

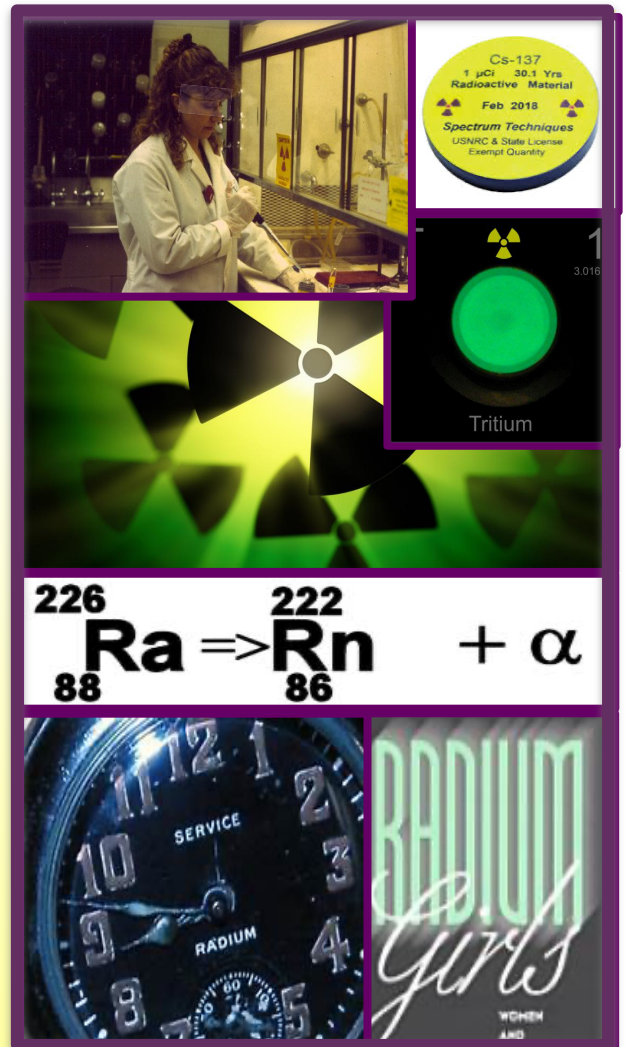


San Francisco
State University

CA License No. 0084-38

SFSU Safety Program for Radioactive Materials

Radiation safety program for
the use of radioactive materials
at SFSU under an Academic License.



Update: July 17, 2023



Table of Contents

I.	Preface	
II.	Introduction.....	3
III.	Policy, Purpose, And Program.....	3
IV.	The President's Authority and Responsibility Delegation.....	5
V.	University Radioactive Materials License	7
VI.	Obtaining Approval for Use Of Radioactive Materials	7
VII.	Procedure For Procurement Of Radioactive Materials.....	9
VIII.	Delivery And Custody Of Radioactive Materials.....	11
IX.	Instruction Of Personnel In Radiation Protection	12
X.	Radiation Exposure Limits And Policy	15
XI.	Dosimetry and Bioassay.....	17
XII.	Radiation Monitoring and Surveys	17
XIII.	Posting And Labeling	19
XIV.	Shipment Of Radioactive Materials.....	19
XV.	Disposal Of Radioactive Waste	21
XVI.	Animal Use.....	23
XVII.	Human Use.....	23
XVIII.	Emergencies	25
APPENDIX A	Standard Work Rules.....	i
APPENDIX B	RSO Duties and Responsibilities	iii
APPENDIX C	Review and Amendment Log	v

Intentionally Left Blank



I. Preface

Radioactive material used in biological or chemical research and in instruction can be a very useful tool. These applications of ionizing radiation require that users take proper precautions to prevent the contamination of equipment and facilities, and most importantly, to protect people. Inadequate or careless use can result in unwarranted radiation exposure to individuals and serious repercussions for the University, affecting its ability to use this material.

This manual presents the means of establishing and maintaining a working environment with exposure to ionizing radiation as low as reasonably achievable (ALARA). It is expected that the provisions will be carried out to the fullest extent to ensure the safety of all personnel having access to University facilities employing radiation sources.

Intentionally Left Blank



II. Introduction

The Radiologic Health Branch (RHB) is within the Food, Drug, and Radiation Safety Division of the California Department of Public Health (CDPH). The RHB has the responsibility by State Law for evaluating and licensing the use of radioactive material in California.

