THE UNIVERSITY OF TEXAS-RIO GRANDE VALLEY

ENVIRONMENTAL HEALTH SAFETY AND RISK MANAGEMENT
RADIATION SAFETY PROGRAM

RADIATION SAFETY MANUAL

July 2025

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A. Introduction

All policies, procedures, and guidelines outlined in this manual are in effect and must be followed by all personnel who acquire, handle or dispose of radioactive materials. Compliance with the contents of this manual will be verified through surveillance on the part of the Department of Environmental Health, Safety, and Risk Management. Any questions regarding the content of this material may be addressed by calling the Department of Health, Safety and Risk Management at (956) 665-3690.

B. Responsibilities

1. Radiation Safety Officer

The Radiation Safety Officer (RSO) oversees the daily activities regarding the safe use of radioisotopes and sources of radiation, including non-ionizing radiation on the University of Texas-Rio Grande Valley (UTRGV) campus. The RSO also serves as the liaison between the UTRGV and the Texas Department of State Health Services – Radiation Control Program.

The RSO is ultimately responsible for the following:

- Terminating any operations that are deemed radiation hazards.
- Performing periodic inspections of areas where sources of radiation are stored and used.
- Maintaining records of radiation surveys and inventories of radioactive materials.
- Developing the rules and procedures needed to control the procurement and use of radioisotopes and sources of radiation at the UTRGV.
- Preparing instructions that ensure adequate protection of university personnel in compliance with all state and federal regulations.
- Providing a service for periodic calibration of survey instruments or have the instruments calibrated by a service licensed by the Texas Department of State Health Services. All instruments must be calibrated annually.
- Ensuring all radiation sources and areas are properly labeled.
- Maintaining a comprehensive file on personnel radiation dose records, receipt, use, storage, and disposal of radioisotopes; and all other matters pertinent to the Radiation Safety Program involving radiation control.
- Periodically evaluating the results of leak tests on sealed sources and recommend action to comply with state and federal regulations.
- Arranging for the disposal of radioactive waste.
- Advise and assist University personnel in matters of radiation safety and in the procurement, use, storage, and disposal of radioactive material.
- Providing overall administrative direction of the UTRGV Radiation Safety Program.

2. *Radiation Safety Program (RSP)*

The Radiation Safety Program is responsible for ensuring that radioactive materials (RAM) are used in accordance with local, state, and federal regulations.

In fulfilling this responsibility, the (RSP):

- Formulates general policy governing the use of radioactive materials, including non-ionizing radiation.
- Determines that all individuals authorized to use RAM have sufficient training and experience to enable them to perform their duties safely.
- Reviews all requests to use RAM at the University and send applications to the Texas Department of State Health Services for approval.
- Establishes a program to ensure that all individuals who may be required to work in the vicinity of RAM or radiation producing machines are properly instructed on all appropriate health and safety matters.
- Conducts an annual review of the Radiation Safety Program to determine that all activities are being conducted safely and in accordance with Title 25 of the Texas Administrative Code, Chapter 289 (25 TAC §289) and the conditions of the UTRGV radioactive material license.
- Reviews and makes recommendations for compliance with applicable regulations.

3. Authorized User

All authorized users (AU) of radioactive materials must comply with the conditions of their authorization and the radioactive material license of the UTRGV.

The AU is responsible for:

- Providing instructions on safe and proper radiation practices to all persons working within the facilities of the AU.
- Assuring that areas beyond the control of the AU are not affected by the use of RAM.
- Providing necessary equipment to work safely with RAM.
- Securing all RAM against theft or unauthorized use.
- Contacting the RSO for proper disposal of all radioactive waste.
- Notifying the Radiation Safety Officer of any accident or abnormal incident involving or suspected of involving RAM.
- Complying with 25 TAC §289, conditions of the UTRGV radioactive material license, and policies of the EHSRM.

C. Procurement of Radioactive Materials

The University of Texas-Rio Grande Valley (UTRGV) has been issued a license to possess and use radioactive materials (RAM) by the Texas Department of State Health Services, Radiation Control Program (TDSHS – RCP). This license permits the use of radioactive isotopes in research and teaching activities. At the same time, it requires UTRGV to maintain a well-managed and documented program to ensure that all RAM is used safely.

1. Authorization for Use

Any qualified person who wishes to use RAM must submit an application for the non-human use of radioactive materials form **(Appendix I)** to the Radiation Safety Officer (RSO) describing their training and experience. The letter of application must also contain detailed information on the facilities, proposed experiment, radiation measuring instrumentation, any special safety devices, and procedures for the control of radiation, emergency procedures, and waste disposal methods.

