222 gigabequerels (GBq) (6 Ci)
G. Carbon 14	Aqueous solution	2.41 (GBq) (65 mCi)
H. Iodine 125	Aqueous solution	5.55 MBq (150 µCi)
I. Phosphorus 32	Aqueous solution	370 MBq (10 mCi)
J. Sulfur 35	Aqueous solution	370 MBq (10 mCi)
K. Nickel 63	Aqueous solution	185 Becquerels (Bq) (0.005 µCi)
L. Nickel 63	Foil or Plated source	Not to exceed 555 MBq (15 mCi) per source
M. Hydrogen 3	Aqueous solution	25.9 Gbq (700 mCi)
N. Technetium 99m	Aqueous solution	74 MBq (2 mCi)
O. Americium 241	Sealed Neutron Source (CPN Int'l Model CPN 503)	No single source to exceed the maximum activity specified in certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State
P. Cesium 137	Sealed Neutron Source (CPN Int'l Model CPN 503)	No single source to exceed the maximum activity specified in certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State
Q. Tin 119m	Sealed Source (WebRes Co., Inc. Model MSn9 series)	No single source to exceed the maximum activity specified in certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State and 20 millicuries total.

6. Purpose(s) for which licensed material will be used

A. through F.	Possession and storage only, incident to disposal
G. through K., and M	Research and development as defined in CFR 30.4; animal studies; teaching and training students; and calibration and checking of licensee's instruments.
L.	To be used for sample analysis in compatible gas chromatography devices that have been registered either with the U.S. Nuclear Regulatory Commission under the CFR 32.210 or with agreement State.
N.	Instrument Calibration
O. and P.	In Campbell Pacific Nuclear International Model No. 503 Hydroprobe Moisture Gauge devices for measuring physical properties of materials.
Q.	For use in a Mössbauer Spectrometer for research purposes.

7. Individual(s) responsible for Radiation Safety Program and their training experience
   - See the Appendix 1 from the Application for Material License Renewal.

8. Training for individuals working in or frequenting restricted areas
   - See the enclosed Radiation Safety Regulations Manual (Appendix A).

9. Facilities and Equipment
   - Equipments used by the Radiation Safety Personnel are Described in Table 1
   - Other equipments containing radioactive sources in the University of Puerto Rico- Mayagüez Campus (UPRM) for research and Academic purposes are described in Table 2.
   - The UPRM Radiation Areas Plans are contained in the Appendix 2 from the Application for Material License Renewal.

Table 1: Radiation Safety Program Equipment

Instrument Description	Model	Supplier
One Geiger Counter	Model 2401-P	Ludlum Measurements
Two Geiger Counters	Model 14C (44-9 detector)	Ludlum Measurements
One liquid Scintillation Counter	LS 6000LL	Beckman
Low background alpha/beta/gamma counting system	The Traveler G5000	Gamma Products Inc.
Sun Nuclear Wipe Counter	SNC Model 1051	Sun Nuclear Corporation

Table 1: Others equipments with Sealed Sources

Instrument Description	Model	Supplier
Hydroprobe Moisture Gauge[1]	CPN 503	CPN International
Four Gas Chromatographer	Various	Various
Mössbauer Spectrometer[2]	MS3/W300	WebRes

1. By an involuntary error, the model described in current License is CPN 131.
2. This instrument will arrive during the current semester.

10. Radiation Safety Program
    - The UPRM Radiation Safety Program is described in the enclosed Radiation Safety Regulations Manual.

11. Waste Management
    - The waste management in UPRM is described in the enclosed Radiation Safety Regulations Manual (Appendix B.4)

12. License Fees
    - Not applicable

Application for Material License Renewal
Appendix 1

Roberto Torres Martínez

Address: P.O. Box 5222
Mayagüez, Puerto Rico 00681

Phone: (787) 832 – 4779

E_Mail: FRO_TORRES @ RUMAD.UPRM.EDU

Education: B.S. University of Puerto Rico, Mayagüez Campus, Chemistry Department

In progress: M.S. University of Puerto Rico, Medical Sciences Campus, Faculty of Biosocial Sciences and Graduate School of Public Health

Professional Experience:

Director of the Health & Safety and Environmental Office, University of Puerto Rico, Mayagüez Campus, 1995 to present

Administrative Assistant and Safety Coordinator, University of Puerto Rico, Mayagüez Campus, Chemistry Department, 1986 - 95

Chemistry Laboratory Professor, Interamerican University, San German Campus, 1990 – 95

Environmental Technician, University of Puerto Rico, Mayagüez Campus, 1985 – 95

Laboratory Technician, University of Puerto Rico, Mayagüez Campus, Chemistry Department, 1983 – 86

Other Duties:

President of the Radiation Safety Board, University of Puerto Rico, 2002 to present

Radiation Safety Officer, University of Puerto Rico, Mayagüez Campus, 1996 to present

Certifications, Seminars and Trainings

Occupational Medicine, Series V Seminars, Assessment of Respiratory Impairment and Disability, FCEC, March 2004

Salud Pública y Ambiente: Protección Contra el Terrorismo y los Desastres Naturales, Seminario AIDIS, April 2003

OSHA Occupational Exposure to Bloodborne Pathogens, February 2003

HAZMAT for RADIATION Certification, CRMI, January 2003

Conferencia de Salud y Seguridad y Salud Ocupacional, December 2002

Hazardous Waste Operations and Emergency Response, 8–Hour Refresher Course, ERM, August 2002

Medical Emergency Management, November 2002

OSHA 10 Hours Course on Chemical Process, August 2001

Hazardous Waste Operations and Emergency Response, 8 Hours Refresher Course, ENSCO, June 2001

Advanced Ergonomics Training, January 2001

Hazardous Waste Operations and Emergency Response, 8 Hours Refresher Course, June 2000

Ergonomics Course, November 2000

EPA/AHERA (TSCA Tittle II) Approved Accreditation and NESHAP's Regulation Training, October 2000

Ergonomics Principles Course, May 2000

Hazardous Waste Operations and Emergency Response, 8 Hours Refresher Course, June 1999

Transportation of Hazardous Materials, DOT Regulation, November 1998

Asbestos in Buildings: Inspection and Assessment, June 1998

Hazardous Waste Operations and Emergency Response, 8 Hours Refresher Course, June 1998

First Aid (BFA) and CPR Courses, June 1998
Industrial Hygiene for Safety Personnel, OSHA Institute, March 1998

Principles of Ergonomics, OSHA Institute, December 1997
Transportation of Hazardous Materials, DOT Regulation, June 1997

HAZWOPER Refresher Course, June 1996

NFPA Life Safety Code 5 Days Seminar, February 1996

Radiation Safety Officer Course, Wisconsin, October 1995

HAZWOPER Refresher Course, June 1995

Hazardous Waste Operations and Emergency Response, 8 Hours Refresher Course, June 1994

OSHA Standards and Training Requirements, PROSHACADEMY, March 1994

Portable Fire Extinguisher Training, December 1993

Environmental Pollution Seminar, April 1991

Asbestos Seminar, February 1991

Laboratory Standards and Hazard Communication Standard, November 1990

HAZWOPER Refresher Course, June 1990

Chemical Spill Responder Workshop, May 1989

Hazardous Materials handling, Monitoring and Safety Training Course, 40 hours, September 1988

RCRA Training, 24 hours Course, September 1988

Citizenship: Puerto Rico, USA

Professional Affiliations

American Industrial Hygiene Association

Puerto Rico Federal Safety and Health Council

AIDIS Puerto Rico

Damaris Santiago

Address: P.O. Box 6887
Mayagüez, Puerto Rico 00681

Phone: (787) 310 – 8832

E_Mail: dsantiago @ rumad.uprm.edu

Education: *M.S. in Pharmaceutical Sciences*,
University of Puerto Rico, Medical Sciences Campus,
School of Pharmacy

B.S. in Biology
University of Puerto Rico, Mayagüez Campus

Professional Experience:

Environmental Protection and Occupational Health Safety Specialist, University of Puerto Rico, Mayagüez Campus, Mayagüez, P.R., 2002 to present.

Radiation Safety Technician, University of Puerto Rico, Mayagüez Campus, Mayagüez, P.R., 1998 to 2002.

Research Assistant, University of Puerto Rico, Medical Science Campus, Rio Piedras, P.R., 1994 – 1998

Research Assistant, Texas A&M University, College Station, TX, 1994 – 1994

Research Assistant, Anabolic Steroids Laboratory, University of Puerto Rico, Medical Science Campus, Rio Piedras, P.R., 1993 – 1993

Other Duties:

Secretary of the Radiation Safety Board, University of Puerto Rico, 2002 to present

Secretary of the Radiation Safety Committee, University of Puerto Rico, Mayagüez Campus, 1999 to present

Secretary of Ergonomic Committee, University of Puerto Rico, Mayagüez Campus, 2000 to present

Certifications, Seminars and Trainings

- Hazmat for Radiation Certification, November 2004
- OSHA 2250: Principles of Ergonomics Applied to Work- Related Musculoskeletal and Nerve Disorders, June 2004
- Continuous Improvement Through Strategic Planning and Assessment, May 2004
- Hazardous Material Transportation, May 2003
- Hazardous Waste Management, December 2003
- OSHA Occupational Exposure to Bloodborne Pathogens, February 2003
- Hazardous Waste Operation and Emergency Response, 8 hrs refresher Course, November 2002
- 9th Health and Safety Conference, December 2002
- First Aid Response in Work Areas, 8 hrs, November 2002
- OSHA Ergonomics: A Compliance Update, September 2001
- Hazardous Waste Operation and Emergency Response, 8 hrs refresher Course, November 2001
- Advance Training in Ergonomics, January 2001
- CPR and First Aid, June 2001
- Advance Course in OSHA 2000, 8 hrs, November 2000
- Ergonomics: The Body Interaction with Equipments, April 2000
- Basic Concepts in Ergonomics, May 2000
- Radiation Safety Seminar, 3 Days, March 1999
- Hazardous Waste Operation and Emergency Response, 40 hrs Course, June 1999
- Occupational Exposition to Hazardous Chemical Substances in Laboratories, September 1999
- Chemical Agents Management, April and May 1996
- Biological Agents Managements, November 1995
- Basic Concepts in Biosafety, Procedures and Responsibilities Seminar, October 1995
- Biohazard Material Management Seminar, November 1995
- Medical Science Campus Radiation Safety Training, 30 hours course, May 1994
- Medical Science Campus Institutional Animal Care and Use Training, September 1993