San Francisco State University has been issued an academic license by RHB-CDPH to possess and use radioactive materials for the purposes of instruction and research. In the licensing process the University has committed to follow specific rules as well as general State regulations.

This academic license has replaced the University's previous broad scope license. Individual Radioactive Materials Supervisor Users (formerly RUA Holder) must be approved by the RHB and added to the University license. Radioactive materials users working under such Supervisory Users may be approved internally, as they are under the supervision and responsibility of the Supervisory User.

This Radiation Safety Program has been established to inform users of radioactive materials at SFSU of the policies that govern this use, and of the procedures required to obtain approvals.

This manual covers the possession and use of radioactive materials. A separate X-Ray Safety Manual covers the possession and use of radiation-producing machines. X-ray machines are registered with RHB and subject to its regulations, but are not included in the issued radioactive materials license.

III. Policy, Purpose, And Program

1. The President's Policy

The President of San Francisco State University directs that all radioactive materials shall be handled in accordance with the official policies and protocols established in the SFSU Radiation Safety Program, and with standards of applicable regulatory agencies.

2. Radiation Safety Program

The purpose of the radiation safety program is to ensure that work with radioactive materials is conducted in such a manner as to protect health and minimize danger to life and property. Use of ionizing radiation is with the purpose of furthering legitimate research and teaching goals while keeping risks and exposures as low as reasonably achievable (ALARA). Each use of radioactive material must be reviewed by the Radiation Safety Officer. After this initial review, the RSO will forward the request to the RHB-CDPH for approval and addition to the University's license.

3. Radiation Safety Program Manual

The purpose of the Radiation Safety Program Manual is to set forth the University's policy, organization and operating procedures and standards for conduct of the SFSU radiation safety program. In addition, the Manual provides a guide to individuals using or having responsibility for the use of radioactive material in complying with University policy, with conditions stipulated in the University's license for use of radioactive materials, and with pertinent and applicable regulations of governmental agencies.

4. Distribution and Custody of the Written Radiation Safety Program

Each Radioactive Materials *Supervisory User* (RAM-SU) will be assigned a copy of this Radiation Safety Program at the time of his or her initial request to be added to the University License. This copy shall be kept at all times in the area where the radioactive materials are used, as a reference for persons engaged in the project.



IV. The President's Authority and Responsibility Delegation

The President of San Francisco State University is vested with the authority and responsibility for ensuring that the campus radiation safety program is effectively implemented and in compliance with all relevant government regulations.

To this end, the University has assigned a campus Radiation Safety Officer, who is approved by the CDPH-RHB, to manage and implement the campus Radiation Safety Program.

1. Radiation Safety Officer

The Radiation Safety Officer (RSO) is responsible for the review of campus performance with respect to University and campus policies on radiation and radiation protection and for informing the Director of Environment, Health & Safety (EH&S) and Radiation Safety Committee on matters related to radiation safety.

The RSO is responsible for all aspects of radiation control on the campus. Annual reporting requirements include the following:

1. Written review of the radioactive materials program provided to the Radiation Safety Committee
2. Inventory update of government-owned sealed sources to the NMMSS On-Site Recovery Program.
3. Radioactive waste report to the RHB

See Appendix B for a complete list of RSO responsibilities.

2. Radiation Safety Committee

The Radiation Safety Committee (RSC) assists the RSO with program management and enforcement. The Committee no longer manages the radiation safety program, as the University no longer has a broad scope license.

When radioactive materials are in use, the RSC should meet at least once a year for the purposes of reviewing the Radiation Safety Program and to consider matters needing its attention.

1. The Committee members will include the RSO, Associate RSO, Chair, and at least one faculty member.
3. The RSO and Committee Chair shall be present at all RSC meetings.
4. The RSC may institute controls more stringent than that required by the RHB if deemed necessary to protect personnel safety, University property, or the environment.

3. RAM Supervisory User

Each radioactive materials *Supervisory User* (RAM-SU) is personally responsible for compliance with campus and governmental regulations as they pertain to the authorized use of ionizing radiation, such as the following:

1. Maintenance of current records regarding:
 - Receipt, use and disposal of radioactive material.
 - Monitoring of laboratories and workplaces, including, where appropriate, radiation and contamination levels.
 - Personnel engaged in radiation work under his/her supervision.
2. Having required records available for inspection at reasonable times by the RSO or government inspectors.
3. Documented instruction of all personnel under his or her supervision in proper procedures for control of radiation hazards and reduction of exposures.
4. Posting of required warning signs and labels, and for ensuring the proper storage of radionuclide containers.
5. Enforcement of requirements by all individuals on his or her radioactive materials use agreement
6. Disposal of all radioactive wastes in accordance with approved procedures.

