

# Radiation Safety Refresher Training 2022



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# Outline



- Results of 2021 RSC Summer Audits
- Training
- Radioisotope Inventory, Tracking, & Accountability (RITA)
- Waste
- Contamination Surveys
- SHIELD by BioRAFT: Lab Management Tool

# 2021 RSC Summer Audit

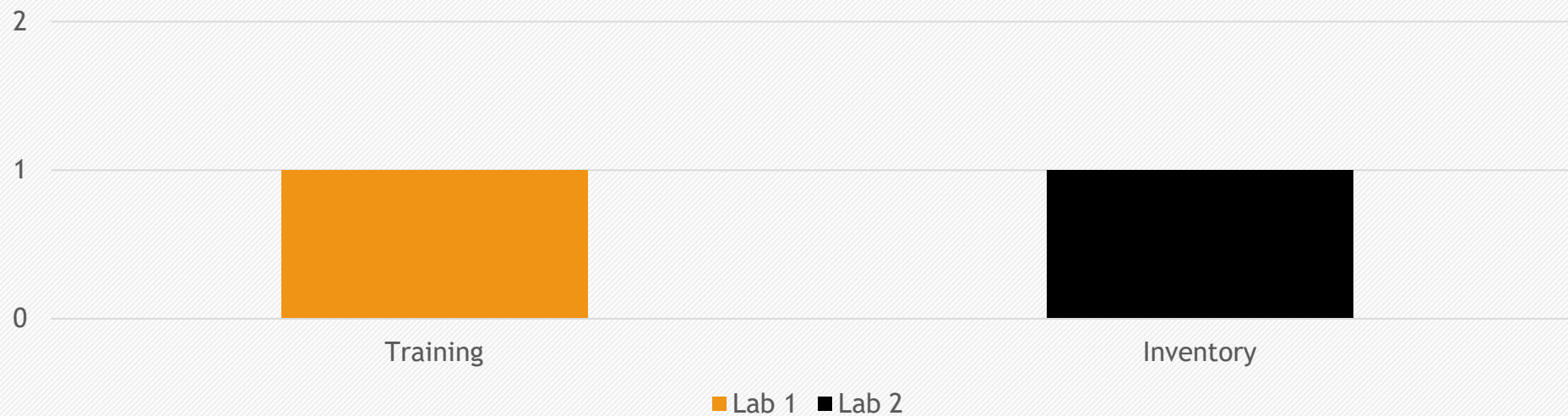


2 labs inspected

2 total findings

1 relating to training

1 relating to inventory



# Training: Who, What & How



All members of this lab must complete radiation safety training.

## ★ Radiation Safety Awareness

★ Training for all who do not use RAM

## ★ Radiation Basics (5 Modules), Radioactive Materials Safety Class & Protocol Specific Training

★ Training for PI, lab managers, and researchers who use RAM

The screenshot displays the Princeton University Employee Learning Center interface. At the top, there is a navigation bar with links for Home, Contact, Help, and Logout. Below this is the Princeton University logo and the text "Employee Learning Center". A secondary navigation bar includes "My Training", "All Training", "Training by Department", "Training by Topic", "At Your Desk", and "Home". The main content area is titled "Training by Department" and includes a sub-header "Choose a Department from the tabs below. Click on a topic to see a list of available training opportunities in that area." There are several departmental tabs: Environmental Health & Safety, Finance & Treasury, Human Resources, OIT, ORPA, University Services, PPPL, and Health & Wellness. The "Environmental Health & Safety" tab is selected, showing a list of training topics including All Safety Training, Biological Safety, Multi-Discipline, Workplace Safety, Laboratory Safety, COVID-19 Awareness for Faculty Staff and Researchers, COVID-19 for Students, Radiation Safety, Emergency Preparedness, Fire Safety, eLearning, and Department Highlights. Below this, there is a section for "Environmental Health and Safety | Radiation Safety" with a link to "Click here for Radiation Safety eLearning (WEB) courses." and a note "To register for a session, click on the enrollment name." A table titled "Enrollments" is shown with the message "No records found." Below the table, there are several course listings under the heading "RAM-Radiation Safety":

- Radiation Basics Modules for Contained Source Users DEC2020** - This radiation safety training presentation is intended for people who plan to use contained sources of radioactivity. [Click here to start this course](#)
- Radiation Basics Modules for Open Source Users DEC2020** - This radiation safety training presentation is intended for people who plan to use open sources of radioactivity. The Radiation Basics modules are a prerequisite for attending the Radioactive Materials Safety Class. [Click here to start this course](#)
- Radiation Safety Awareness Training for Non-Radioisotope Users - DEC2020** - Radiation safety training awareness training for researchers who work in areas where radioactive materials are used but who do not use radioactive materials themselves. [Click here to start this course](#)
- Radiation Safety Training for Uranium and Thorium Users DEC2020** - Training for Princeton University researchers and staff who use uranium and thorium compounds in small amounts for applications such as electron microscopy. [Click here to start this course](#)
- Refresher - Radiation Safety Training for Contained Source Users DEC2020** - A web-based training session offered to users of Category B, C, and D contained

# Training: More on the Who



We rely on SHIELD to identify who needs what.

