


| | |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
|  | Environmental Health and Safety Request for Authorization to Procure and Use Radionuclides for Non-Human Use |
| Date of Issuance: | Revision Date: 6/2/2021 |
| Revision Number: 1 | Prepared by: EHS |

Complete the items in the form below, as indicated. Use as much space as required for each entry. Submit form to Radiation Safety 313 Mellon Institute for review. Forms are to be typewritten.

1. Applicant:

Name:

Department:

| |
|-------------------------------------------------------------------------------------------------------|
| Authorization No. Expiration Date: License No. Received: Radiation Safety ONLY |
|-------------------------------------------------------------------------------------------------------|

2. Addresses: Office:

Email:

Campus Mail:

3. Telephone(s): Office:

Laboratory:

Home:(Required)

4. Type of application: Check all that apply.

- New, research
- New, classroom only
- New, sealed sources or devices
- Renewal of current authorization #

5. Project Title

6. Radionuclides and activity: List all of the radionuclide(s) and the activity to be covered by this authorization. In general, list all nuclides that will be used in your research on this one application. The generic chemical may be used.

| Radionuclide | Possession Limit (mCi) ¹ | Typical activity per order (mCi) ² | Physical form ³ | Generic chemical form ⁴ |
|--------------|-------------------------------------|-----------------------------------------------|----------------------------|------------------------------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

¹Possession Limit: Maximum activity permitted in your laboratories at any one time. INCLUDING the activity in the waste containers. This should probably be no more than 5 times the amount you expect to purchase at any one time.

²Typical activity per order: Activity that you expect to order for use in the laboratory.

³Physical form: Solid(S), Liquid(L), Gas(G), Sealed Source(SS), Plasma (P)

⁴Chemical form: Nucleotide, methionine, acetate, activated metal, etc.

7. Location: List all rooms where radionuclides will be used and/or stored. Describe the facilities, such as sinks, hoods, cold rooms, counting rooms, dark rooms, etc.

| Room | Building | Intended Use (Lab bench, dark room) | Facilities (hoods, sink, etc.) |
|------|----------|-------------------------------------|--------------------------------|
| | | | |
| | | | |
| | | | |

8. Personnel: List all persons, and their email addresses, who are permitted to receive and use radioactive material under this authorization. All persons listed must have completed radionuclide safety training at Carnegie Mellon prior to beginning work with radioactive material. When someone new starts working in your laboratory, notify Radiation Safety.

| Name | University Status (faculty, staff, post-doc., etc.) | Email |
|------|--------------------------------------------------------|-------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

9. Proposed use(s): Briefly describe the proposed use(s) of the radioactive material.

10. Procedures: Describe the experimental procedures that involve radioactive materials. The procedures should be in sufficient detail for the reviewer to determine the amount of radionuclide and other reagents used (this is needed to determine the amount and composition of the waste from each experiment). The description should also indicate the precautions to prevent contamination and radiation exposure of personnel. If airborne radioactive material can be produced (powder, vapor, gas, aerosol), describe the procedures and facilities that will be used to control the airborne material. The radionuclide user is required to routinely survey his/her work station for contamination using a survey meter plus wipes and/or smears. *IF YOU WILL BE USING A STANDARD PUBLISHED PROCEDURE, PLEASE ATTACH A COPY.*

11. Radiation detection equipment: The equipment listed below is provided by Radiation Safety and must be used to detect radiation and radioactive contamination. The type of instrument, manufacturer, model, and range (cpm or mr/hr) for all instruments is included. All laboratories, except those using only tritium, are required to have a portable survey meter in that laboratory any time radioactive material is used. Therefore, shared portable survey instruments are not acceptable. Laboratories using tritium must have a liquid scintillation counter (LSC) available, but not necessarily located in that laboratory.

| Type of detection, equipment, and location | Manufacturer | Model | Type of Probe | Range of Detector |
|--------------------------------------------|--------------|-------|---------------|-------------------|
| LSC in room | | | | |
| Auto-gamma in room | | | | |
| Portable survey meter | | | | |
| | | | | |
| | | | | |

12. Waste disposal: The radionuclide user is responsible for preparing, segregating, labeling, and storing all radioactive waste according to the procedures established by Radiation Safety. No radioactive waste may be released to the sanitary sewer, the hood, or the normal trash container in the lab. In the table below, estimate the volume and activity of the waste to be generated.