4. Individual Authorized Users (students included)

Each authorized user is responsible for keeping all radiation exposures to himself or herself and others as far below the legal limits as practicable; for knowing and observing all precautions required by this Manual and the license; and for informing the *RAM-SU* or RSO of any unsafe conditions known to exist.



V. University Radioactive Materials License

San Francisco State University has a non-medical Academic License from the RHB-CDPH. Copies of this license are available for inspection at the office of the RSO. This license allows use of specific radioisotopes with specific limits of inventory for each.

Each radioactive materials *Supervisory User* (RAM-SU) is individually on the University License by name. Radiation Use Authorizations are no longer issued by the University. All uses of radioactive materials (RAM) must be approved by the RHB-CDPH. The Radiologic Health Branch (RHB) inspects SFSU periodically to determine compliance with license requirements, standard work practices, and federal/state regulations.

1. Conditions Requiring University License Amendments

All requests for additions or changes to license conditions must be vetted by the RSO before being forwarded to the RHB for approval and license amendment.

1. Use of radioactive material not specifically included in the license
2. Quantities in excess of the maximum stipulated in the license
3. Use at locations or field stations not authorized in the license
4. New RAM Supervisory User to be added to the license

VI. Obtaining Approval for Use Of Radioactive Materials

1. Application Process for New Supervisory Users

The RSO collects the necessary documents from the applicant and performs the initial review. Final approval of the project and conditions for use rests with the RHB.

1. Fill out the forms below and add any supporting documentation
 - RH 2050A form, "Training and Experience", from the RHB
 - SFSU RAD-A form, "Application to Use Radioactive Materials"
2. Provide the completed forms to the RSO
3. Work with the RSO to collect a submittal package to the RHB
4. The RSO will submit a signed letter to the RHB requesting the license change
5. The RSO and applicant will respond as needed to additional requests for information or documentation from the RHB
6. Wait for notification of approval and license change from the RHB

2. Process to Modify An Approved Use

Significant changes to the approved project or use of radioactive materials will usually require a license amendment. Any increase in quantity of materials possessed or the addition of a new radioisotope to the project must first be reviewed by the RSO. The RSO will then work with the applicant to submit a license amendment package to the RHB.

1. Fill out the forms below and add any supporting documentation
 - Request for proposed change in writing to the RSO
 - SFSU RAD-A form, "Application to Use Radioactive Materials"
2. The RSO will submit a signed letter to the RHB requesting the license amendment
3. Wait for notification of approval and license change from the RHB before implementing the changes

3. Process to Add a New Location

Adding a new location, whether a new room or off-site use will require a license amendment.

1. Fill out the forms below to add a new room, building, or other on-site location with the same address as the Romberg Tiburon Center or main SFSU Campus
 - Request for proposed change in writing to the RSO
 - SFSU RAD-A form, "Application to Use Radioactive Materials"
2. Work at an off-site location, including work done at sea, requires additional documentation:
 - RHB- form RH 2050, available on the RHB website
 - Acknowledgement or approval to use radioactive materials from the owner, operator, or responsible entity of the off-site location (if applicable)
3. The RSO will submit a signed letter to the RHB requesting the license amendment
4. Wait for notification of approval and license change from the RHB before starting work

4. Process to Add Non-Supervisory Users

Adding new radioactive materials users to a project under the supervision and responsibility of the *Supervisory User*, does not require a license amendment. The RSO can approve them internally and add them to your project/use.

1. Fill out the radioactive materials New User Enrollment form for each person and submit them to the RSO.
2. New users must complete a radiation safety training class with the RSO.
3. New users must complete and document job-specific training with the *Supervisory User* or his/her designee
 - No work with radioactive material is permitted until the New User Enrollment Form and initial radiation safety training is finished
 - No unsupervised work is permitted until the job-specific training is complete



5. Termination of Radioactive Materials Use

A *Supervisory User* may terminate his or her approval by making a request in writing to the RSO.

1. RAM-SU must remove all stock vials, sealed sources, and contaminated materials from their space. Unused stock must be returned to the RSO or transferred to another Supervisory User. All RAM must be accounted for to the RSO.
2. The RAM-SU must wipe down all surfaces and take a final set of contamination wipes (unsealed source use).
3. The RSO will arrange to decommission the space as directed by the RHB and ultimately amend the license to remove the affected spaces.