Presentations

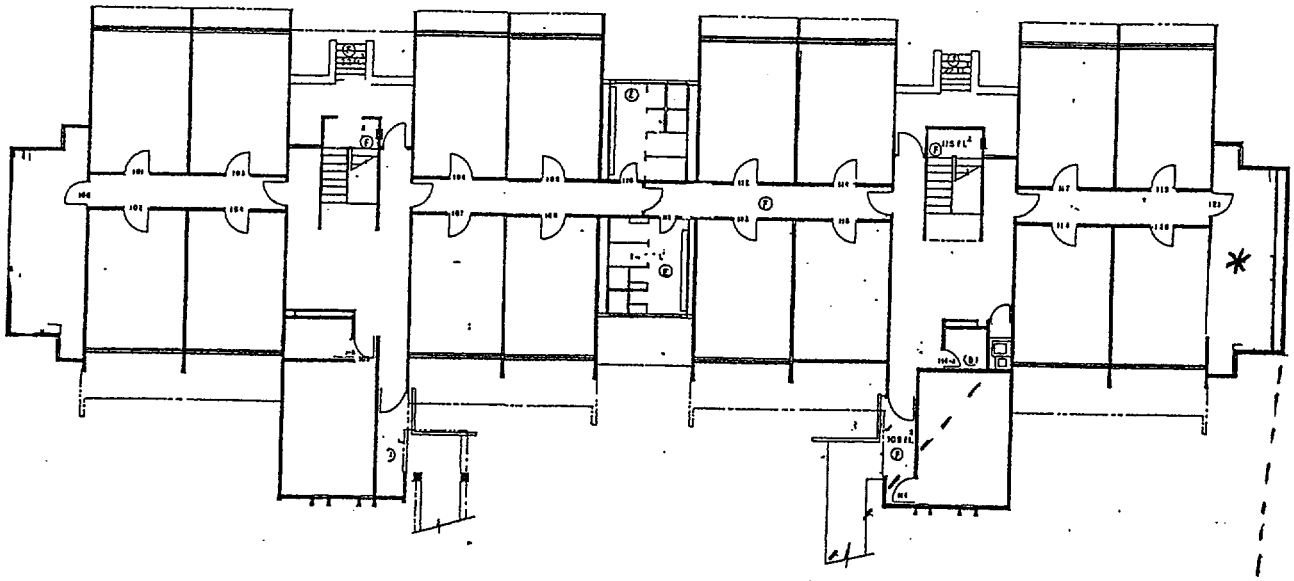
Poster Presentation in the Society of Toxicology Annual Convention, Cincinnati, March 1997

Honors and Awards

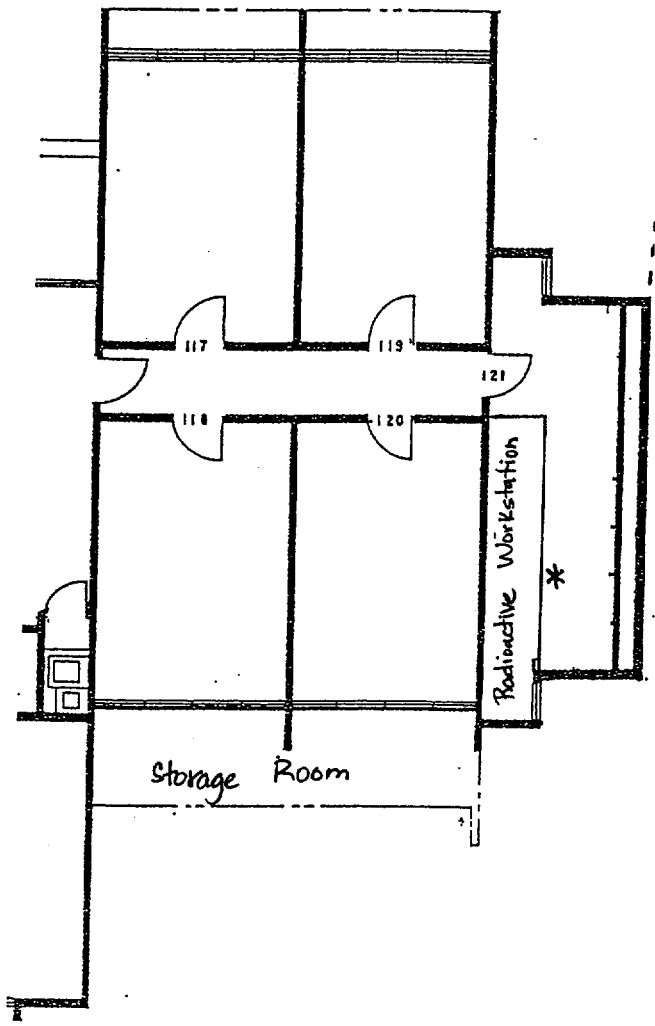
Aerospace Related Science Fellowship (1994-1998)
Beta Beta Beta Honor Society (1993)

Application for Material License Renewal
Appendix 2

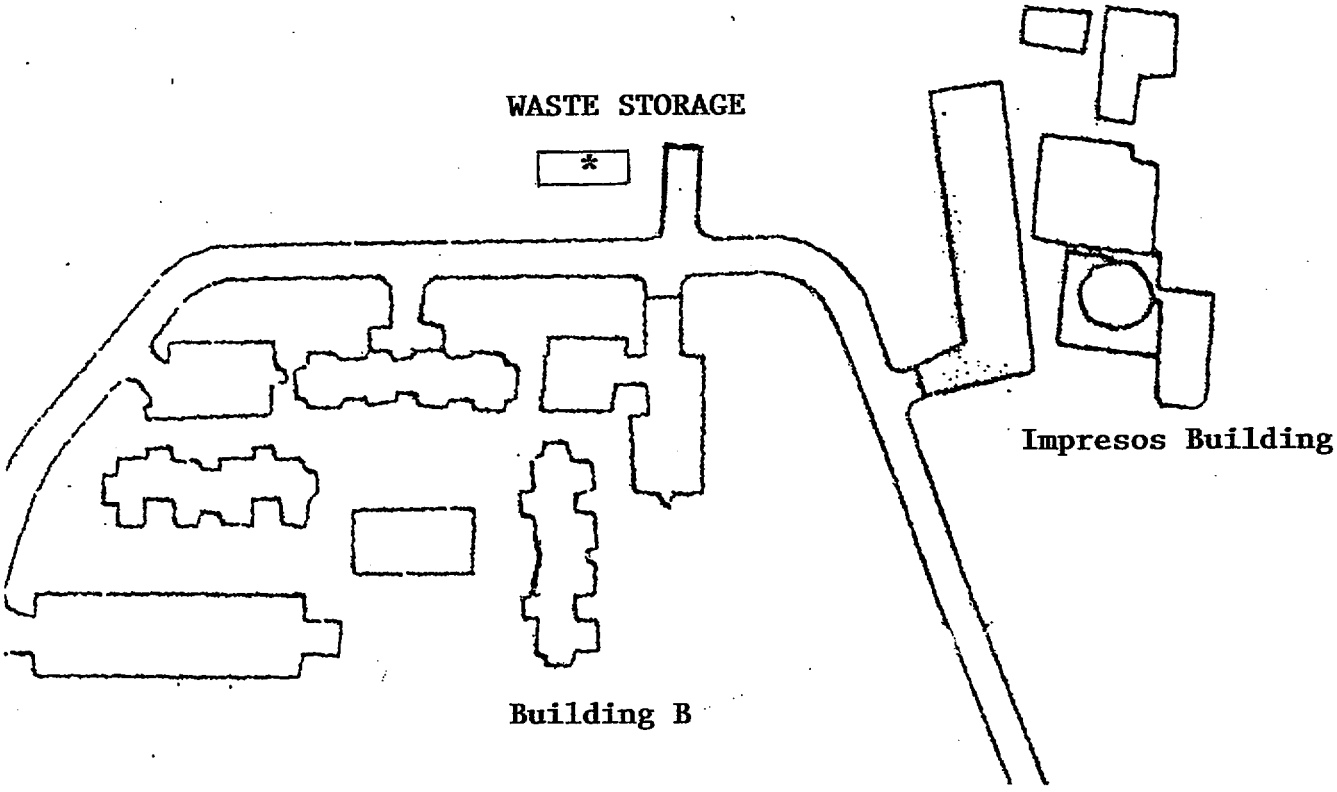
Building B
University of Puerto Rico- Mayagüez Campus



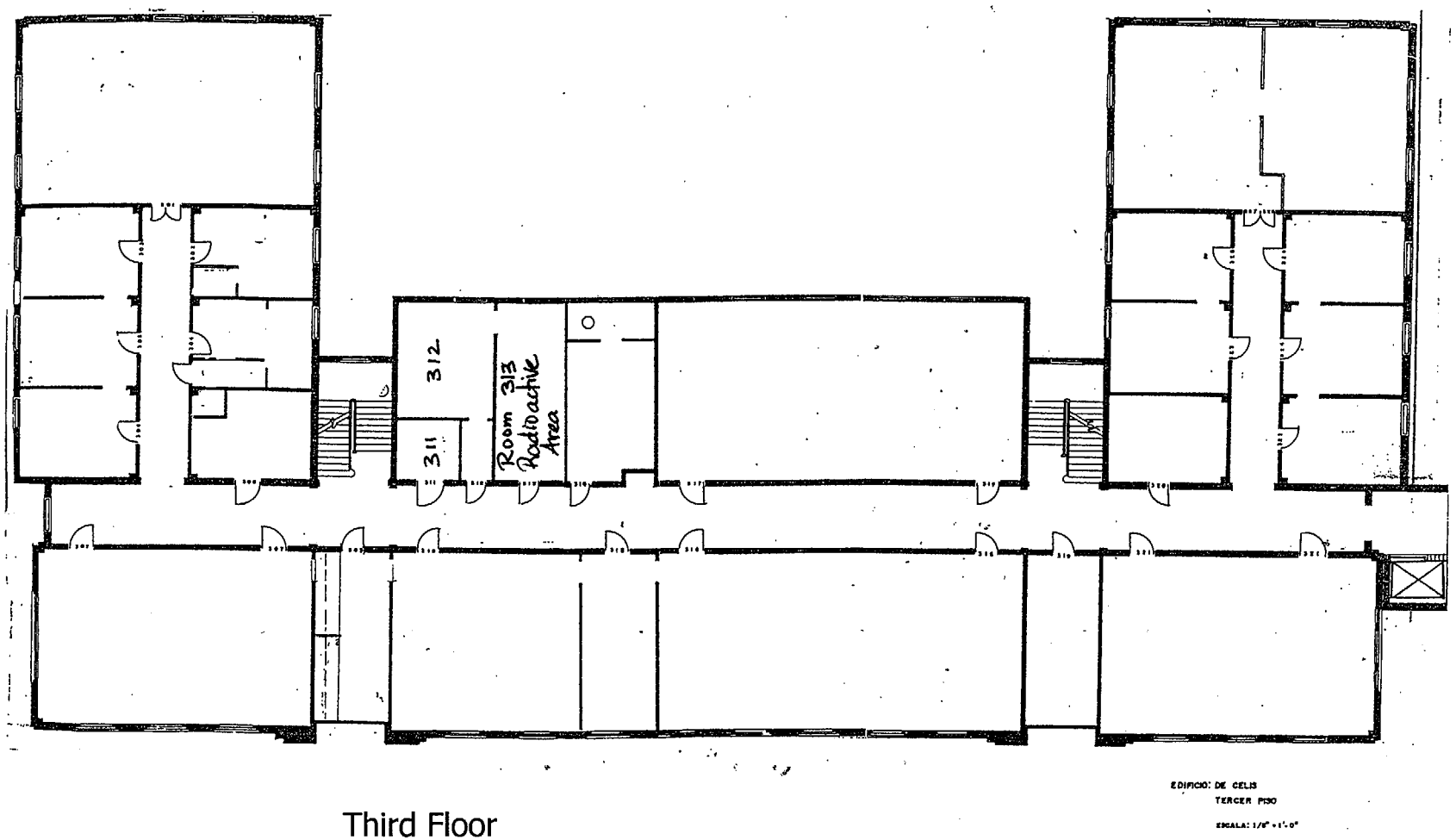
Building B First Floor
Health and Safety Offices 117-121
Radioactive Areas: Room 121 and
Storage Room