| Waste type | Volume (gallon/month) | Activity (mCi/month) |
|-------------------------------|-----------------------|----------------------|
| Solid (paper, plastic, glass) | | |
| Liquid (aqueous) | | |
| Liquid (organic) | | |
| Liquid scintillation vials | | |
| Animal carcasses | | |
| Other | | |

12.1 The use of the hazardous chemicals should be avoided if possible. If these chemicals are required for your research, each must be discarded into a separate radioactive waste container to minimize the total volume of radioactive/chemical waste that will require special handling. Radiation Safety staff will gladly assist you in finding special waste containers and shielding to fit your needs. The use of any heavy metal or solvent chemicals in combination with radioactive material should be avoided.

I will be using hazardous compounds in my radiological research and will require special containers from radiation safety for their storage.

List all of the chemicals that are used in your experiments that will be in the liquid radioactive waste. List the full name of the chemical, not just the name of the buffer. (Circle the hazardous chemicals that you know you will be using.)

12.2 Because radioactive pathogen waste or recombinant DNA waste is biological as well as radiological hazards, both sets of regulations apply to this waste. All liquid radioactive waste containers that will contain biological waste must contain at least 10% bleach solution (based on final volume) to inactivate pathogens and prevent microbial growth during storage. All solid radioactive waste containing bio-hazardous material must be sterilized in an autoclave prior to placing the material into the solid radioactive waste containers provided by Radiation Safety.

I will not be generating any pathogen waste or recombinant DNA waste in my radiological research.

I will ensure that 10% (final concentration) bleach is added to all aqueous waste containers that will contain biological waste **prior** to adding biological waste to the container.

I will ensure that all solid pathogen radioactive waste is sterilized **prior** to placing the radioactive material into the solid waste container.

12.3 Because radionuclides in animals may pose special disposal problems, additional handling and preparation in the laboratory may be required. In addition, because waste disposal may be difficult or expensive, producers of high-activity animal waste may be charged for waste disposal.

- I will not be using radioactive material in live animals.
- I will be using radioactive material in live animals. **Complete RS2.1, Form 4, Request to Use Radionuclides in Animal Studies.**
- I will be producing radioactive animal waste as follows:

12.4 Because flammable liquid scintillation cocktails pose an added disposal expense and are a hazard in the laboratory, laboratories are strongly encouraged to use non-flammable LS fluid. Non-flammable fluid is liquid with a flash-point greater than 1400 F (600 C). If specific requirements of your research require the use of flammable fluids please explain the reasons for this request.

- My research requires that I use flammable liquid scintillation fluid. My reasons are included as an attachment to this application.
- I will use only non-flammable liquid scintillation fluids. Examples include: Cytoscint, Ecolum, Fischer's Scintiverse BD, Scintisafe Econo 2, Scintisafe EconoF, National Diagnostics Ecoscint A, C, H, and O, and OptiScint Hisafe and Hisafe 3 (These examples are not to be taken as endorsements or referrals).

13. Training: Title 10, Part 19.12 of the Code of Federal Regulations requires that all personnel working with sources of ionizing radiation be trained in the procedures and precautions necessary to minimize radiation exposure. Personnel, listed in section 8, who will be USING radioactive materials in your laboratory must have been trained by Radiation Safety, and passed the exam. The Radiation Safety Office provides a web-based training presentation and demonstration session. What additional training will you provide?

- New personnel will be trained by me or by one of my senior trained personnel in the safe handling of radioactive material, the use of survey meters, how to perform wipe or smear tests, how to maintain inventory records, how to prepare radioactive waste for pickup, and how to maintain proper security of radioactive materials.
- Personnel performing iodinations or using more than 5 mCi of ³²P at one time will be trained by me and then will arrange for specific laboratory training by Radiation Safety.
- My laboratory requires a vehicle to transfer radioactive material between research locations. I will arrange to have personnel trained by Radiation Safety prior to having anyone perform such a transfer.
- This radionuclide is used as part of an approved class. Training of the class by Radiation Safety will be requested.
- Long term radioactive animal caretakers will need to be trained by Radiation Safety.
- Additional training specific to this authorization includes:

14. Security of radioactive material: You are responsible for providing security adequate to "prevent the unauthorized removal of radioactive material" from any location where you and your staff use or store radioactive material. Explain how your security will be maintained. The methods listed below may be changed with the consent of Radiation Safety. Recall, security must be properly maintained at all times.