The RSO will review the application, inspect the applicant's facilities and obtain any additional information that may be required. If the application is complete, it will be forwarded to the Texas DSHS – RCP for final approval. The permit issued by the TDSHS-RCP will include the AU, the RAM authorized for use, and any special conditions to be followed.

2. Purchasing Radioactive Materials

Only authorized users (AU) may request the purchase of radioactive materials (RAM). Radioactive materials may be purchased using the following steps. Failure to do so may result in a delay in receiving the material.

- The requestor will request to purchase radioactive materials through *ishop*, at which time the RSO is included in the approval process. Upon receipt, the RSO will examine their records to determine if approval will exceed the type or quantity limit as outlined in the RAM license. The Purchasing Department will not process any DPR for radioactive materials or sources without prior approval by the RSO.

- Radioactive materials or sources are to be shipped directly to EHSRM, for processing and may not be received directly by an AU. In the event a package is shipped directly to the AU, then the AU is instructed to notify the EHSRM immediately for processing.

- The shipping address must be the following:

  University of Texas-Rio Grande Valley
  Department of Environmental Health and Safety
  1201 West University Dr.
  Edinburg, TX 78539
  Attn.: Pradyot Chowdhury

3. Receipt of Radioactive Material

Upon receipt of radioactive material or sources by Central Receiving the RSO will be notified so the material can be checked in. No weekend shipments will be accepted by Central Receiving.

When notified, the RSO will:

1. Travel to Central Receiving.

2. Survey the outside packaging for leakage, unless the contents are exempt by 25 TAC §289.202(ee). Those packages that require surveys shall be surveyed as soon as possible, but no later than four hours after it was received by Central Receiving. Receipt of the radioactive material form will be completed **(Appendix II)** for all packages received that are not exempt.

3. After the required surveys are completed and documented, the shipment will be given an Inventory Number. This number will be placed on the primary container, the inventory forms, and all subsequent paperwork related to that item.

4. A "*Radioactive Material Utilization Log* " form will be prepared and issued to the authorized user for each inventory number assigned **(Appendix III).** This form will be used to monitor the amount of activity used for the subsequent experiments and the remaining activity in the original container.

5. The RSO will promptly notify the appropriate person when a shipment of radioactive material is ready for distribution. It will be the responsibility of the individual to make arrangements to pick up the RAM or have it delivered.

D. Precautionary Measures

1. Training Requirements

Initial training is required for all individuals prior to working with radioactive materials and for those persons who frequent areas where radioactive material or sources are used. Refresher training is required every three years. Training is provided by the EHSRM. Training must include the following topics:

- The UTRGV Radiation Safety Manual.
- How the source(s) of radiation are stored, used, or transferred.
- Health problems associated with exposure to such radiation or radioactive sources.
- Precautions and procedures to take to minimize exposure.
- Purpose and function of protective devices and personal protective equipment.
- All applicable regulations concerning the use of radiation or radioactive sources.
- Use of instrumentation.
- Radioactive waste disposal.
- Procedures to report any conditions which may lead to or cause a violation of the above-mentioned regulations or result in unnecessary exposure to radiation or radioactive sources.
- Emergency procedures.
- Whom to contact for additional information about radiation safety.

General awareness training is required for those personnel that share a laboratory with persons using radioactive materials.

The authorized user is responsible for seeing that all personnel working under his/her supervision receive this training.

2. Posting Restricted Areas

Areas in which access is controlled by the authorized user for purposes of protection of individuals from exposure to radiation and radioactive material will be designated as "Restricted Areas". These areas or rooms must be posted with the appropriate radiation caution signs or labels according to 25 TAC §289.202(aa).

3. *Personnel Radiation Monitoring*

Radiation cannot be seen and affects none of the senses. Therefore, it is necessary to use special methods of recording exposures to individuals. Commonly, film badges, pocket ionization chambers, or thermoluminescent dosimeters (TLDs) are used. Film badges and TLD's are used to monitor an individual's whole-body exposure over a long period of time, usually one month to a maximum three months. Pocket ionization chambers are used over short periods of time and/or when immediate readings are required. Personnel dosimetry records are maintained and kept by the Radiation Safety Officer (RSO). An individual who would like to review their dosimeter records may do so by contacting the RSO 25 TAC §289.202(q)(1) states that each licensee or registrant shall monitor exposures from sources of radiation and shall supply and require the use of individual monitoring devices for:

- Adults are likely to receive, in 1 year, a dose in excess of 10% of the outlined limits or 500 mrem
- Minors likely to receive, in 1 year, a deep dose equivalent in excess of 0.1 rem (1 mSv), an eye lens dose equivalent in excess of .15 rem (1.5 mSv), or shallow dose equivalent to the skin or extremities in excess of 0.5 rem (5 mSv);
- Declared pregnant women likely to receive during the entire pregnancy, a deep dose equivalent in excess of 0.1 rem (1 mSv); and
- Individuals entering a high or very high radiation area