Hazardous and Radioactive Waste Storage
University of Puerto Rico- Mayagüez Campus

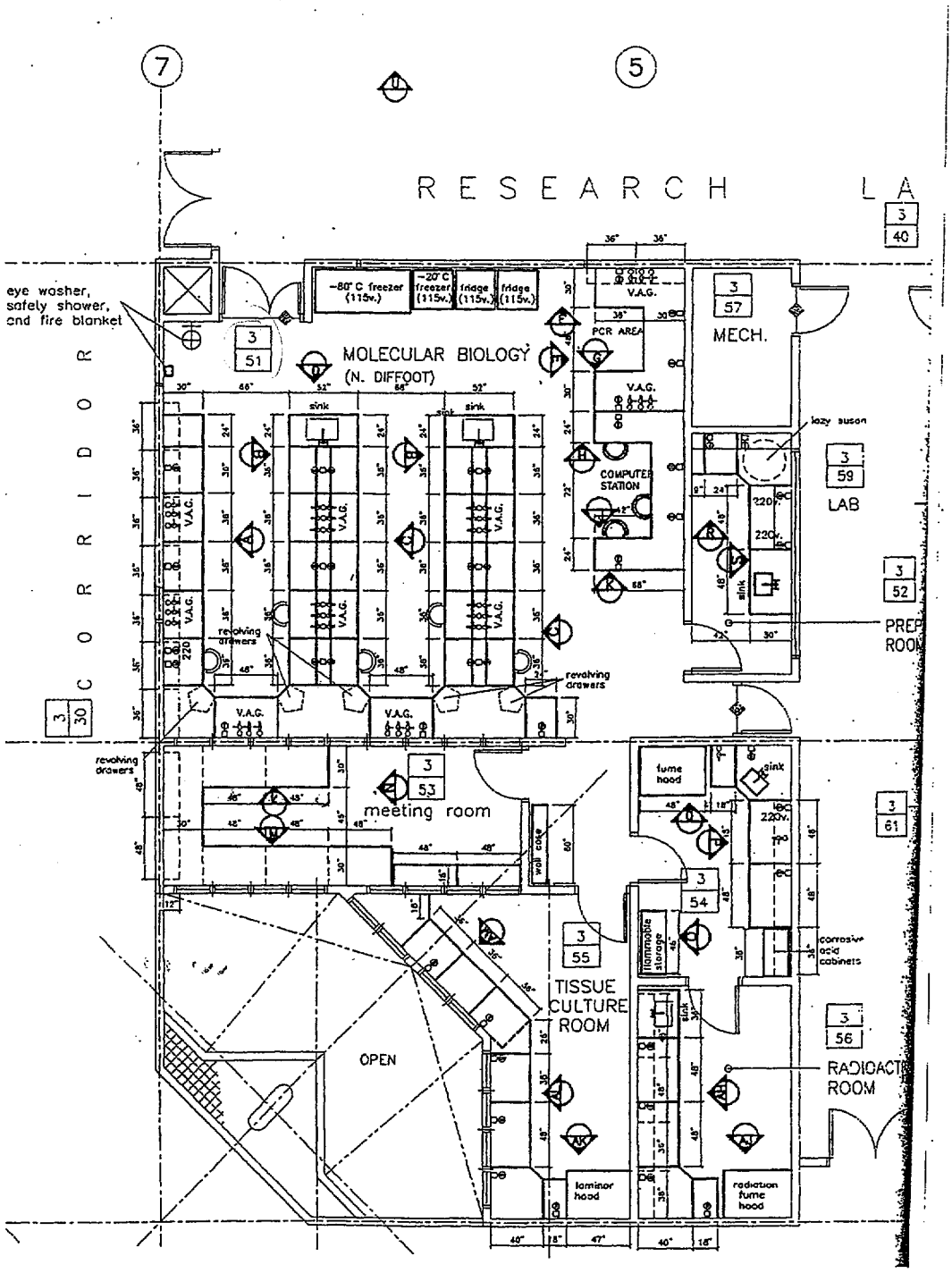


LUIS CELIS BUILDING
University of Puerto Rico- Mayagüez Campus



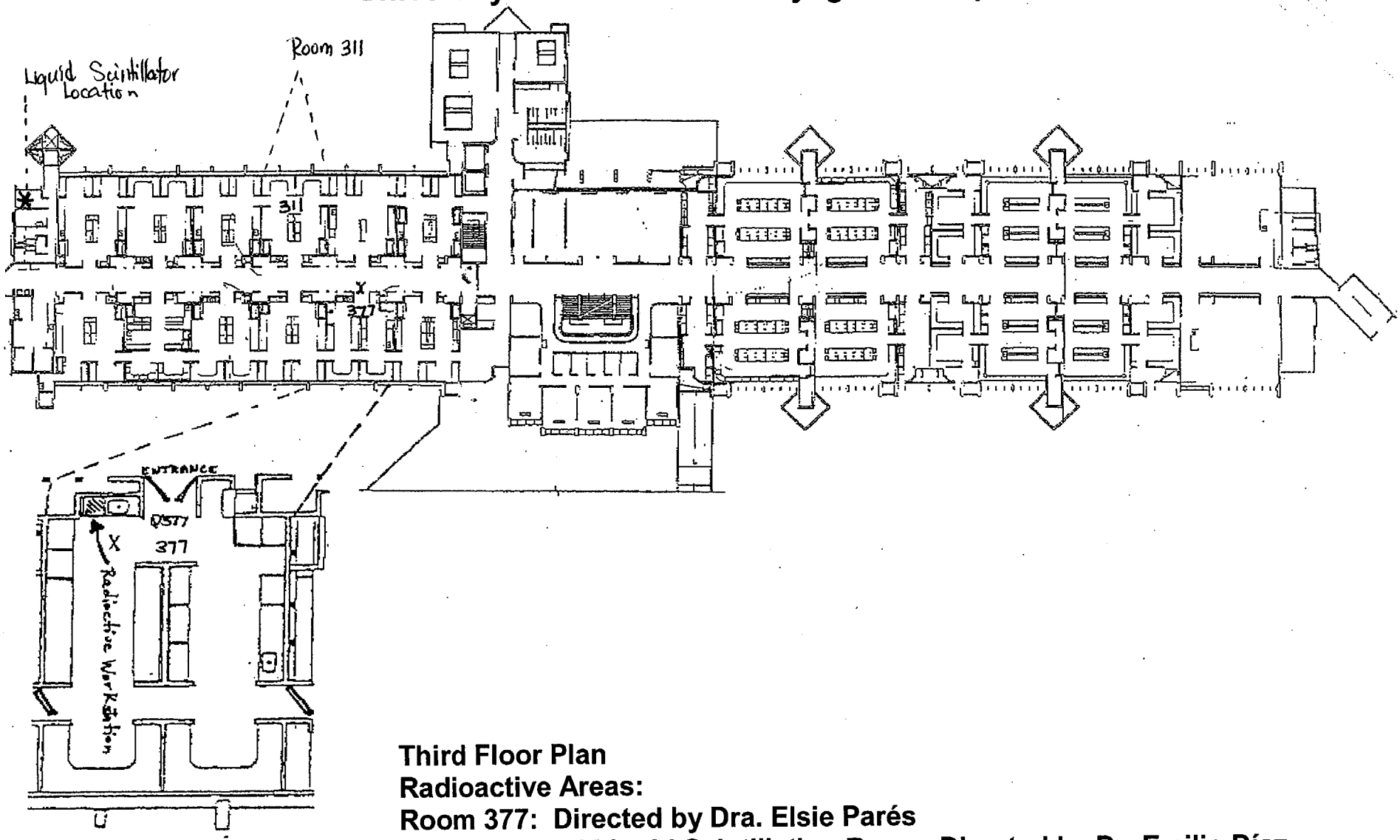
Third Floor
Molecular Biology Laboratory (Rooms 311-313)
Directed by: Dra. Nannette Diffoot
Radioactive Room: 313 (This laboratory will be transferred to the New Biology Building on May 2005)