The RSO may suspend an authorized use if the Supervisory User is found to be in violation of his/her use agreement or the University Radiation Safety Program, until the issue(s) are corrected.

In cases where the *Supervisory User* is found to be willfully or negligently in violation of his/her authorization or the University Radiation Safety Program, the authorization may be terminated and radioactive materials impounded by the RSO.

VII. Procedure For Procurement Of Radioactive Materials

All radioactive material acquired must be within the bounds of the radioactive materials license. Prior to ordering from a vendor or obtaining material from another source, Supervisory User or his/her designee must obtain prior-approval from the RSO and obtain a "**Purchase Control Number**" or PCN.

Supervisory Users are required to maintain an accurate log of all acquired radioactive materials in their lab radiation safety documents binder. Copies of the log form are available from the RSO.

All purchases of radioactive materials must be made in accordance with SFSU purchasing policies and protocols.

Intentionally Left Blank



VIII. Delivery And Custody Of Radioactive Materials

1. Receiving Radioactive Materials

The receiving department or staff must inspect each shipping container for damage. The **package must be checked within 3 hours of receipt**. If the shipment is in good condition they shall deliver it to the *Supervisory User* or designated authorized user. If not in good condition, the RSO will be notified and the package and carrier held at the receiving location.

1. The Supervisory User or designated Authorized User shall inspect the package and complete an **"Incoming Radioactive Material Receipt Report"** form. A copy must be forwarded to the RSO as soon as possible along with attached wipe test report.
2. The designated authorized radiation user will inspect the radioactive material package using the following standard operating procedure:
 - a. Don standard PPE: lab coat, gloves etc.
 - b. Check for damage of shipping containers. Notify RSO if damaged or leaking.
 - c. Check radiation levels external to the package, if required by DOT regulations (yellow label packages). The RSO or RTC Lab Coordinator must perform this step.

Note that most radioactive materials ordered by SFSU are at quantities that do not require the yellow label.

- d. Read supplier's instructions for special operating procedures (if any).
 - e. Open package and verify the type(s) and quantities of radioisotopes. If there is suspicion of damage or leakage of primary container, perform a leak test.
 - f. Perform wipe test of labeled packages and inner containers to check for contamination.
 - g. Initiate decontamination procedures when contamination is found in excess of 200 dpm per 100 square centimeters (cm²)
For packages that are contaminated or have excess dose rate, the RSO or authorized designee will notify the shipper and vendor.
Criteria: External removable contamination >2200 dpm/100 cm². For gamma-emitters, contact package radiation level >200 mrem/hr, > 10 mrem/hr at 1 meter.
3. Fill out the top portion of a new **"Use and Transfer Log"** with the Purchase Control Number (PCN) and isotope details, which will be a running inventory of the stock as it is used.
4. Complete the Acquisition Log entry with the receipt information.

2. Custody/Inventory Of Radioactive Materials

Once delivered to the *Supervisory User*, that user shall become continuously responsible for the proper storage, labeling, inventory accounting, use, and disposal of the material. All material will be stored in secure areas, accessible only to authorized users.

The *Supervisory User* shall maintain a continuous inventory of these radioactive materials. The radioactive materials inventory shall be available to the Radiation Safety Officer (RSO) at anytime. At least twice a year, the RSO will request an updated inventory.

The RSO will track the full campus inventory and provide a summary to the Radiation Safety Committee at least once per year.

IX. Instruction Of Personnel In Radiation Protection

1. Initial Radiation Safety Training

Prior to handling unsealed or non-exempt radioactive materials, all prospective users, including *Supervisory Users*, must complete initial radiation safety training from the RSO. This training includes review of the physics of radioactivity, biological effects, radiation safety principles, and SFSU radiation program requirements. A written test is required.

Authorized Users must have the following documents on file and may work with radioactive materials unsupervised:

1. Enrollment/Training and Experience Form
2. Initial Radiation Safety Training (written test on file)
3. On-the-Job Training form on file
4. Refresher training documented (when applicable)

2. On-the-Job Training

In addition to the initial radiation safety review, prospective authorized users must go through "on-the-job" (OTJ) training with their *Supervisory User* or his/her designee. Supervisory Users must provide specific training for authorized users under their supervision regarding hazards, procedures, and requirements of their project and work space. A copy must be sent to the RSO and the original kept in the recordkeeping binder.