★ Based on Job Responsibilities

★ SHIELD must be managed by at least 1 individual in the lab

The screenshot displays the BioRAFT user interface. At the top right, it says "Welcome, Colt L. Greer" with links for "Home", "Support", and "Logout". The main header includes the SHIELD logo and the text "Welcome to BioRAFT". Below this, there is a search bar for "Find Individual or Group" and a "Search" button. A sidebar on the left lists several menu items: Research Management, Inspections, ChemTracker, Research Tools, Training, Equipment, and My Account. The main content area is divided into several sections: a warning box about an incomplete "Animal Contact Review Wizard", an "Announcements" section with no recent announcements, a "Required Training" section with unknown or not set requirements, and a "Compliance E-Mail Inbox" with three entries dated 02/24/2022 and 02/21/2022. There is also an "SDS Search" section with a search bar and a "Need Support?" button with a lightbulb icon.

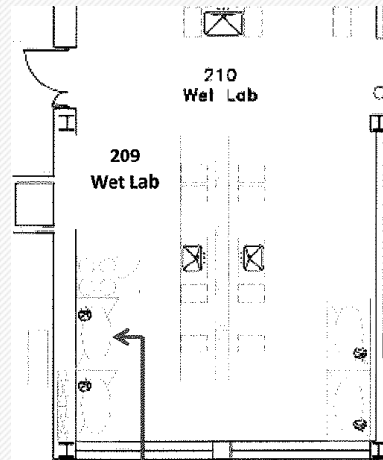
# Training: More on the What



The lab's request to use RAM is reviewed and approved by the Radiation Safety Committee.

The authorization is specific to:

- ★ Isotope
- ★ Chemical Form
- ★ Procedure
- ★ Conditions



This fume hood will be used for opening containers that may contain volatile S-35. Radioactive waste and stock vials are stored in this section of the lab.

## 12. Conditions of Use:

Radioisotope use must be conducted in accordance with the requirements of the Princeton University radiation safety program as set forth in the Princeton University Radiation Safety Guide and the Radiation Safety Manual, and in accordance with the procedures described in Prof. Rabinowitz's authorization applications.

## 13. Additional Conditions of Use

The following additional conditions are imposed:

- EHS will inspect the hood and infusion work area prior to the first round of infusions to ensure that the area is properly prepared.
- EHS will conduct a thorough wipe survey after the first round of infusions to advise lab members about the extent of contamination of equipment and to review decontamination procedures.
- EHS will provide waste collection/storage procedures for the mixed wastes and all types of animal wastes.

## 12. Conditions of Use:

Radioisotope use must be conducted in accordance with the requirements of the Princeton University radiation safety program as set forth in the Princeton University Radiation Safety Guide and the Radiation Safety Manual, and in accordance with the procedures described in Prof. Rabinowitz's authorization application, as well as the following conditions:

- The lab continues to follow the conditions placed on the original authorization approval (attached).
- Opening the sealed tissue culture flasks must be performed within the chemical fume hood to minimize the potential of releasing  $^{14}\text{CO}_2$  within the lab space. Once there is sufficient data that quantifies the amount of labelled  $\text{CO}_2$  released in this process, EHS will re-evaluate.
- The lab must notify the RSO of any desire to modify the experiments to increase the activity in any single experiment/labeling operation prior to making the modification to experimental protocol.

# Radioisotope Inventory, Tracking, & Accountability (RITA)



- Inventory: Promptly dispose of stock vial once removed from RITA
  - [RITA | Review User Inventory](#)

## Vial Use Log

<b>Authorization #</b> I-0930	<b>Authorized User</b> Shenk, Thomas
<b>Vial Activity</b> 15.0000 mCi	<b>Vial ID</b> 02-0345

**When this vial has been discarded as waste, return the vial use log to EHS, 262 Alexander Street**

Date	User	Volume withdrawn (uI)	Balance on hand (uI)	Activity withdrawn (uCi)	Comments



# Receiving a Package at the Lab



When you accept a package:

Immediately secure it, such as storing in the locked rad freezer. Never leave it unsecured while you finish other tasks.

Before you dispose of the packaging, be sure to deface or remove or cover all *Radioactive* labels and markings.

Be sure to survey the packing list and packaging before you discard it.





# Waste: Dry RAM



You must close and seal the bag.