NEW BIOLOGY BUILDING
University of Puerto Rico- Mayagüez Campus



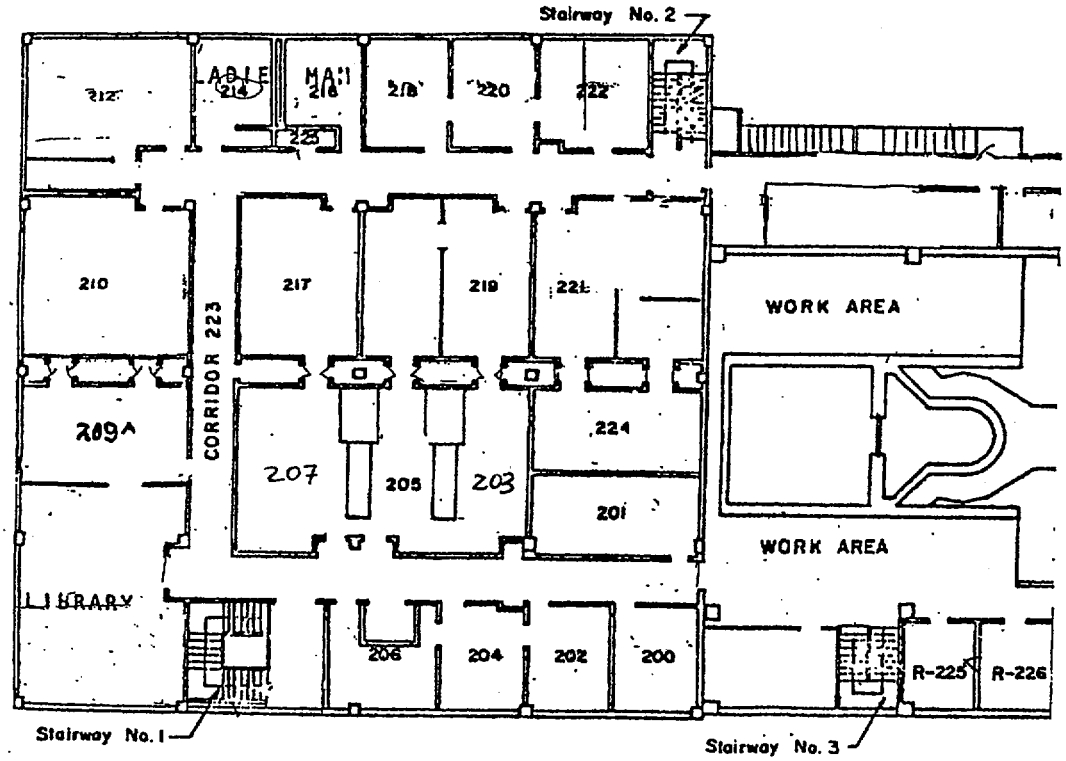
Molecular Biology Laboratory
Directed by Dr. Nannette Diffoot
Room 351
Radioactive Area: room 356

CHEMESTRY BUILDING
University of Puerto Rico- Mayagüez Campus



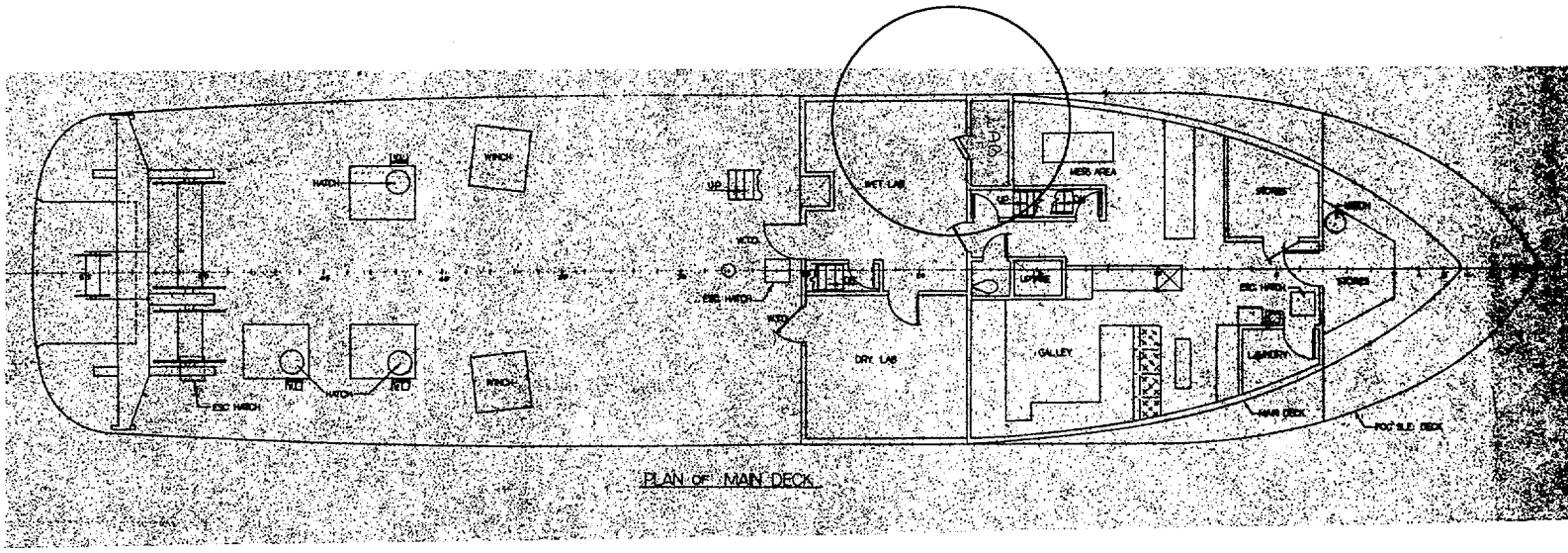
Third Floor Plan
Radioactive Areas:
Room 377: Directed by Dra. Elsie Parés
Room 311 and Liquid Scintillation Room: Directed by Dr. Emilio Díaz

RESEARCH AND DEVELOPMENT CENTER BUILDING



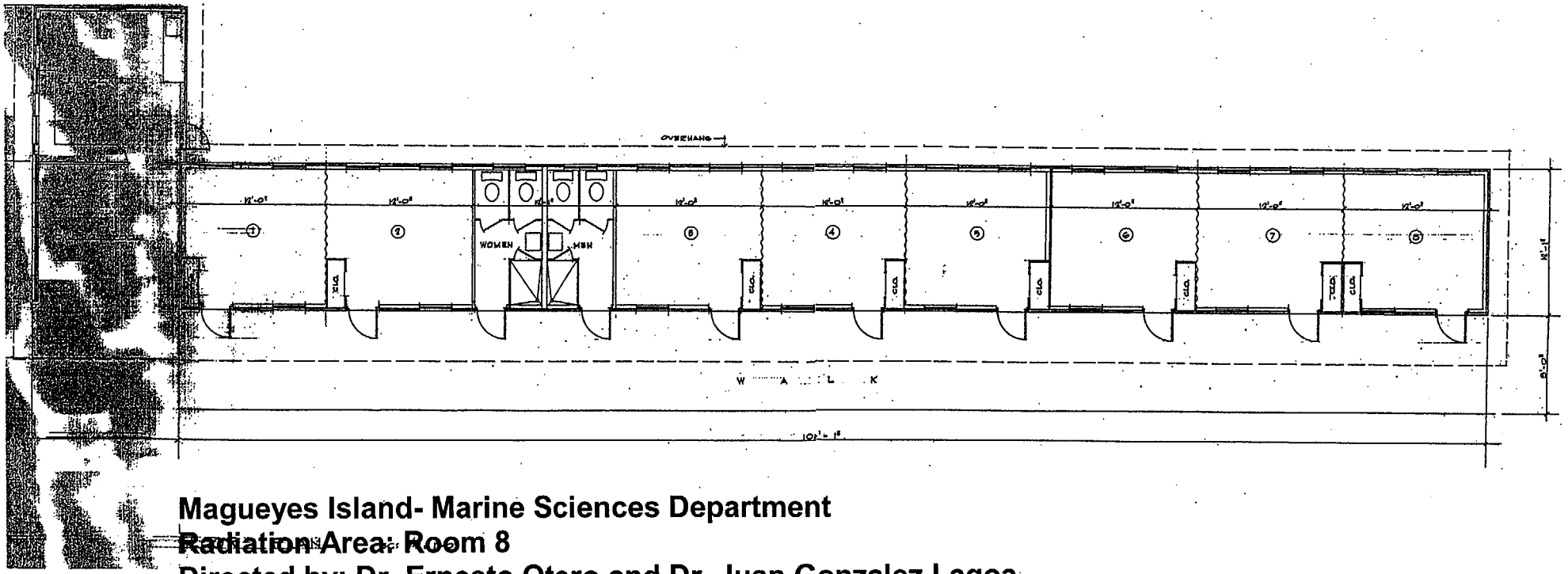
Second Floor
Marine Science Laboratory
Directed by Dr. Jose M. López
Radioactive Areas: Room 203, 205, and 207

RESEARCH VESSELL CHAPMAN



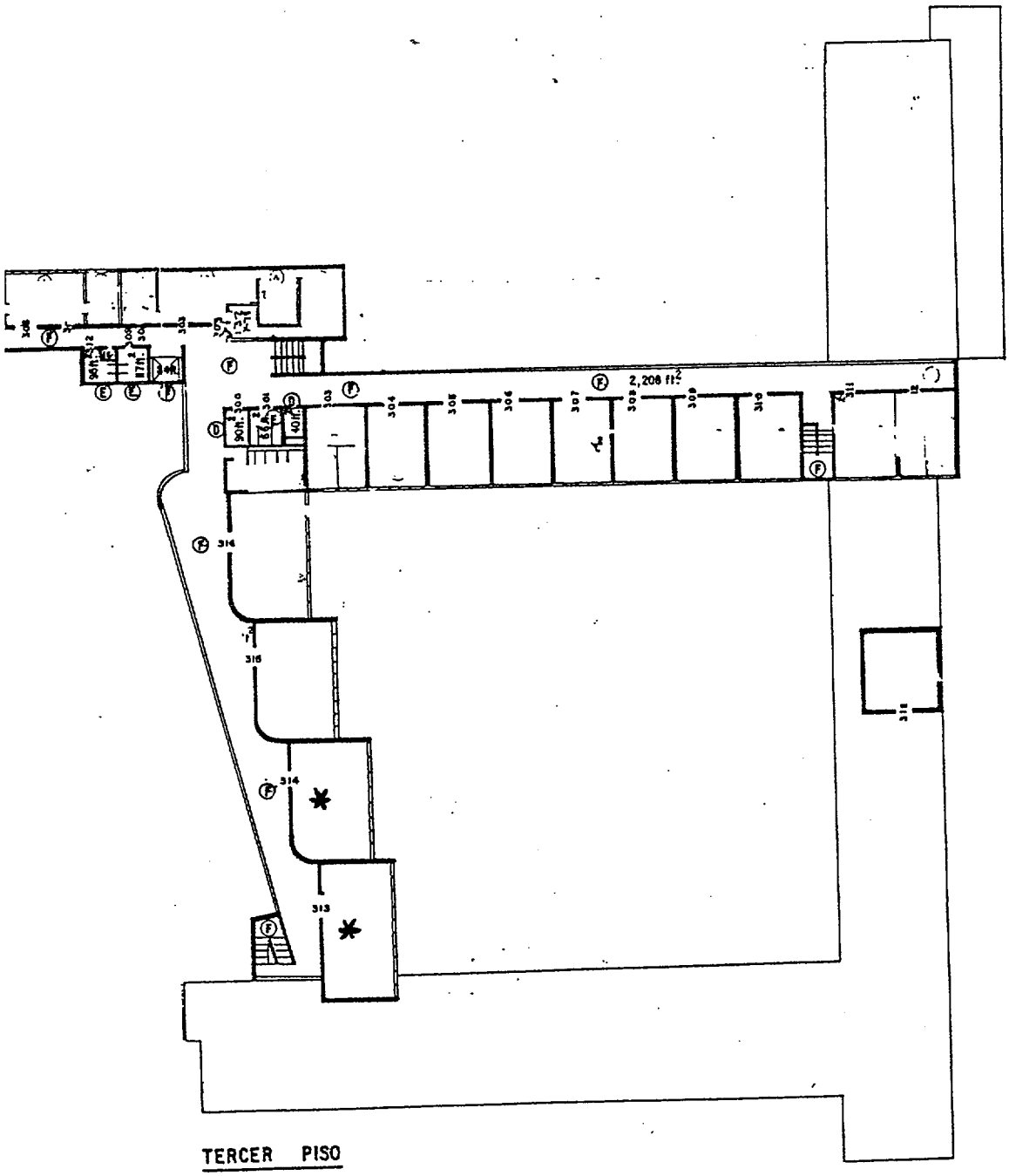
Main Deck
Directed by Marine Sciences Department
Users: Dr. Jose M. López and Dr. Ernesto Otero