- Laboratory door(s) will be locked at all times, even when room is occupied.
- All radioactive material will be securely locked except when it is in uses. It will be under direct supervision at all times when the room is not locked.
- Room will be locked when lab personnel are not present.
- Other:

15. Exemptions: If you are requesting a special exemption to normal RSC policies, or if you wish to continue an exemption previously granted by the RSC, explain your request. Include a copy of any supporting documents. An example would include special laboratory arrangements that allow food consumption in a part of the lab.

16. Restrictions: The Radiation Safety Officer and/or Radiation Safety Committee will complete this section prior to approval.

17. Applicants statement

The applicant is responsible for insuring that all persons using radioactive material under this authorization have been adequately trained in the procedures used in the laboratory and are aware and agree to comply with the rules and procedures set forth in the Regulations Regarding Safe Use of Sources of Ionizing Radiation. Radioactive material is only to be used as described in this authorization and in the locations listed in section 7. No use of radioactive material in humans or in field releases is permitted. All procurement, transfer, or shipment of radioactive materials is to be done through radiation safety. Experimenters are responsible for performing routine contamination surveys and the immediate decontamination of contaminated areas. The Radiation Safety Committee reserves the right to revoke or cancel this authorization.

I understand the conditions of this authorization and agree to comply with the *University Rules and Procedures for the Use of Radioactive Material.*

Applicant: _____
Signature Date

18. Radiation Safety’s recommendation for authorization approval

Radiation Safety Officer: _____
Signature Date

19. Radiation Safety Committee Review

Departmental Representative: _____
Signature Date

Chairperson: _____
Signature Date

Optional—Purpose of Research: Please describe in broad general terms, suitable to a person not in your field, why this research is interesting, and what you hope to discover or develop. One or two brief paragraphs should be sufficient. **This is for information only, and is not part of your application. It will mainly be used to explain to people who do NOT work with radioactive material, why radioactive material is needed on campus.**

**Carnegie Mellon University
Training Summary
RS2.1, Form 2**

First Time Applicants Only

First time applicants must satisfy educational, training, and experience requirements before they will be permitted to act as a Radiation Laboratory Supervisor. Please provide the following information, identifying the formal training and experience you have in the specific topics listed below.

Formal Classroom Education or Training

| Topic | University/college or company name and address where you received education or training | Course Title | Course Length (in hours or number of credits) |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------|-----------------------------------------------|
| General principles of radioactivity and radioactive materials | | | |
| Characteristics and types of ionizing radiation. | | | |
| Units of radiation dose and radioactive materials quantities. | | | |
| Radiation detection instrumentation. | | | |
| Biological hazards and effects of exposure to ionizing radiation. | | | |
| General principles of radiation protection practices. | | | |

Radiation Detection Instrumentation

| List each instrument separately. (GM survey meter, liquid scintillation counter, gamma spectroscopy, etc.) | University/college or company name and address where you gained experience with the instrument. | Type of work performed. (Contamination surveys, sample analysis, etc.) | Years of experience. |
|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Please identify the types of dispersible radioactive materials, sealed sources, or radiation generating devices you have experience working with and the type of work performed.

| Nuclides and/or devices used. (List individually.) | University/college or company name and address where you gained experience working with these materials. | Type of work performed. (DNA labeling, gel electrophoresis, radioiodinations, x-ray crystallography, etc.) | Activity of nuclides used (mCi). | Years of experience. |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

STATEMENT OF AGREEMENT
RS2.1, Form 7

The below named individual(s) signifies that he/she has read and is willing to abide by the university regulations concerned with the use of radionuclides. The undersigned also has available copies of NRC regulation 10 CFR 20 and Pennsylvania Code Title 25, and agrees to comply strictly with all regulations, license conditions, and conditions on the attached RS2.1, Form 1, pertaining to the safe use of radiation sources in his/her possession.

Signed

Name and Title of Applicant

Date

Radiation Safety Committee Chair

Date

Radiation Safety Officer

Date

Attachment: RS2.1, Form 1

NOTE: The Statement of Agreement is applicable to the attached application and all accompanying forms as approved by the Radiation Safety Committee. Any requests for increased possession limits, additional nuclides not already specified, or use in other areas or processes not already approved will require an amendment to the RS2.1, Form 1 or a new application on RS2.1 forms 3 and 1, respectively.