3. Refresher Training

Annual refresher training is required for all individual authorized users of *unsealed sources* to maintain "authorized user" status. *Supervisory Users* using only *sealed sources* may require annual refreshers as directed by the RSO or recommended by the RSC.

Enrolled students using sealed sources in classrooms are exempt from refresher training. Classrooms: Students working with sealed sources and other approved radioactive materials must be physically supervised by the instructor.

Ancillary personnel who will have to work in radiation-controlled areas must be brought to the attention of the RSO so they may be briefed appropriately.

Intentionally Left Blank



X. Radiation Exposure Limits And Policy

1. ALARA Policy

SFSU has an aggressive policy to prevent unnecessary radiation exposures to persons and the environment and to reduce all exposures to as low as reasonably achievable (ALARA), in accordance state regulatory requirements.

2. Occupational Dose

Radiation exposure shall be ALARA, but in no case exceed the regulatory dose limits specified below when exposures from external and internal sources are added together. SFSU has established lower administrative limits as part of our ALARA policy.

Occupational Dose Limits

Category of Dose Equivalent	Regulatory Limit	SFSU Administrative Limit
Total Effective Dose Equivalent (TEDE):	5,000 mrem/yr	500 mrem/yr
(Eye) Lens Dose Equivalent (LDE):	15,000 mrem/yr	1,500 mrem/yr
Shallow Dose Equivalent (SDE) Skin or extremities (hands and forearms, feet and ankles):	50,000 mrem/yr	5,000 mrem/yr
Total Organ Dose Equivalent (TODE):	50,000 mrem/yr	5,000 mrem/yr
Minors (individuals < 18 years of age)	500 mrem/yr or 10% of NRC limit allowed for adult workers	100 mrem/yr or 20% of SFSU administrative limit allowed for adult workers
Pregnant workers	500 mrem/9 mos* *gestation period	50 mrem/9 mos*

3. Public Dose

Public radiation exposure shall be ALARA, but in no case exceed the regulatory limits specified below when exposures from external and internal sources are added together. All activities conducted in a controlled area shall limit the exposure of non-radiation users to the regulatory limits for members of the public. Public exposure limits apply to students involved in educational activities (not otherwise qualified as radiation workers), "non-occupationally" exposed staff, faculty, and members of the public.

Public Dose Limits

Category of Dose Equivalent	Regulatory Limit
Annual Limit:	100 mrem/yr
Limit/guideline for dose in unrestricted area (public areas) in any one hour	2 mrem

4. Prenatal Radiation Exposure Policy

All female authorized users are strongly encouraged to contact the RSO and declare their pregnancy if they are pregnant or are planning to become pregnant. Due to the nature of the work done at SFSU and the type of radioactive materials, doses and exposures to ionizing radiation at SFSU are typically far below regulatory or administrative limits. However, there may be some cases where special precautions may be necessary to limit exposure.

- To be declared officially "pregnant" written notification to the RSO is required. A form letter is available from the RSO to declare one's pregnancy.
- Once a woman is declared pregnant, the RSO will provide information on risks to the developing embryo/fetus from ionizing radiation
- Options for monitoring and maintaining external and internal doses and exposures as low as reasonably achievable (ALARA) may be reviewed with the RSO.

Exposures must be maintained below the SFSU administrative limits of 100 mrem/yr (*body*) or 20% below *skin* or *extremity* limits.

- "Declaring" one's pregnancy is not required. However, if not declared in writing, dose/exposure limits remain at standard occupational levels.
- Discussion of the potential risks with one's doctor is recommended.



XI. Dosimetry and Bioassay

The RSO will require issue of dosimetry or biological sampling of authorized users if it is likely that an individual will receive greater than 10 per cent of the regulatory limits noted above. In general, body and extremity dosimeters will be required for those handling millicurie amounts of gamma emitting or high-energy beta emitting radioisotopes. If there is a significant risk of internal exposure due to the handling of volatile or dispersible radioisotopes, urine bioassay sampling will be required. This determination will be made by the RSO during the evaluation process of new use requests.

Individuals subject to these requirements will receive an annual report of radiation exposure, and will be immediately notified of any significant exposure (greater than 10 per cent of annual limits during an assay period). Procedure modification and/or work restrictions will be made as appropriate, based on exposures.