Personnel monitoring devices must be used in accordance with the following rules:

- "Whole body" monitors are worn at collar level outside any shield such as aprons and lab coats.
- Monitors are worn at all times while in radiation areas except where an individual is not likely to receive, in 1 year, a dose in excess of 10% of the outlined limits, or minors and declared pregnant women likely to receive, in 1 year, a dose in excess of 10% of the outlined limits. In this case, appropriate documentation in the form of dose calculations or previous monitoring will be maintained and available for inspection.
- Monitors should be stored in a safe place away from radiation when not in use.
- Monitors are issued to one person and may not be worn by another individual.
- Monitors should not be washed.

- Whole body monitors that utilize film or TLD finger dosimeters are worn for one month and then changed.
- Notify the RSO immediately if you lose your personnel monitoring device or if any other incident occurs.

4. Area Surveys

Areas where radioactive materials are stored, handled, or used must have radiation level surveys and contamination level surveys conducted on a regular basis. The frequency of surveys depends on the amount and type of radioactive material used. The following table outlines the minimum frequency in which surveys should be conducted. It is prudent, however, to conduct a survey after each experiment. All surveys results should be given to the RSO.

Survey Type and Frequency

Isotope Type	Survey Type	Instrument Type	Minimum Survey Frequency (0- 200 uci / procedure	Minimum Survey Frequency > 200 uCi /procedure
Low Energy Beta Emitting Isotopes (^{3}H, ^{14}C, ^{35}S)	Contamination	Liquid Scintillation Counter (1)	Monthly	Weekly
High Energy Beta Emitting Isotopes (^{32}P)	Contamination Radiation Level	Liquid Scintillation Counter (1) Survey Meter (2)	Monthly	Weekly
Gamma Emitting Isotopes (51Cr, ^{86}Rb)	Contamination Radiation Level	Liquid Scintillation Counter (1) Survey Meter (2)	Monthly	Weekly
Sealed Sources	Leak Test	Outsourced		

(1) Beckman Liquid Scintillation LS 6500 Counter or similar.
(2) Ludlum GM Detector M-14C with Pancake probe or similar.

Suggested methods for conducting radiation level surveys and contamination level surveys are outlined below. All results should be recorded on the on a standard form showing the location, date, person performing survey, instrument used and calibration date, and radiation levels **(Appendix IV)**. Surveys should be conducted in areas that are most likely to be contaminated including, but not limited to, laboratory benches, fume hoods, storage locations, door knobs, telephones, sinks etc.

- *Radiation Level Surveys* – A radiation level survey is conducted with a survey meter capable of measuring radiation levels as low as 0.1 mR/hr. Radiation levels are measured one three inches from the surface**. *If radiation levels exceed 2x background, then the surface is considered contaminated, and should be decontaminated, including the conduction of a contamination survey to assess surface contamination levels.*** Maintenance of the meter should be in compliance with TAC 289.202(p)(2).

- *Contamination Surveys* – A series of wipes using filter paper or other material should be taken from surfaces where contamination could exist or where radiation levels are fairly high. The wipes should be rubbed over an area of about 100 cm^2 to maintain consistency. ***If surface contamination levels exceed 100 DPM/100 cm^2 in any location, then actions should be taken to decontaminate the surface.*** By using the appropriate scintillation counter, the level of contamination can be determined. All results are recorded on a form entitled Laboratory Survey Form, or similar (**Appendix IV).**

E. Laboratory Procedures

1. *Written Procedures*

A set of written procedures is required for each laboratory or area where radioactive material is used. These procedures must describe specific rules governing the storage, use, handling and disposal of radioactive materials in that area. All individuals working in the laboratory or area must know where the written procedures are located.

General Rules of Conduct:

- The use of radiation detection device (survey meter) should be available to the laboratory personnel. The survey meter is to be used to monitor the work area and an individual after using radioactive material before the individual leaves the area.
- Absorbent paper shall cover workbenches, trays, and other work surfaces where radioactive materials are handled.
- The laboratory should be kept clean and orderly at all times.
- Avoid carelessness in handling radioactive materials. Do not splash, splatter, or spill radioactive liquid.
- Always handle volatile material or potentially airborne radioactive material in appropriate fume hood.
- Notify the Radiation Safety Officer (956-296-1860) immediately in the event of a spill or an accident.
- Disposable gloves shall be worn while working with radioactive solutions, when hand contamination is deemed possible.
- All laboratory personnel working with radioactive material must wear some type of outer garment to prevent contamination of personal clothing. Never wear a contaminated coat
- Pipetting by mouth is prohibited. Use mechanical pipetters.
- Every bottle, flask, tube, etc. which contains radioactive material shall be identified by a proper radiation warning label.
- When storing radioactive material, always cover or stopper the container.
- Bottles, flasks, beakers, and other vessels which contain more than 100 microcuries of activity should not be picked up by hand for more than a few seconds; for longer period of time, tongs or forceps should be used, whenever practical.
- Glassware containing radioactive material is never to be turned into a central washroom, unless it has been decontaminated first.
- All radioactive waste and contaminated material must be placed in receptacles, especially marked for radioactive material storage.
- When a procedure is completed –before leaving the lab, thoroughly wash hands and monitor for radioactive contamination.
- Decontamination of the hands is not easy and may require repeated washing. Wash hands over the sink in full stream of water; use cool water, non-abrasive soap, and a soft surgical scrub-brush, taking care to not abrade the skin.
- No food or beverage is to be stored in the same refrigerator or freezer as radioactive material.
- No eating, drinking, smoking, or applying cosmetics is allowed in a laboratory using or storing radioactive material.

- The proper radiation caution signs are to be posted in the appropriate areas containing radioactive materials.
- A “Notice to Employees” sign must be posted in a sufficient number of places so that employees may observe a copy on their way to and from their place of employment.
- Radioactive materials, which emit penetrating radiation, and whose activity exceeds 500 microcuries, shall be kept behind lead shields or inside of lead-lined vessels. Plastic shielding will be used with high-energy bet emitters, i.e. 32P
- Protective eyewear is to be worn when working on the open bench top with more than 10 millicuries of a beta emitter. It is recommended that the eyewear be worn anytime > 1 millicurie of a beta emitter is to be used on the bench top.
- Radioactive material is to be stored in a secured manner.

2. *Storage Requirements*

Radioactive materials must be kept in leak proof containers using the appropriate shielding. Liquid waste should be stored in secondary containment. All containers must be labeled with the appropriate radiation symbol with at least the following information:

- the radionuclide,
- the activity, and
- the date.

Refrigerators, freezers, and any other type of storage unit must have a sign that states "Caution Radioactive Material". Any unit that is used for the storage of radioactive material may not contain food or beverages for human consumption. All radioactive material must be secured from unauthorized access. All areas where radioactive materials are handled and stored must have non-porous flooring and work surfaces.

3. *Handling Radioactive Material*

Disposable gloves must be worn when handling unsealed radioactive material. In some instances, remote-handling devices, such as tongs, may be required. Some materials may require the use of shielding. The use of volatile radioactive material must be done in a fume hood specifically approved for such use by the Radiation Safety Officer (RSO).

Notify the RSO prior to the repair or removal of any equipment that may be contaminated with radioactive material. The RSO must conduct surveys to determine the level of contamination, if any.

F. Disposal Procedures

1. *Waste Minimization*

All Authorized Users should practice basic waste minimization principles of source substitution, reduction, segregation, and minimization when conducting activities using radioactive materials. The EHSRM will work with the Authorized User to determine the best mechanisms for reducing waste generated. In as much as possible the following principles should be:

a. Substitution of a non-radioactive material for radioactive materials in experiments
b. Substitution of a short-lived radioactive material for radioactive materials with long half-lives.
c. Use of radioactive materials in quantities, which will result in waste at exempt levels for H-3; C-14; and I-125.
d. Segregation of long-lived radioactive materials from short-lived radioactive materials
e. Use of microscale techniques to minimize the quantity of radioactive materials used.

2. *Disposal Methods*

All radioactive waste streams should be disposed of through the EHSRM.

- Place the material in the appropriate container. Properly label each container with the appropriate isotope, activity (Ci or Bq's), and date. For gamma emitting isotopes it is also advised to put the maximum radiation reading and mark that specific location with an X.

- Contact the EHSRM for collection (x3690 or email the waste line (waste@utrgv.edu)

Upon collection, the EHSRM can use a variety of options to dispose of the radioactive material which is dependent on the isotope, form, activity, and half-life. Radioactive material should be disposed of by one of the following methods. In all cases, the appropriate documentation for the characterization, quantification, and ultimate disposal of all radioactive waste streams must be maintained and available for inspection.

a. Exemption of Specific Wastes

In some cases, certain isotopes in certain concentrations can be disposed of "without regard to its radioactivity". They include:

- .05 microcurie or less of hydrogen-3, carbon-14, or iodine-125 per gram of medium used for liquid scintillation counting or in vitro clinical or in vitro laboratory testing; and .05 microcurie or less of hydrogen-3, carbon-14, or iodine-125 per gram of animal tissue averaged over the weight of the entire animal and:

b. Decay in Storage

For some materials with a short half-life, it may be practical to store the waste until it has undergone sufficient radioactive decay to background levels and disposed of as non-radioactive in the regular trash. It will only be disposed of as non-radioactive waste, after a minimum 10 half-lives, and if survey readings cannot be distinguished from background. At that time the waste may be disposed of as non-radioactive provided all radioactive markings have been defaced. The guidance documents for disposal of radioactive waste by "Decay in Storage" is included in appendices (Appendix V).