OLD DORMITORIES BUILDING
University of Puerto Rico- Mayagüez Campus



Magueyes Island- Marine Sciences Department
Radiation Area: Room 8
Directed by: Dr. Ernesto Otero and Dr. Juan Gonzalez Lagoa

General Engineering Department
University of Puerto Rico- Mayagüez Campus



Third Floor Plan
Radiation Areas: Room 313-314
Directed by: Dr. Oswald Uwakweh
Mössbauer Spectroscopy

UNIVERSITY OF PUERTO RICO
MAYAGÜEZ CAMPUS

RADIATION SAFETY REGULATIONS MANUAL

January 2005

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AUTHORIZATION

THE RADIATION SAFETY REGULATIONS FOR THE UNIVERSITY OF PUERTO RICO, MAYAGÜEZ CAMPUS, ARE HEREBY APPROVED IN COMPLIANCE WITH THE CODE OF FEDERAL REGULATIONS TITLE 10 AND MADE OPERATIVE AS OF APRIL 1994.

1. INTRODUCTION

The University of Puerto Rico at Mayagüez {hereinafter called UPRM} is authorized by the Nuclear Regulatory Commission (NRC) to procure and use radioactive materials for research and academic purposes. The use of radioactive materials and sealed sources in UPRM requires establishing a Radiation Safety Program to protect the university environmental and population from contamination and radiation exposures. As part of the Radiation Safety Program, a Radiation Safety Manual has been prepared.

This Radiation Safety Manual establishes procedures governing the safe possession and handling of radioactive materials in UPRM. All the procedures contained in this manual are in compliance to the guidelines, standards and regulations contained in the Title 10 Code of Federal Regulations. The guidelines described in this manual constitute the minimum requirements for maintaining radiation safety inside the Campus. All personnel in possession of or handling radioactive material must conduct their operations in accordance with this manual in order to keep radiation exposure on Campus as low as reasonably achievable (ALARA).

2. SAFETY ORGANIZATION

The Chancellor of the UPRM has the ultimate responsibility and authority for all activities related to radiation safety. It is recognized that the radiation safety is a line of responsibility. The Chancellor will issue, under competent advice, regulations governing the use of radioactive materials within the areas controlled by the UPRM.

A Campus-wide Radiation Protection Organization will be developed by the UPRM, consisting of the Radiation Safety Officer (RSO) appointed by the Chancellor and the Radiation Safety Committee (hereinafter called Committee). The Chancellor has the responsibility of maintaining this organization with qualified personnel and in the compliance with the NRC and applicable local regulations.

2.1 Responsibilities of the RSO or his/her designee

a. Responsible for all matters related to the use of radioisotopes.
b. Responsible for conducting the Radiation Safety Program within the Campus.
c. Must have full authority to stop, without consultation, any procedure deemed unsafe.
d. Represents the Chancellor in all matters related to Radiation Safety.
e. Responsible to authorize new experiments and repetition of experiments previously approved by his/her.
f. Responsible to authorize to approve the purchase, transfer or use of instrument with sealed sources and other instruments that emits radiation.

2.2 Duties of the RSO or his/her designee

a. General surveillance of all activities pertaining radiation safety including acquisition and safe use of all radioactive and radiation sources.
b. Furnishing consultation services to personnel at all levels and all aspects of radiation protection.
c. Receipt radioactive materials arriving at the UPRM, not delivered to the Receiving Office.
d. Open, survey, supervise shipment or transference all radioactive materials.
e. Periodical inspection for adequate temporary waste storage. Coordinate the transfer of radioactive waste from laboratories to the UPRM Radioactive waste storage. Coordinate and supervise the waste disposal by specialized hazardous waste disposal company until the final destination.
f. Maintaining and operating a personnel and area monitoring service suitable for the radioactive materials being used, maintaining dose records, and issuing exposure record notices to the radiation workers.
g. Performing periodical surveys in all areas where radioisotopes are being used.
h. Maintaining an inventory of all radioactive materials under the UPRM control.
i. Maintaining all required records and forms.
j. Assuring that the leak test is performed on all sealed sources under the UPRM control twice a year.
k. Supervising decontamination procedures in cases of accidents involving radioactive contamination.
l. Notify individuals and the proper authorities whenever radiation exposure reaches reportable levels as prescribed in NRC regulations.
m. Coordinate or provide training courses for personnel.
n. Enforcing all NRC and applicable local regulations.
o. Referring to the Radiation Safety Committee matters requiring its review and approval.

2.3 Radiation Safety Committee

2.3.1 Scope
The Committee exists in order to assure that all operations and experiments involving the use of radioisotopes are properly reviewed so that they may be conducted in a safe manner.

2.3.2 Chairperson
The chairperson will be appointed by the chancellor. The chairperson will chair the meetings of the Committee and participate in any and all discussions, but will not vote on any issue before the Committee except in the event of a tied vote.

2.3.3. Secretary
The secretary of the Committee will be appointed by the chairperson and will not need to be a member of the Committee.

2.3.4 Membership
The Committee will be composed of a minimum of 4 (four) members and the RSO as an ex-officio member. Membership will be selected from different academic fields. The chairperson or his/her designee, with the approval of the Chancellor, will choose the members of the Committee.

2.3.5 Requirements
Each member will be required to have specific training and experience in the use of radioactive materials, keen interest in the business of the Committee, and be competent in his/her field.

2.3.6 Term

a. A new chairperson shall be appointed every three (3) years.
b. Two new members shall be appointed every two (2) years replacing the two members with longest tenure.
c. The Chancellor may change the term of the chairperson or of the members at his/her discretion or criteria.

2.3.7 Duties

a. Provide the RSO technical assistance whenever requested to do so.
b. Provide advice to the Chancellor on matters related to radiation safety.
c. Establish guidelines for the safe use of radioisotopes in accordance with the NRC regulations.
d. Review incidents related to the use of radioisotopes and propose corrective actions if necessary.
e. Revise the Radiation Safety Regulations, every five (5) years or prior to the application for the renewal of the NRC license(s).

2.3.8 Quorum and Requirements for Holding Meetings
More than half of the members of the Committee will be considered as quorum. The meetings are restricted to the participation of the secretary and members of the Committee, however, when necessary, other persons related to the items in the agenda may be invited. The Committee shall meet as frequently as the chairperson considers necessary, but no less than once every calendar year.

2.3.9 Reports
A report of the minutes of the meeting will be submitted to the Chancellor, as well as copy of all documents, i.e., reports, procedures, etc., evaluated, revised, or reviewed in the Committee meetings. A copy of these documents will be kept by the secretary of the Committee.

3. Required Qualifications of Users

All potential radioisotope users will take a written or verbal examination issued by a qualified personnel assigned by the RSO. At the discretion of the examination person, the potential users will be required additional training using audiovisual aids or other training materials if considered necessary. After completion of this exam, a written permit, valid for a specified period of time, isotope, amounts and procedures indicated in the application for the use of radioisotopes, will be issued.

3.1 The supervisory personnel
The supervisory personnel that is, the authorized user or principal investigator, must posses a College degree at baccalaureate level, or equivalent training experience in the Physical or Biological sciences or Engineering.

(a) At least 40 hours of training and experience in:
    1. Safe handling of radioisotopes.
    2. Characteristics of ionizing radiation.
    3. Units of radiation dose and quantities.
    4. Radiation detection instrumentation.
    5. Biological hazards of exposure to radiation in special form (sealed sources) or the type and form of the radioactive materials that the person will use. If formal training courses have been taken, evidence such as certification or diplomas must be submitted to the RSO.

3.2 Students
Students in the courses requiring the usage of radioisotopes will be under constant supervision of qualified personnel and will be required to have received at least six hours of training in subjects described in appendix A, before they will be permitted to use radioactive material.

4. Responsibilities of users

4.1 Individual Employees Using Radioisotopes
Each employee is responsible for following safety regulations that include, but are not limited to:

a. Use of radioisotopes in such manner as to minimize all chance of undue radiation exposure or injury.
b. Whenever required by the RSO, to wear appropriate monitoring device such as film badge dosimeter, which will be left in the working area in a secure place provided for that purpose.
c. Proper labeling of radioactive material and equipment.
d. Maintenance of the working areas where isotopes are being used neat and clean.

e. Refraining from smoking, drinking, eating, and using cosmetics or contact lenses in any place where radioisotopes are being used.
f. Never, under any circumstances, pipetting any radioactive solution by mouth.
g. Wearing clothing appropriate to the task being performed and protective devices whenever required.
h. The custody of the radioactive materials in his possession. These materials will not be loaned, given away, or otherwise transferred without prior approval by the RSO.
i. Reporting promptly to the supervisor and the RSO any unusual occurrences or events involving radioactive materials.
j. Taking prompt action to prevent the spread of any released or spilled radioactive materials.
k. Carrying out decontamination procedures under the direction of a competent authority approved by the RSO.
l. Never, under any circumstance, will he/she work with radioactive solution while having an exposed wound.
m. In the case of female personnel in pregnancy, it is necessary to notify immediately the supervisor and the RSO, who proceed to inform her about the prenatal radiation exposure regulations, contained in 10 CFR 20.1208 and provide a form letter for declaring pregnancy. The supervisor and the RSO will determine if is required a change in job or job responsibilities during the pregnancy to meet the lower dose limit.
n. Prior to separation, all working areas will be left in a clean, safe, and neat condition.
o. Making use of those techniques that will prevent a spill or other accident.
p. Practicing good waste minimization techniques.