XII. Radiation Monitoring and Surveys

Immediately following the use of radioactive materials, users shall monitor the area and equipment for contamination (and for dose-rate if applicable).

Every area in which radioactive materials are used (except areas using **tritium** exclusively) shall have a survey instrument capable of detecting hazardous amounts of radiation. These instruments shall be continuously available for routine monitoring and for hazard survey following a radiation incident. These survey instruments shall be serviced annually.

- At least monthly, or as directed by the RHB, a thorough, documented wipe and instrument survey of all areas used with radioisotopes must be conducted.
- Contamination found outside the controlled work area (usually a papered bench area) identified by reading above background must be investigated, cleaned and retested.
- For designated work surfaces, cleanup criteria are 200 dpm per 100 square centimeter wipe or any reading above 100 CPM on a meter.
- Significant contamination must be immediately reported to the RSO - see EMERGENCIES. All wipe results must be reported in dpm.
- If a project is finished or inactive for a period of time, this must be documented in the survey log in lieu of a monthly survey.
- The RSO shall conduct periodic surveys and compliance audits.
- Survey meters shall be calibrated at least annually by a qualified service provider.

Intentionally Left Blank



XIII. Posting And Labeling

All rooms in which radioactive materials are used or stored shall be posted "**CAUTION- Radioactive Material**". These rooms will have controls in place to prevent unauthorized access to radioactive materials.

Areas where radiation levels exceed 5 millirem per hour, or greater than 100 millirem in 5 consecutive days must be posted with the radiation symbol and the words, "**CAUTION – Radiation Area**". These rooms will have access controls to prevent entry by unauthorized personnel.

Workspaces, such as bench tops, used for radioactive materials must be delineated with "**Caution-radioactive material**" label tape.

All containers holding radioactive materials for storage, or during processing and use, and equipment that may be contaminated shall be conspicuously labeled "**CAUTION- Radioactive Material**." Exception: counting samples. Containers with larger amounts of material should have the isotope and amount on the label.

State Form RH2364 "**Notice to Employees**" shall be permanently and conspicuously posted within areas in which radioisotopes are used

XIV. Shipment Of Radioactive Materials

Shipment of radioactive materials must conform to appropriate state and federal transportation regulations. The Radiation Safety Officer must be informed prior to any shipment of such materials from the University, in order to insure compliance with these regulations.



XV. Disposal Of Radioactive Waste

Radioactive waste will be collected in specially labeled approved closed receptacles in specific locations in each laboratory. High-energy beta emitters and gamma emitters must be properly shielded. Waste must be segregated by type (LS vials, solid, liquid, stock vials, mixed chemical, mixed biohazard) and radionuclide. Solid waste shall not contain any liquids and shall be contained in transparent plastic bags. Liquid scintillation vials shall be collected in plastic-lined containers or drums. Liquid waste shall be free of solids stored in glass bottles in secondary containment or stored in appropriate DOT collection drums.

During waste accumulation, keep track of the activity and composition so the waste may be properly characterized at pick-up. Notify the RSO prior to the creation of mixed chemical/radioactive waste.

1. When waste containers are 3/4 full, fill out a waste transfer tag with isotope, activity, chemical components, etc.
2. Survey the outer container by wiping. If the wipe is above 220 dpm, re-bag it.
3. Attach the waste transfer form. Notify the RSO for pickup.

A. Decay-In-Storage Method of Waste Disposal

This method involves properly storing the material and allowing the radioactive material to decay while in storage. Only radioisotopes with half-lives ≤ 90 days are eligible for disposal through decay-in-storage (DIS). Examples of eligible isotopes are P-32, P-33, S-35, and I-125

- Only the RSO may store and dispose of DIS material
- Storage must be secure and separate from other activity areas
- Each material in the DIS storage area will be tracked by the RSO.
- Materials must be stored for at least ten (10) half-lives.
- Before disposal as normal waste, materials will be surveyed to determine that its radioactivity cannot be distinguished from background. All radiation labels will be removed or defaced.
- The RSO will maintain records of the disposal of decayed materials for three (3) years.

B. Releases of Effluent

SFSU does not and will not release radioactive effluent at our Romberg Tiburon Center facility in Tiburon, California.

SFSU does not currently release effluent on its main campus.



XVI. Animal Use

Any use of live animals (not insects or other invertebrates) on SFSU property must first be first be reviewed by the Human and Animals Protections (HAP) committee and approved by the Institutional Review Board (IRB). Before a Radiation Use Authorization may be issued, a joint meeting with the RSO and members of both the IRB and RSC to review the project is required.