c. Release into Sanitary Sewer

Radioactive material may be discharged into the sanitary sewer system provided the material is soluble or dispersible in water and the amount disposed does not exceed limits outlined in 25 TAC §289.202(gg). The guidance document for the disposal by "Release to Sanitary Sewer" is included in appendix IV.

d. *Transfer to an Authorized Recipient*

If the waste cannot be disposed using one of the previous methods, then it is disposed of via an offsite contractor generally to a low-Level waste disposal facility for land disposal, or incineration. Disposal of these waste streams are arranged by the EHSRM with an offsite vendor.

G. Emergency Information

1. Emergency Telephone Numbers

Radiation Safety Officer –Dr. Pradyot Chowdhury	296-1860
Department of Environmental Health and Safety Radiation Safety Program	665-3690
University of Texas-Rio Grande Valley Police Department	911 or 665-7151

In the Event of:	
Radioactive Spill	911 or 665-3690
Chemical Spill	911 or 665-3690
Medical Emergency	911 or 665-4357

Information that will be needed:

1. Your name
2. Your location (room and building)
3. The phone number you are using

Describe the nature of the emergency

2. *Emergency Procedures for Minor Spills*

Minor spills can generally be considered as those that contaminate small areas of laboratory surfaces or equipment, but **do not** result in:

- Contamination of personnel,
- Excessive external exposure to personnel, or
- Internal contamination of personnel.

Procedure:

1. Notify all persons in the area that a spill has occurred.

2. Cover the spill with absorbent paper or pad.

3. Using disposable gloves and remote handling tongs, carefully fold the absorbent paper or pad, insert in a plastic bag.

4. In another plastic bag insert all other materials that have been contaminated, i.e.: disposable gloves.

5. Report the incident to the Radiation Safety Officer (RSO) and Authorized User. The RSO will decontaminate the area and arrange for disposal of contaminated articles. The RSO will also survey any affected personnel to determine the extent, if any, of any contamination.

3. *Emergency Procedures for Major Spills*

Major spills can generally be considered as those that:

- Contaminate large surface areas,
- Contaminate personnel,
- Provide excessive external exposure to personnel, or
- Internally contaminate personnel.

Procedure:

1. Notify all persons not involved in the spill to vacate the room.

2. Cover the spill with absorbent paper or pad. **Do not attempt to clean up the spill.**

3. Prevent potentially contaminated personnel from leaving the room. Prevent personnel from entering the area.

4. Notify the RSO and the Authorized User.

5. The RSO will conduct the appropriate surveys and decontamination as necessary.

H. Inspection Criteria

The following inspection form outlines the inspection criteria in which the RSO will assess compliance with the rules and regulations mandated by the Texas Department of State Health Services - Bureau of Radiation Control and the Radiation Safety Manual. **Inspections by the RSO will be conducted on an annual basis**. All records are to be available and in orderly fashion for inspection by the RSO. Because the inspection criteria parallel the rules and regulations mandated by the BRC and the Radiation Safety Manual, they can also be used as a guide for conducting activities in the laboratory.

The University of Texas – Rio Grande Valley
Radiation Survey

Description	Citation	Y	N	N/A	Comments
General					
Laboratory posted with appropriate caution signs?	TAC289.202(aa)				
Laboratory posted with emergency contact and numbers?	RSM Section G				
Laboratory posted with "Notice to Employees"?	RSM Section G				
Is the Radiation Safety Manual available?	RSM Section E				
Have all personnel attended Radiation Safety Class?	RSM Section D				
Receipt and Use					
Compliance with requirements for the receipt of radiation sources?	TAC289.202(ee)				
Are laboratory procedures being adhered to?	RSM Section E				
Is the principle of ALARA being adhered to?					
Is the proper PPE worn? (lab coats, gloves, safety glasses)	RSM Section E				
No evidence of eating drinking or smoking or food storage?	RSM Section E				
Is liquid R/A stored in secondary containment?	RSM Section E				
No mouth pipetting?	RSM Section E				
Are contaminated items labeled?	RSM Section E				
Is radioactive material secure from unauthorized removal or under constant surveillance in unrestricted areas?	TAC289.202(y)				
Are containers labeled "Caution, Radioactive Material"?	TAC289.202(cc)				
Are containers labeled with the isotope name and quantity?	TAC289.202(cc)				
Are empty container labels defaced prior to disposal?	TAC289.202 (cc)				
Surveys and Monitoring					
Are laboratory surveys appropriate for radiation types and quantities use?	RSM Section D				
Is instrumentation and equipment used appropriate, operable, and calibrated?	TAC289.202(p)				
Are radiation levels and surface contamination limits in compliance with RSM requirements? (Attach survey)	RSM Section D				
Are dose levels to individual member of the general public in compliance? (2 mr/hr and 50 mrem/yr)	TAC289.202(n)				
Occupational Dose Limits					
Demonstrated compliance with occupational exposure limits?	TAC 289.202(f)				
Is appropriate occupational monitoring in place or appropriate documentation for external or internal dose?	TAC289.202(q)				
Release					
Is waste minimization being practiced?	RSM Section				
Is waste disposed of in accordance with TDSHS-RCP-BRC regulations?	TAC289.202(ff)				
Is waste properly segregated?	RSM Section				