4.2 Supervisory Personnel

Supervisory personnel will insure that individuals under their supervision handle radioactive materials in a safe manner and shall further be responsible for at least:

a. Adequate planning of procedure and experiments involving the use of radioactive materials.
b. Notifying the RSO at least four weeks in advance of any new experiment or procedures involving the use of radioactive materials and providing the information required in the RSO FORM-001, making them available in case the Committee needs additional information related to their proposals.
c. Requesting the issuance of film badges or any other monitoring device required for new radioisotope users under their supervision, and notifying the RSO within two weeks prior to the user's departure.
d. Procuring, using and disposing of radioactive materials in accordance with these regulations.
e. Notifying the RSO of any accidents involving radioactive materials within their supervision.
f. Obtaining clearance from the RSO before any equipment that may be contaminated is taken away from the working area for cleaning, repair or modification, to surplus, or to ultimate disposal.

g. Obtaining approval from the RSO for the procurement of radioactive materials.
h. Notifying the RSO before any service or maintenance work is done on plumbing, ventilation, or other components the areas where radioactive materials have been used.
i. Instructing personnel for whom they are responsible in the techniques necessary to maximize safety.

4.3 Other Personnel

4.3.1 Purchasing Department Personnel

The purchasing Department has the responsibility to:

a. Withhold processing of all requisitions or other procurement documents related to the acquisition of radioactive materials by the UPRM personnel unless the acquisition is approved by the RSO.
b. Call the RSO or his/her designee in case of any doubts about the radioactivity of any item to be acquired by members of the UPRM.

4.3.2 Property Office Personnel

The Property Office has the responsibility to:

a. Deliver all radioactive materials, equipment, etc., purchased or acquired by members of the UPRM's staff to the RSO.
b. Notify the RSO of the arrival of all radioactive materials at the UPRM. Any package bearing "Radioactive" warning labels will not be delivered, nor opened by any person but the RSO.

APPENDIXES

THE FOLLOWING APPENDIXES ARE AN INTEGRAL PART OF THESE REGULATIONS.

APPENDIX A: Training requirement for Workers in Restricted Areas

Previous experience of radiation workers will determine of the content of the training course and the duration of it.

A.1 Support personnel

A.1.1 Course and Training Topics of:
- a) Fundamentals of Radiation
  - (1) The Radiation Symbol
  - (2) What is Radiation?
  - (3) Why is radiation a health hazard?

A.1.2 Exposure and Contamination
- a) Precautions against exposure: time, distance and shielding
- b) External contamination and procedure for area decontamination.
- c) Personnel monitoring devices.

A.1.3 Radiation Protection Standards
- a) The exposure report and what it means.
- b) Maximum permissible levels.
- c) Restrictions (pregnancy, etc.)

A.1.4 Radiation Protection
- a) Protective clothes.
- b) Safe working habits.

A.1.5 Radioactive Waste Disposal
- a) Solid waste.
- b) Liquid waste.

A.2 Technicians, Students, Supervisory Personnel and other similar personnel

A.2.1 Course and Training Topics of:
- a) Fundamentals of radiation
  - (1) What is radiation?
  - (2) Types of radiation.
  - (3) Why is radiation a health hazard?
  - (4) Radiation units.

A.2.2 External exposure
- a) Whole body irradiation.
- b) Sources in normal form and special form.
- c) Precautions against external exposures: time, distance and shielding.

A.2.3 Internal exposure
a) Entry to the body: inhalation, ingestion, skin absorption.

A.2.4 Contamination and decontamination
a) External contamination.
b) Internal contamination.
c) Decontamination procedures.

A.2.5 Radiation Protection Standards
a) Personnel monitoring devices.
b) The exposure report and what it means.
c) Maximum permissible levels.
d) Restrictions (pregnancy, etc.)

A.2.6 Instruments in radiation protection
a) Survey meters.
b) Monitors.

A.2.7 Radiation Protection methods
a) Protective clothing.
b) Safe working habits.
c) Respirators.

A.2.8 Radioactive waste disposal
a) Containers
b) Solid wastes
c) Liquid wastes

A.2.9 Emergency procedures

A.2.10 Health protection forms

A.3 Maintenance of Records

A.3.1 All records on matters pertaining radiation safety workers will be kept in the Radiation Safety Office.

APPENDIX B: Control of Radiation Sources

B.1 Acquisition and Use of Radioactive Materials

The following procedure is to be followed in the acquisition and use of radioactive material. In developing these procedures every attempt has been made to achieve simplicity, while at the same time complying with all applicable regulations and requirements of radiation safety.

B.2 Authorization of Experiments and Operations

B.2.1 All experiments and operations involving the use of radioisotopes within the UPRM will have a prior written approval from the RSO.

B.2.2 All experiments proposed will be submitted to the RSO using the RSO FORM-001 within no less than four weeks prior to the expectant starting date of the experiment.

B.2.3 The RSO will review all proposals as soon as possible and will notify the results to the requisitioner using the space provided in the form.

B.2.4 The requisitioner is responsible for providing the RSO all the information, related to the experiment being revised which the RSO considers necessary for a better evaluation of it.

B.2.5 The criteria outlined in the "Guidelines for Bioassay Requirements for Tritium" issued by the NRC will be used to determined the need to perform bioassays in case a project involving Tritium, in amounts above those specified on table 1 of the quoted guideline, is proposed and approved.

B.3 Purchasing of Radioactive Material from Outside the UPRM

B.3.1 Only those individuals who have been approved by the RSO are permitted to acquire, by whatever means, radioactive material from outside the UPRM. An application for permit for procurement is initiated by submitting two copies of RSO FORM-001 to the RSO. If the application is approved, the RSO will return one copy of it bearing an approval number.

B.3.2 The RSO will make inventory checks at least once a year in order to determine he condition of the isotopes in stock, the activities remaining, the amount used, and the amount disposed off as waste. It is recognized that a high accuracy cannot be achieved on some items. However, each custodian is responsible for making the best estimates (using RSO-FORM 004) in cases where exact figures are not available.

B.4 Radioactive Waste Disposal

Each radionuclide decays at its own characteristic rate and nothing that man can do will change this rate. For this reason, strict regulations govern the disposal of radioactive materials. Each user, under the supervision and approval of the RSO, is responsible for the disposal of the radioactive waste generated as a result of activities under his/her supervision. The following simplified regulations will apply to all users:

B.4.1 No person shall discharge any radioactive waste into the city sewage system without that approval of the RSO.

B.4.2 Under no circumstances shall radioactive material be discharged into regular waste containers or other containers that can cause contamination of regular trash (garbage).

B.4.3 Each user will be sure that there is a container for radioactive waste, properly identified as Radioactive Waste, laboratory number, isotope, final date, and estimated activity. If there is no such container, the supervisor of the area is responsible for acquiring it, under the advice and approval of the RSO.

B.4.4 Radioactive material will be handled over surfaces covered with absorbent paper or any other material that absorbs spills and can be easily disposed off.

B.4.5 Radioactive waste will be kept to the minimum volume technically possible.

B.4.6 Each user will acquire, under the advice and approval of the RSO, a container for radioactive liquid waste, and the use it in the appropriate way. These containers will be temporary stored in a secured and appropriate area inside the laboratory. Full containers will be transferred to the UPRM hazardous waste storage area. The user must contact the RSO or his/her designee to coordinate the transfer.

B.4.7 The user must make a good estimate of the radioactive material deposited in the waste containers. The isotope, date and approximate activity of the wastes must be recorded in the RSO-FORM 004.

B.4.8 The user must have constant surveillance and control of radioactive waste.

B.4.9 No mixed waste are allowed.

B.4.10 All UPRM Radioactive waste shall be stored temporary in a secured and appropriate area controlled by the RSO. It shall be moved from that area by a specialized hazardous waste disposal company under the supervision of the RSO or his/her designee.

B.4.11 The RSO must be notified promptly if there has been any accidental violation of any of these regulations in this or any section of the Radiation Safety Regulation Manual.

B.4.12 All the waste in UPRM will be store temporary and disposed as follows:

(1) Liquids:

a) All the liquid waste generated in the laboratory will be carefully poured in an approved container. Five gallon container is recommended. The user must keep a good record of the waste (quantity and estimated activity) added to the container (RSO Form-004). Adequate container labeling is required.
b) The user will contact the RSO or his/her designee once the container is full. The container will be transferred to the waste storage area by the RSO or his/her designee.
c) Liquid waste of radioactive materials with half life of 120 days or less will be transferred to the UPRM Waste Storage for decay. Liquid waste of radioactive materials with half life of more than 120 days will be transferred UPRM Waste Storage disposed through a contracted radioactive waste disposal services broker.
c) The RSO or her/his designee will analyze an aliquot of the container in order to determine the activity and keep a record of transferred containers.

(2) Solids:
a) Absorbent paper, pipette tips, or any other solid contaminated with radioactive material will be considered solid waste. Animal carcasses will not be considered as solid waste.
b) Solid wastes must contain no more than droplets amounts of liquids.
c) Contaminated sharp objects must be placed in sharp containers. Other solid waste can be placed in a lined pail. Once full, the pail liner will be sealed to be transferred to the waste storage.
d) No radioactive waste will be disposed of by burial within Puerto Rico.
e) Radioactive solid wastes with half life of 120 days or less will be stored for decay.

(3) Gases:
a) No radioisotopes in gaseous form will be purchased or used with in UPRM property.

APPENDIX C: Radioactive Materials Handling

No exposure guide or permissible dose should be considered as allowable outer limit which can be approached with complete safety. Every practical effort must be made to keep exposures as far below the guidelines consistent with the program efficiency and economy. The RSO and the Radiation Safety Committee will determine the laboratory areas in which certain operations can be carried out and will assist in planning procedures that will minimize personnel exposures.