SFSU does not have the facilities to house large animals or primates. Any radioactive work with animals on campus will be limited to rodents, reptiles, invertebrates, fish, and insects/bugs.

SFSU does not currently use radioactive materials with live animals.

A complete description of the animal use and the facility will be provided before applying to the RHB for such use in the future.

Irradiation of insects and bugs via an x-ray machine will be handled under the SFSU X-ray Machine Safety Program.

XVII. Human Use

The administration of radioisotopes, internally or externally, to humans is not permitted at San Francisco State University. Any such use must be done at a campus or institution where an approved Human Use Committee is constituted, and all work will be under its jurisdiction.

Intentionally Left Blank



XVIII. Emergencies

For all campus emergencies, call 911 or 415.338.2222 (if using a cell phone) 24 hours per day.

For campus emergencies involving radioactive materials, the following is required.

For any spill or contamination detected outside the papered work area, stop work, cover the area with paper or plastic to prevent spread. Use moist material for dry contamination. Warn others in the area and restrict movement. The RSO must be advised at 415-338-6892 immediately, during normal working hours. Call Ext. 8-2222 during other hours and have the police contact the RSO. Start monitoring personnel and have them remain in the area until the RSO arrives. If there is a potential inhalation hazard assemble in a safe area until the RSO arrives. Turn off the room ventilation, if possible, and close the windows and doors.

For fires and/or injuries involving radioactive materials, call 911 or x8-2222 immediately. Advise the Dispatcher of the involvement of radiation. Ask the Dispatcher to contact the RSO. It is the responsibility of the Dispatcher to notify the responding agency (Fire Department and/or ambulance) of the involvement of radioactive materials, however the person reporting the accident should remain near the scene and advise these agencies of any pertinent information concerning this involvement.

For minor spills of radioactive materials with no significant skin contamination or physical injuries (contamination only in the controlled, papered work area), the following procedures should be used to decontaminate experimental equipment and facilities:

1. Monitor to determine the level and location of contamination. Mark off contaminated areas with radioactive caution tape.
2. Remove contaminated clothing then bag as radioactive waste.
3. Wash contaminated skin with a non-abrasive soap and cold water.
 - The sink can be decontaminated later. Focus on gently washing the skin
 - Keep contaminated wash water away from the skin. Abrasive cleaners and hot water can increase absorption into the skin.
4. Dispose of anything that does not need to be reused into the radioactive waste. Clean items to be reused with appropriate decon material. Dispose of cleaning material into the radioactive waste. Wipe items and release only if <200 dpm per 100 sq. cm. and non-detect with a meter.

For assistance with monitoring, contact the RSO.

The Regulatory Agency numbers are 916-327-5106 (State RHB Office) and 800-852-7550 (24-hour radiological emergency number)

Intentionally Left Blank



APPENDIX A Standard Work Rules

The following rules of good radiation protection practice should be scrupulously observed by all radiation workers to prevent unnecessary radiation exposure and minimize contamination.

1. Wear lab coats and impermeable gloves when working with unsealed radioactive material.
2. Use trays or tubs to store and transport containers of radioactive solutions that will hold the contents of the primary container in the event of breakage.
3. Store and transport liquid forms of radioactive material in securely closed containers.
4. Line trays and working surfaces with absorbent paper that has an impermeable backing.
5. Clearly label all containers of radioactive material and post all radiation and storage areas with the standard radiation warning symbol.
 - Labels on containers should bear the legend, "**Caution - Radioactive Materials**", preferably with an indication of the nuclide and quantity of radioactive material.
 - Placards for posting of radiation and storage areas should bear the legend, "Caution-Radioactive Materials". Areas with a radiation level exceeding 5 mR/hr at 1 foot must have appropriate labeling.
6. Use remote handling tools when needed to reduce hand exposure (P-32, gamma emitters).
7. Shield stored P-32 and gamma emitters appropriately.
8. Always use assigned dosimeters when handling material requiring them.
9. Conduct work with radioactive material in accordance with written radiation safety and operating procedures.
10. Monitor work areas, hands and clothing during procedures and at the end of the day. Perform required periodic documented wipe and meter surveys.
11. Report and/or clean spills and contamination promptly.
12. Do not eat, drink, smoke or apply cosmetics in areas where unsealed radioactive materials are used.
13. Use remote pipettes – Do not pipette by mouth.