Appendix I
Application for the Non-Human Use of Radioactive Material

The University of Texas Rio Grande Valley

Environmental Health, Safety & Risk Management

Radiation Safety Program

Application for Non-Human Use of Radioactive Materials

Section 1. Applicant Data.

Application Date: _____

Name of Principal Investigator: _____

Department: _____

Building/Office No.: _____

Office Phone: _____

Section II. Radionuclide and activity data.

Type of Activity	Proposed Radionuclide	Proposed activity per order (mCi)	Proposed activity for each experiment (mCi)	Physical Form (S;L;G)

Section III. Identify laboratories where radioactive materials will be utilized.

Campus Location/Building	Room Number	Phone Number

Section IV. Identify the type of waste streams you will be generating and the percentage for each experiment.

Solid _____ %

Liquid _____ %

Liquid Scintillation Vials _____ %

Animal Carcasses _____ %

Mixed Chemical Waste _____ %

Section V. List personnel who will be working with radioactive materials under this authorization (all personnel working with R/A materials are required to attend basic radiation safety class).

Name	Student / Employee	Basic Radiation Class (Y/N)

Attach CV of Principal Investigator indicating radiation experience.

Revised: 3/22/16

Appendix II
Radioactive Material Receipt Form

Environmental Health, Safety and Risk Management
Radiation Safety Program
Radioactive Material Receipt Form
TAC289.201(d) 289.202(ee)

Section 1: Authorized User Information

User: _____

Date Received: _____ Survey Date/Time:_____

Section 2: Radionuclide and Activity Data

Name of Transferor: _____

Radioactive Material License#: _____ Regulatory Agency issuing License: _____

Radionuclide: _____ Total Activity: _____ mCi μCi _

Type(circle) Solid Liquid Sealed source/SN_____

Package Type (circle one) White I Yellow II Yellow III

Section 3: Package Check-In (Contamination Wipe Test)

LSC Model: _____ Serial Number: _____

Background: _____ cpm MDA: _____ dpm Counts _____dpm

Compliant with TAC 289.202(ee)(4)(A)(ii) or 22 DPM/cm^2 Yes No

Meter Survey : (Yellow II and Yellow III)

Maximum Surface Exposure: _____mR/hr Transport Index : _____ mR/hr

Survey Instrument: _____ Serial Number: _____ Cal Date: _____

Compliant with TAC 289.202(ee)(4)(B) Yes No

Section 4: Comments

_____

_____

Surveyed By:_____ Date: _____

Appendix III
Radioactive Material Utilization Log

The University of Texas – Rio Grande Valley
Environmental, Health, Safety and Risk Management
Radiation Safety Program

Laboratory Survey Report

Date:_____

Building: _____ Room Number:_____ Authorized User: _____

Radioisotopes used in this Laboratory: _____

If No Use or Storage - In comment section indicate "No Use or Storage This Month"

Meter Survey

Type /Model No: _____ S/N No. _____ Cal Date: _____

Contamination Survey

LSC Model: LS6500 Serial Number: 490293

Laboratory Diagram

Bckrd = _____

Wipe Test Results

Background Count Rate (cpm):_____

$$dpm = \frac{(cpm - background)}{efficiency}$$

#	Count Rate (dpm)
Bckrd	
1	
2	
3	
4	
5	
6	
7	
8	
9	

Comments: _____

Surveyed by: _____ Date: _____

Note: The decontamination level stated in Section 6.3 of the *Radiation Safety Manual* is 1000 dpm/100 cm^2 (200 dpm/100 cm^2 for ^{125}I). 25 Texas Administrative Code §289.202(ggg)(6) states 1000 dpm/100 cm^2 removable contamination for all beta- and gamma-emitting radionuclides except ^{90}Sr and ^{129}I.