Sealed with zip tie

**Do NOT overfill!**

- Contact EHS - [ehs@princeton.edu](mailto:ehs@princeton.edu)
- ANY HOUR OF ANY DAY **609.258.5294**
  - Press “2” to be connected to the EHS on-call phone with an urgent health and safety matter

**EHS may reject non-conforming waste.**



The date you write on this tag is the date that you schedule EHS to pick up the pail, not the date you start using the pail.

# Waste: Sewer Release Protocol



- Non-Hazardous
- Soluble in water or readily dispersible biological material
- pH between 5.5 and 9.5
- Flush with lots of water so it doesn't get caught in the trap
- [Updated list of compounds posted](#) (2019)



# Radioactive Compounds Approved For Drain Disposal

The following radioactive compounds are approved for disposal in Radioactive Disposal Sinks.  
For compounds not listed here, contact EHS for written approval prior to disposal.

Acetic Acid	Glucagon	Orthophosphate
Acetyl CoA (coenzyme A)	Glucose	PIPES (buffer)
Adenosine Diphosphate (ADP)	Glycerol	Ribonucleic Acid (RNA)
Adenosine Triphosphate (ATP)	Glycine	Saline Solution
Albumin	HEPES (buffer)	Saline sodium citrate (SSC)
Bicine	Histidine	SDS - Sodium Doecyl Sulfate
Buffer Solutions	Inositol	Sodium Chloride
Calcium Chloride	Leucine	Sodium Phosphate
CAPS	Lipopolysaccharides	TES
Coomasie Brilliant Blue	Magnesium Chloride	Tricine
Cyclic Adenosine-3, 5-monophoshate (CAMP)	Maltodextrins	TRIS
Cysteine	Mannitol	Urea
Cytidine	MES (buffer)	Uridine Diphosphate (UDP)
Cytidine Diphosphate (CDP)	Methionine	Uridine Triphosphate (UTP)
Cytidine Triphosphate (CTP)	Monopotassium Phosphate	Vitamin B1 (Thiamine)
Dextrose	Monosodium Phosphate	Vitamin B12 (Cobalamin)
EDTA	MOPS (buffer)	Vitamin B7 (Biotin)
Ferritin	Nicotinamide Adenine Dinucleotide (NAD)	

Contact EHS with questions: 609-258-5294 [ehs@princeton.edu](mailto:ehs@princeton.edu)

Updated 02/2019



# Contamination Surveys



- Performed after every use.
  - Work Area
  - Self
  - DOCUMENT EVERYTIME
- EHS performs monthly provided the lab has used.

RADIOISOTOPE LABORATORY SURVEY LOG

DATE	TIME	SURVEYOR'S NAME	ISOTOPE USED	SURVEY TYPE		SURVEY RESULTS IN CPM & COMMENTS DO NOT USE "OK" OR "BACKGROUND"	SURVEY METER USED: MFG., MOD & S/N AND PROBE TYPE
				PERSONAL	WORK AREA		
1/12/00	2 <sup>30</sup> pm	S. Dupré	P-32	✓	✓	≤ 50 cpm except 1000 cpm on hood sash; cleaned sash to ≤ 50 cpm.	EHS # 1

# SHIELD by BioRAFT: Lab Management Tool



We use SHIELD to management the labs:

- ★ Personnel
- ★ Job Responsibilities
- ★ Training
- ★ Hazards
- ★ Equipment

The screenshot shows the SHIELD by BioRAFT web application interface. At the top right, it says "Welcome, Colt L. Greer" with links for "Home", "Support", and "Logout". The main header features the SHIELD logo. Below the header, there is a search bar for "Find Individual or Group" and a "Search" button. A navigation menu on the left lists: Research Management, Inspections, ChemTracker, Research Tools, Training, Equipment, and My Account. The main content area is titled "Welcome to BioRAFT" and includes a warning: "Your 'Animal Contact Review Wizard' is incomplete. [Start Now](#)". There are three main sections: "Announcements" (no recent announcements, with links for "View All Announcements" and "Add Announcement"), "Required Training" (training requirements unknown or not set, with links for "Training History" and "Course Directory"), and "Compliance E-Mail Inbox" (listing three emails from 02/24/2022 and 02/18/2022 with links to view the inbox). Below the inbox is an "SDS Search" section with a text input for "Chemical Name or CAS Number" and a "Search" button. At the bottom right, there is a "Need Support?" section with a lightbulb icon and a link to view the knowledge base. The footer contains the BioRAFT logo and copyright information: "BioRAFT © v3.10.140.3 (Willis Lamb), All Rights Reserved" with links for "Contact Us" and "Mobile version".



# Thank you!



Contact EHS - [ehs@princeton.edu](mailto:ehs@princeton.edu)

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Press “2” to be connected to the EHS on-call phone with an urgent health and safety matter