Intentionally Left Blank



APPENDIX B RSO Duties and Responsibilities

CDPH 8243 MRA (04/18)

Duties and Responsibilities of the Academic Radiation Safety Officer and Delegation of Authority (Non-Medical)

Radiation Safety Officer (RSO) duties and responsibilities include ensuring radiological safety and compliance with California and Department of Transportation (DOT) regulations and the conditions of the license. These duties and responsibilities include ensuring that:

1. General surveillance is provided over all activities involving radioactive material, including routine monitoring, special surveys and responding to events
2. Incidents are responded to, investigated, and cause(s) and appropriate corrective action(s) are identified and timely corrective action(s) are taken
3. Proper authorities are notified of incidents such as loss or theft of licensed material, damage to or malfunction of sealed sources and fire
4. Violations of regulations or license conditions or program weaknesses are identified, effective corrective actions are developed, implemented and documented, as needed
5. Immediate termination of all activities following any unsafe condition or activity that is found to be a threat to public health and safety
6. RSO is the primary source of radiation protection information for personnel at all levels of responsibility
7. Radiation exposures are ALARA and ALARA practices are being followed
8. 10 CFR Part 20 and investigational levels are followed
9. Radiation protection procedures in the daily operation of the licensee's radioactive material program are developed, distributed, implemented and are up-to-date
10. Audits of the radiation protection program are performed and documented at least annually
11. Possession, use, and storage of licensed material are consistent with the limitations in the license, the regulations, the NSSDR Certificate(s), and the manufacturer's recommendations and instructions
12. Individuals installing, relocating, maintaining, or repairing devices containing sealed sources are trained and authorized by an NRC or Agreement State license
13. Training is personnel conducted and is commensurate with the individual's duties regarding licensed material

14. Documentation that individuals are not likely to receive, in one year, a radiation dose in excess of 10% of the allowable limits
15. The RSO is to verify that the total effective dose equivalent does not exceed the annual limit for members of the public. This determination is to be documented by measurement or calculation
16. When necessary, personnel monitoring devices are used and exchanged at the proper intervals, and records of the results of such monitoring are maintained
17. Fume hoods and glove boxes used for volatile radioactive material work are monitored for proper operation
18. The receipt, opening and delivery of all packages of radioactive material arriving at the laboratory are overseen and coordinated
19. An inventory of all radioactive materials is maintained and the types and quantities of radionuclides at the facility are limited to the forms and amounts authorized by the license
20. Sealed sources are leak-tested at required intervals
21. There is effective management of the radioactive waste program, including effluent monitoring
22. License materials is transported in accordance with all applicable DOT requirements
23. Violations of regulations or license conditions or program weaknesses are identified, effective corrective actions are developed, implemented, and documented, as needed
24. Appropriate records are properly maintained
25. Up-to-date license is maintained and amendment and renewal requests are submitted
26. On-site direct evaluations of the Radiation Safety Program are made by the RSO by physically visiting the site on a monthly basis or more frequently as needed
27. Dose records and surveys are reviewed quarterly
28. The qualifications of the new users are reviewed prior to their first use of radioactive materials first use

In the event of a RSO ending employment at a facility, the licensee must immediately notify the RHB of the event. Additionally, the facility must find a qualified individual to serve as the acting RSO and submit a completed Delegation of Authority to the RHB.

NOTE:

In the event of a proposed change in the facility's RSO or license termination, the current RSO must remain in the position until the RHB amends the license to reflect this request.



APPENDIX C Review and Amendment Log

Date	Amendments	Pages/Sections	Initials
02/08/2019	Amended reporting and RUA approval requirements that address the program changes from a broad scope license to an academic specific license.	V, VI, X	LEV
07/24/2019	Added Appendix C, the review and amendment log.	Appendix C	LEV
06/30/2021	Amended the role of the Radiation Safety Committee (RSC). The RSO, not the RSC, reports significant problems to the Office of the President.	Page 5	LEV
06/03/2022	Amended the description of the role of the Radiation Safety Committee for the change in license type.	Page 5/IV.2	LEV
	Added "RUAs are no longer issued by the University."	Page 7/V	LEV
	Added the words 'unsealed' to the standard work rules page when requiring lab coats and impermeable gloves	Appendix A	LEV
7/17/2023	Reviewed written program. No changes to the program were made.	N/A	LEV