Appendix IV
Laboratory Survey Report

The University of Texas – Rio Grande Valley
Environmental, Health, Safety and Risk Management
Radiation Safety Program

Laboratory Survey Report

Date:_____

Building: _____ Room Number:_____ Authorized User: _____

Radioisotopes used in this Laboratory: _____

If No Use or Storage - In comment section indicate "No Use or Storage This Month"

Meter Survey

Type /Model No: _____ S/N No. _____ Cal Date: _____

Contamination Survey

LSC Model: LS6500 Serial Number: 490293

Laboratory Diagram

Bckrd = _____

Wipe Test Results

Background Count Rate (cpm):_____

$$dpm = \frac{(cpm - background)}{efficiency}$$

#	Count Rate (dpm)
Bckrd	
1	
2	
3	
4	
5	
6	
7	
8	
9	

Comments: _____

Surveyed by: _____ Date: _____

Note: The decontamination level stated in Section 6.3 of the *Radiation Safety Manual* is 1000 dpm/100 cm² (200 dpm/100 cm² for ^{125}I). 25 Texas Administrative Code §289.202(ggg)(6) states 1000 dpm/100 cm² removable contamination for all beta- and gamma-emitting radionuclides except ^{90}Sr and ^{129}I.

Appendix V
Guidance Document
Disposal by Decay in Storage

Environmental, Health, Safety and Risk Management
Radiation Safety Program
Guidance Document

Title: Disposal by "Decay in Storage"

Date: 07/01/2014

General:

This procedure describes the protocol for disposing of waste which at one time exhibited a physical characteristic of spontaneously emitting radiation.

Guidance:

1. The radioactive waste is initially segregated at the point of origin and stored in an appropriately-labeled and shielded container.

2. All radioactive materials with a half life < 90 days (^{32}P, ^{33}P, ^{35}S, etc.) are placed in a sealed and labeled opaque bag and then placed into one of the segregated accumulation containers located in the respective laboratory.

4. When full, a call is made to the DEHS waste line who will then proceed to collect the waste.

5. A measurement will then be made of the container and the maximum radiation level emanating from the package will be marked on the container.

6. The decay-in-storage waste will be stored in a secure and shielded area in the radioactive waste processing room.

8. After an appropriate period of time has elapsed, the container will be surveyed to ensure that the radiation levels do not exceed twice the background level.

9. If the radiation levels are < than twice background, the waste may be disposed without regard to its formerly radioactive constituents, **provided that all radioactive labels, tags, and markings have been removed or otherwise obliterated.**

Appendix VI
Guidance Document
Disposal by Release to Sanitary Sewer

Title: Disposal by Release to Sanitary Sewer (TAC289.202(gg))

Date: 02/01/14

General:

Liquid radioactive waste may be discharged into sanitary sewerage pursuant to TAC289.202(gg) . The liquid waste must be readily soluble and dispersible biological material in water. In addition, the total activity of licensed radioactive material released through this procedure during a month divided by the average volume of water released into the sewer must not exceed the concentration limits in Table III of subsection (ggg)(2).

Guidance:

1. Aqueous wastes are stored in one- to five-gallon containers. When the radioactive waste container is full, the information requested on the pre-labeled jug is completed by the generator. Information on the label includes the generator name, laboratory location, radionuclide, activity, and the date.

2. The generator contacts the DEHS to schedule a liquid waste collection. The liquid waste containers are collected routinely (approximately 3 days per week) by the DEHS.

3. When a sufficient number of jugs have been collected a release to sanitary sewer procedure is initiated.

4. Before handling radioactive material, appropriate personal protective equipment and/or engineered controls are utilized.

5. The waste jugs are initially segregated by radionuclide. A preliminary ambient radiation field survey should be performed to ensure that doses are maintained ALARA during the procedure.

6. Using a pipette and disposable pipette tips, obtain a representative aliquot from each one-gallon jug and place into a liquid scintillation vial. Repeat this process for each liquid waste container. Each aliquot must be representative of the average concentration in each waste container.

7. Fill each liquid scintillation vial with an appropriate volume of liquid scintillation counting fluid. Agitate each vial to encourage uniform mixing between the sample and counting fluid.

8. Analyze the LS vials on a quench-correcting liquid scintillation counter. (See Guidance Documents - Liquid Scintillation Counting). This will result in a specific activity value for each jug. The total activity of the liquid waste may be calculated by multiplying the LSC result (dpm mL^{-1}) times the volume of the liquid waste in the container.

9. In some cases steps 6-8 can be substituted by combining several containers with a known volume of radioactive liquid waste into a larger container or sink and extracting one aliquot from the resultant combined solution. The total activity is determined by multiplying the LSC result (dpm mL^{-1}) by the total volume of the combined containers.

10. If the material is readily soluble, or is readily dispersible biological material in water it can be disposed of into the sanitary sewer.