C.1 Designation of Areas

NRC regulations carefully define certain areas with respect to radiation sources. Each area must be conspicuously posted (as established in 10 CFR 20.203) with a sign or signs in English and/or Spanish bearing the appropriate words.

C.1.1 An **unrestricted area** is an area into which access is not controlled for the purpose of protecting individuals from radiation exposure.

C.1.2 A **restricted area** is an area into which access is controlled for the purpose of protecting individuals from radiation exposure.

C.1.3 A **radiation area** is any area where an individual could receive on to major portion of his body a dose greater than 5 mrems in one hour at 30 centimeters from the source or 100 mrems in five consecutive days.

C.1.4 A **high radiation area** is any area where an individual could receive, on to a major portion of his body, a dose greater than 100 mrems in one hour 30 centimeters from the source or from any surface through which the ionizing radiation penetrates. Areas at licensee facilities must be posted as "high radiation areas" and access into these areas is maintained under strict control.

C.1.5 Areas where licensed material is stored and which contains any radioactive material exceeding 10 times the quantity of such material specified in 10 CFR part 20, APPENDIX C will be conspicuously posted with signs bearing the radiation caution symbol and words in English and/or Spanish.

C.2 Radiation Symbol

a) Cross-hatched area is to be magenta or purple.
b) Background is to be yellow.
c) Words added shall be black.

C.3 Laboratory Practice

Some of the most important requirements for laboratory practice are given below. The RSO and/or the Radiation safety Committee will review special cases and will supply detailed information upon request:

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Some of the most important requirements for laboratory practice are given below. The RSO and/or the Radiation safety Committee will review special cases and will supply detailed information upon request:

C.3.1 Containers in which radioactive material will be stored or transported will be appropriately marked. Each label or decal will identify the nuclide, specify the activity within the container, the date of the activity estimate, and the initials of the responsible custodian. This labeling will not be required for laboratory containers such as beakers and flasks being used in laboratory procedures during in presence of the user.

C.3.2 Stock solutions or sources in use may be kept in a laboratory area, bearing appropriate labels, inside sufficient shielding to reduce the dose rate at the closest point outside the shield to 1 mR/hr. The shield should be posted as a "Radiation Area" or a "High Radiation Area", as appropriate, even though a major portion of the body may not be exposed inside the shield.

C.3.3 Laboratory procedures involving radioactive materials will be taken out inside hoods as far as is appropriate.

C.3.4 When the appropriate protective devices such as trays, glass plates, or absorbent paper will be used in order to prevent contamination of permanent building structures such as bench tops, hoods and floors. Absorbent paper should be discarded frequently to prevent dusting off spills that have dried.

C.3.5 Each user of radioactive nuclides will make periodic surveys of working areas to search contamination.

C.3.6 Equipment used with radioactive nuclides will not be released or handled by other workers, sent to a shop for repairs or modifications, and will not be discarded until it is demonstrated by the RSO that it is free of contamination. Repairs or modifications that must be made of contaminated equipment will be done under the supervision of the RSO or his/her designee.

C.3.7 No maintenance work or repair will be made on laboratory sink traps, or waste lines, hood ducts, exhaust systems, or vacuum lines until the areas involved have been cleared by the RSO.

C.3.8 Protective clothing such as gloves and laboratory coats will be worn when working with radioactive materials. These should not be worn outside the working area.

C.3.9 Mechanical pipette-filling devices will always be used at all times with radioactive solutions. Pipetting by mouth is prohibited.

C.3.10 Smoking, eating, drinking, use of cosmetics and contact lenses is forbidden in areas where radioactive materials are used.

C.3.11 Liquid radioactive waste will not be put into the regular laboratory sewage system unless they are known to conform to the requirements specified by the NRC.

C.4 Decontamination Practice

C.4.1 Equipment decontamination

Contaminated equipment must be set aside and discontinued its use until a decision has been reached regarding its status. If said equipment is to be discarded, it will be considered radioactive waste and will be turned over to the RSO for proper disposal. The RSO will assist to store or decontaminate the equipment if it is set aside for decay or for decontamination .It is usually advantageous to start contamination procedures promptly. Delay frequently fixes the contaminants more firmly into surfaces. During decontamination procedures protective gloves shall always worn, supplemented by protective clothing if it is indicated. In general, users can choose the most effective decontamination procedure upon the knowledge of the contaminants. The RSO will provide advice, materials and assistance, and will supervise disposal of the cleaning material.

APPENDIX D: Methods and Frequency of Surveys

D.1 Direct Survey

The direct survey consist of measurements of non-removable contamination and external alpha, beta, and gamma radiation levels. Working surfaces, in the laboratories where radioisotopes in the liquid form are being used, will be scanned using appropriate survey meters. The direct survey will be carried out using a calibrated survey meter sufficiently sensitive to detect 0.1 mR/hr.

D.2 Survey of Removable Contamination

Standard smears techniques, i.e., wiping a surface of 100 square centimeters with a filter paper, using moderate pressure and then counting the activity of the filter paper in an appropriate instrument, will be used in the survey for removable contamination.

A permanent record of surveys result, using the following forms, will be maintained.

Forms: HEALTH PHYSICS ASSAY REPORT
HEALTH PHYSICS MONITORING REPORT

The smears will be counted in a gas-flow proportional counter when looking for high energy beta, gamma or alpha emitters. A liquid scintillation counter will be used for counting the smears taken in those areas where C-14, H-3, P-32 and other low beta emitters are used.

D.3 Frequency of Surveys

Laboratory areas where only smalls quantities of radioactive material are used (less than 100 microcuries) will be surveyed at least once in a month by the user. All other laboratory areas will be surveyed at least once in a week. Each time the radioactive material is used, a survey is required in order to detect any surface contamination. A record of these surveys will be required.

D.4 Acceptable Limits

D.4.1 Radiation Levels

Good practices and monitoring will be performed in order to keep radiation exposures as low as reasonably achievable and within the guidelines provided in 10 CFR Part 20.1201, will be followed at the UPRM.

1) The occupational dose annual limit of a total effective dose equivalent being equal to 5 rems or the sum of the deep-dose equivalent and the committed

dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems.

2) The annual limits to the lens of the eye, to the skin of the whole body, and to the skin of the extremities, which are the lens dose equivalent of 15 rems, and a shallow-dose equivalent of 50 rem to the skin of the whole body or to the skin of any extremity.

D.4.2 Contamination Limits

1) Specific cleanup is required in any area where a wipe test shows 200 dpm per 100 square centimeters for alpha radiation in posted radioactive material zones.

2) Specific cleanup is required in any area where a wipe test equals to three times background or exceed 1000 dpm per 100 square centimeters (which ever is less) for beta and gamma radiation in posted radioactive materials zones.

3) Outside posted radioactive zones, cleanup is required when a wipe test shows 20 dpm per square centimeter for alpha emitters and 200 square centimeters for beta and gamma radiation

4) Each user is responsible for carrying out decontamination procedures under the supervision of the RSO or his/her designee.

D.5 Leak Test to Sealed Sources

D.5.1 Scope

To detect any radioactive material that can pass through a leak hole and be deposited on the outer surfaces of sealed sources.

D.5.2 Procedure

1) Take all necessary precautions to minimize exposure of the person performing the test.
2) Wipe thoroughly (no attempt will be made to scrub) all accessible surface of the source using a piece of filter paper, a cotton medical applicator or other suitable material of high absorptive capacity. The material could be wet but not necessarily.
3) Count the activity in an appropriate instrument capable of detecting .005 microcuries of contamination.

D.5.3 Frequency of test

Every six months.

APPENDIX E: Instruments

E.1 Calibration Frequency

E.1.1 Instrument for survey

a) Instrument for survey will be sent for calibration annually to an NRC approved site.
b) All instruments will be calibrated after repair and whenever abnormal readings are noticed.

E.1.2 Monitoring Instruments

a) The current radiation usage at the UPRM does not require the use of monitoring instruments.

E.1.3 Measuring Instruments

a) All measuring instruments have to be calibrated according to the manufacturer specifications.

APPENDIX F: Emergency Procedures

F.1 Radioactive Materials Spills

This plan has been prepared in order to advise individuals working with radioactive materials on the proper way to respond to emergencies involving spills of radioisotopes, and prevent the spread of the contamination to other areas.

F.1.1 **Minor Spills** (100 microcuries or less for low beta and gamma emitters or 50 microcuries or less for high beta emitters)

a) Notify all the persons in the immediate area at once.
b) If the spill is liquid and your hands are protected, raise the container upright, if your hands are not protected, use a remote handling device.
c) Cover the spill with absorbent paper.
d) Limit access to the area to those persons necessary to deal with the spill.
e) Survey personnel in the area for possible contamination and decontaminate when necessary.
f) Notify the RSO or the Chairperson of the Committee. See the Emergency Procedure posted in the laboratory.
g) Make a written report to the RSO explaining the incident and the action taken.

F.1.2 **Major Spills** (more than 100 microcuries for low beta and gamma emitters or more than 50 microcuries for high beta emitters)

a) Notify all persons not involved in the spill to vacate the room at once. Limit the movement of persons to confine the spread of contamination.
b) If the spill is liquid and your hands are protected rise the container upright, if your hands are not protected, use a remote handling device.
c) Cover the spill with absorbent paper.
d) Turn off all fans.
e) Vacate the room, if possible.
f) Notify or have someone notify the RSO.
g) If the spill is on skin, flush thoroughly.
h) If the spill is on clothing, discard outer or protective clothing at once.
i) Monitor all the persons involved in the spill and initiate decontamination procedures as necessary.
j) Contaminated areas shall not be occupied and contaminated personnel shall not be released until clearance by the RSO is granted.
k) Make a written report to the RSO with the complete history of incident and the action taken.

F.2 Personnel Contamination

Any contaminant event must be considered a situation requiring prompt attention. Whenever there has been any personal contamination, the RSO or his/her designee should be called at once to assist in the decontamination. When large areas of the body are involved, showering may be required. Without waiting for the RSO assistance to arrive, start washing procedures at once. Locate the area of contamination; use a survey meter if appropriate. Wash thoroughly using any available soap or detergent. Washing should be vigorous but care should be taken not to injure the skin by harsh treatment. A soft bristle brush may be effective. Recheck at intervals to verify residual contamination. If progress is being made, the washings should be repeated again and again. If progress is minor, call the RSO and follow his/her instructions; a chelating agent such as EDTA (versene) may be used in place of soap.

Decontamination of wounds and skin abrasions should also be carried out under the direction of a physician. When skin is injured, an important barrier to the entry of contaminants is lost and mismanagement of cleansing procedures can do more harm than good.