11. The appropriate calculation is first made to ensure that :

    a. the quantity of licensed radioactive material that the licensee releases into the sewer in one month divided by the average monthly volume of water released into the sewer by the licensee does not exceed the concentration listed in Table III of subsection (ggg)(2); and

    b. if more than one radionuclide is released, the fraction of the limit in Table III of subsection (ggg)(2) represented by discharges into sanitary sewerage determined by dividing the actual monthly average concentration of each radionuclide released by the licensee into the sewer by the concentration of that radionuclide listed in Table III of subsection (ggg)(2) of this section; and the sum of the fractions for each radionuclide required by clause (i) of this subparagraph does not exceed unity; and

    c. the total quantity of licensed radioactive material that the licensee releases into the sanitary sewerage in a year does not exceed 5 curies (Ci) (185 gigabecquerels (GBq)) of hydrogen-3, 1 Ci (37 GBq) of carbon-14, and 1 Ci (37 GBq) of all other radioactive materials combined

12. Remove all disposal tags from the jugs and place in a secure place.

13. Lay absorbent paper around the sink.

14. Carefully, remove a jug from the cart and place it in the hood. Agitate the jug slightly and remove the cap. Slowly, pour the contents from the jug into the drain. Care is taken to ensure that during the pouring process, the solution does not splash around the general area, the sink does not over-flow, or that solid materials are not poured down the drain.

15. After each jug is poured, decontaminate the jug and the inside of the cap. Place a blank liquid radioactive waste label on the jug. Inspect the container for integrity and sedimentary deposition. If the container cannot attain proper function, dispose of it in the

appropriate solid radioactive waste container.

16. Repeat this process until each jug has been disposed.
17. Upon completion of the procedure, perform a post-work survey of the radioactive liquid waste disposal area. A survey should also be conducted on each jug to ensure that jugs that have any excess radiation readings are not recycled back to the investigators.

18. The total and cumulative activities are maintained to ensure compliance with the referenced activities.

References

UT_Pan American *Radiation Safety Manual*

Appendix VII
Guidance Document
Disposal of Biomedical Exemption Waste

UTRGV

Environmental Health, Safety and Risk Management
Guidance Document

Title: Disposal of Biomedical Exemption Waste [TAC289.202(fff)(1)]

Date: 02/01/2001

General:

Materials containing 0.05 μCi g^{-1} or less of ^{3}H, ^{14}C, ^{125}I of medium used for liquid scintillation counting, *in vitro* clinical or laboratory testing, or animal tissue may be disposed of without regard for its radioactive constituents in accordance with TAC289.202(fff)(1)(A).

Guidance:

1. Radioactive waste disposed through this procedure can be categorized as follows:

   A. Scintillation Vial Waste containing ^{3}H, ^{14}C, $^{125}I < 0.05$ μCi g^{-1}

   B. Solid Waste containing ^{3}H, ^{14}C, $^{125}I < 0.05$ μCi g^{-1}

   C. Animal Tissue containing ^{3}H, ^{14}C, and $^{125}I < 0.05$ μCi g^{-1}

   The radioactive waste is segregated at the point of generation and placed in plastic-lined containers. Each container should be uniquely labeled.

2. Once the container is full, laboratory personnel secure the plastic bag with tape or a tie wrap. Next, laboratory personnel attach a solid waste disposal tag which identifies the generating laboratory, radionuclide, activity, date, and physical form of waste (e.g. solid, liquid, vial, carcass).

3. The sealed and labeled bag is then placed into one of the segregated accumulation containers located in laboratory (generally a 5 gallon buckets) . Massive or unwieldy objects which do not easily fit into the accumulation container are packaged in impermeable plastic and securely closed. Animal carcasses and associated waste are placed in large containers and are placed in a storage freezer.

4. A call is then placed to the DEHS. The waste is subsequently picked up by a member of the staff., and transported to a central radioactive waste processing location.

5. Upon arrival to this location, the completed "Radioactive Waste Disposal" tags are tallied to determine the total activity for each radionuclide in the container.

6. The bags are then weighed on a scale and the weight noted.

7. The specific activity (Ci g^{-1}) and the cumulated annual activity (Ci yr^{-1}) is calculated for each container to ensure compliance with the limits in TAC289.202(fff). **Calculations for solid waste and liquid scintillation vials are made on a container basis. Calculations for animal carcasses are made over the entire weight of the animal.**

8. A surface radiation measurement is made for each container using an appropriate survey meter. Containers exhibiting unusual radiation levels will be further investigated.

9. Upon completion of the container surface survey, the waste may be disposed without regard for its radioactive constituents **provided that all radioactive labels, tags, or other markings have been obliterated or obscured.**

10. All appropriate records will be maintained by the Department of Environmental Health and Safety.