In case of radioactive materials ingestion, the person will contact immediately the RSO or his/her designee and the Medical Services Department. Collect all the urine samples and bring it to the RSO. The RSO will be in contact with the person and the Medical Service Department to collect all the information regarding the event and assist in the medical personnel all necessary information. The person will be under medical examination until the situation will be in control. A written report of the event will be completed by the RSO.

F.3 Fire Plan

F.3.1 Introduction

The following Fire Plan has been prepared to provide organized instructions to persons working in areas where radioisotopes are used. It shall not be considered as the Fire Plan for all UPRM facilities but shall be supplementary to it.

No fire, no matter how small, should be extinguished immediately. Prompt action is important, it is equally important to avoid panic.

The most effective Fire Plan is that one designed to prevent fires from starting. Plan all laboratory procedures carefully, maintain all equipment in safe operating condition and keep the storage of flammable materials to the minimum consistent with efficiency.

F.3.2 Fire in the laboratory or adjacent areas.

An occasional fire may occur that can be extinguished by the person immediately present. He should do so and then report the incident promptly to the supervisor as required by the Safety Office. All other fires should be handled according to the procedures given here.

(1) First person to see the fire:
   a) If there is a fire alarm box in the vicinity, pull it.
   b) If there is no fire alarm, call or have someone call the UPRM Guard and the City Fire Department.
   c) Disconnect or turn off electrical equipment and secure radioactive materials in a safe place provided there is no risk of personal danger.
   d) Inform the persons in the vicinity and ask them to vacate the area.
   e) Stay near the area until the UPRM Guard and the fireman arrive, as long as there is no risk of personal danger. Advise them of the presence of radioisotopes in the area.
   f) Inform the RSO and help in the survey for spills or contamination after the fire has been controlled.
   g) Write a report on the incident and submit it to the RSO.

APPENDIX G

Forms To Be Posted

REPLICA OF THE FORM TO BE POSTED IN ALL
RESTRICTED AREAS EMERGENCY PROCEDURES

Minor Spills:

NOTIFY: Notify persons in the area that a spill has occurred.

PREVENT THE SPREAD: Cover the spill with absorbent paper.

CLEAN UP: Use disposable gloves and remote handling devices. Carefully fold the absorbent paper and pad. Insert into a plastic bag and dispose off it in the radioactive waste container. Include all other contaminated materials.

SURVEY: With a G.M. Survey Meter, check for contamination the area around the spill, your hands and your clothing.

REPORT: Report the incident to the Radiation Safety Officer.

Major spills:

CLEAR THE AREA: Notify all persons not involved in the spill to vacate the room.

PREVENT THE SPREAD: Cover the spill with absorbent pads, but do not attempt to clean it up. Confine the movement of all personnel potentially contaminated to prevent the spread.

SHIELD THE SOURCE: If necessary, the spill should be shielded but only if it can be done without further contamination or with out significantly increasing your radiation exposure.

CLOSE THE ROOM: Leave the room and close the door(s) to prevent entry.

CALL FOR HELP: Notify the Radiation Safety Officer immediately.

PERSONNEL DECONTAMINATION: Contaminated clothing should be removed and stored for further evaluation by the RSO. If the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water.

RADIATION SAFETY OFFICER: _____
OFFICE PHONE: _____
HOME PHONE: _____
CHAIRPERSON: _____
OFFICE PHONE: _____
HOME PHONE: _____

APPENDIX H

Radiation Safety Office Forms (RSO FORMS)

RSO FORM 001
1994

UNIVERSITY OF PUERTO RICO

MAYAGUEZ CAMPUS

APPLICATION FOR RADIOISOTOPE PROCUREMENT OR USE

INSTRUCTIONS

1. Submit two copies to the Radiation Safety Officer at least six weeks before expect date when the experiment will be initiated.
2. Each approved application is valid for the user, radioisotope, amount, purpose, location and period of time indicated.
3. A copy of all requisitions for the purchase of radioisotopes must be sent to the Radiation Safety Officer immediately after issuance.
4. Personnel will dispose off the radioactive waste from the Radiation Safety Office.
5. The Radiation Safety Officer or her/his designee will be the recipient of all radioisotopes and will deliver them to the applicant after performing the corresponding survey. The requisitioner is responsible for assuring that the correct delivery address is indicated in the purchasing documents.

A. Name, Department, Address at the Campus and telephone number of applicant.

_____

_____

B. Summary of past experience and training of the above mentioned person. Please use additional sheets if necessary. Indicate Name of institution, isotope used and amount, purpose and period of time.

_____

_____

_____

_____

_____

C. Other persons using radioisotopes under the supervision of person on Item A.

NAME/SS#	DEPARTMENT	ADDRESS	TELEPHONE	JOB POSSITION. IF STUDENT, SO STATE.

D. Identification of radioisotopes to be used.

RADIOISOTOPE	PHYSICAL AND CHEMICAL FORM	MAXIMUM ACTIVITY TO BE USED IN A SINGLE EXPERIMENT	ESTIMATED ACTIVITY TO BE ACQUIRED PER SHIPMENT	ESTIMATED ACTIVITY TO BE ACQUIRED PER YEAR

E. Expected date when the experiment will be initiated.

F. Proposed protocol: Include detailed procedure, identify the rooms and equipment where the radioisotope will be used and stored. Indicate if rooms are under exclusive control of applicant. IDENTIFY OTHER POTENTAIL HAZARDS BESIDES RADIATION.

G. MONITORING

ISOTOPE	MONITORING INSTRUMENTS REQUIRED	MONITORING INSTRUMENTS AVAILABLE

H. Name and address of radioisotope supplier.

I. Signature of applicant _____ Date _____

(TO BE FILLED BY THE RADIATION SAFETY OFFICER)

1. Application revised on _____.
   Date

2. Other persons present:

   Name Position

   a. _____
   b. _____
   c. _____
   d. _____

3. Experiment approved YES ( ) NO ( ) If NO, indicate the reasons

   _____

4. Approved with restrictions YES ( ) NO ( )
   Restrictions: _____

   _____

CERTIFIED CORRECT _____
NAME AND SIGNATURE

DATE: _____

RSO-FORM 002

UNIVERSITY OF PUERTO RICO
MAYAGUEZ CAMPUS
RADIOISOTOPE CONTROL

1. Purchase:

Order No.	Approval No.	Requisitioner	Department

2. Arrival:

Date and time	Carrier	Person that notified	Date and time

3. Survey date and time: _____ Surveyor: _____

4. Condition of package (check mark):

Good ☐	Punctured ☐	Stained ☐	Crushed ☐	Wet ☐	Other ☐

If other explain: _____

_____

5. Radiation levels (mR/hr):

At 30 cm from the package	On contact with the package	On contact with the source

6. Do packing list and package contents agree? (yes or no)

Radionuclide	Amount	Chemical form	Other

If no, explain the difference: _____

7. Smear result:

Contaminated (yes or no)	Specify kind and activity	Specify where it was found
	dpm	

8. If package was shipped with dry ice, was dry ice present in package at the time of survey?
   Yes ( ) No ( ) N/A ( )

9. Radionuclide delivered to: _____

10. Certified correct: _____ _____ _____
    Surveyor's signature Receiver's signature Date

RSO-FORM 003

UNIVERSITY OF PUERTO RICO
MAYAGUEZ CAMPUS
RADIOISOTOPE TRANSFER PERMIT

1. Requisitioner _____
   Division _____ Date _____
2. Present Custodian _____
   Division _____
3. New Custodian _____
   Division _____
4. Present Storage Location _____
5. Proposed New Storage Location _____
6. Description of Material to be Transferred _____
   Form _____ Activity _____
7. Description of Container _____
8. Proposed Date for Transfer _____
9. Person to do the Transfer _____
10. Remarks _____
    _____

The requisitioner certifies that the new custodian is authorized by the Radiation Safety Officer to use radioisotopes in the form and amount described above.

Signature _____ Date _____

(TO BE FILLED BY THE RADIATION SAFETY OFFICER)

Permit Granted: Yes ( ) No ( )

If no, indicate reasons: _____

_____

Date of transfer _____ Transfer by _____

CERTIFIED CORRECT:

RSO's signature _____

New custodians Signature _____

RSO FORM 004

Radioisotope Inventory Log Sheet

Isotope _____ Location _____

Compound _____ Room(s) used _____

Date	Amount Received	Amount Removed For Experiment	Amount of Waste: (solid or liquid)

*The amounts have to include the activities.

RSO FORM 005

University of Puerto Rico
Mayagüez Campus
Radiation Safety Program

RADIOSOTOPE PURCHASE AUTHORIZATION

Date_____

Department_____Requisitioner_____

Purchase to_____Radioisotope_____

Chemical and /physical form _____

Amount to be purchased_____

Arrival time_____Carrier_____

To be recieved by_____

The requisitioner certifies the information described above is correct. The package will be received only by the Receiving Office at the university. The requisitioner will be authorized to use the package content after the Radiation Safety Technician or the Radiation Safety Officer verifies the package condition. The Radiation Safety Office will not authorized the use of any leaking package.

Requisitioner signature _____date_____

(To be filled by the Radiation Safety Personnel)

Permit Granted: Yes ( ) No ( )
If no, indicate reasons: _____

_____

Certified Correct:

RSO or RS Technician signature_____
Date _____

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

1/28/2005, and to inform you that the initial processing which includes an administrative review has been performed.

Renew 52-10510-04

☒ 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** 136379.
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

BETWEEN:

License Fee Management Branch, ARM
and
Regional Licensing Sections

(FOR LFMS USE)
INFORMATION FROM LTS

Program Code: 01100
Status Code: 2
Fee Category: EX 3L
Exp. Date: 20050228
Fee Comments: 170.11(A)(4)
Decom Fin Assur Reqd: N

LICENSE FEE TRANSMITTAL

A. REGION 1

1. APPLICATION ATTACHED
   Applicant/Licensee: PUERTO RICO, UNIVERSITY OF
   Received Date: 20050131
   Docket No: 3014313
   Control No.: 136379
   License No.: 52-10510-04
   Action Type: Renewal

2. FEE ATTACHED
   Amount: /
   Check No.: /

3. COMMENTS

Signed Rebecca Junod
Date 2/11/2005

B. LICENSE FEE MANAGEMENT BRANCH (Check when milestone 03 is entered /__/)

1. Fee Category and Amount: _____

2. Correct Fee Paid. Application may be processed for:
   Amendment _____
   Renewal _____
   License _____

3. OTHER _____
   _____

Signed _____
Date _____