

The Atom

Newsletter of the Division of Radiation Safety



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New DRS Website Is Live!



For two and a half years, since September 2019, the NIH Office of Research Services (ORS) Division of Radiation Safety (DRS) worked to update and improve its branding and digital footprint, especially relating to enhancing the [DRS newsletter \(Atom\)](#) (internal site) and updating [the internal website](#).

An initiative to update all ORS Division websites to ensure consistency in navigation and layout, color schemes, and informational flow commenced during the DRS project, and DRS decided it was time to have [an external facing site](#) as well. The DRS Atom is now also located [on the external website](#) (in addition to the internal website). Aided by a Communications and Website Development Support contractor, DRS completed the former task and was proud to launch the new external website in April 2023. DRS encourages your review of both websites and would appreciate any feedback you may have.

Smears required: Zr-89 Use at NIH

To coincide with the updated DRS website, a new Radiation Safety Guide (RSG) was written. This is the first RSG produced by DRS since 1998. It consolidates DRS' policies into a single document for those who prefer that format. Included in the new RSG is a more comprehensive table of nuclides in use at the NIH and the proper method for detecting them in contamination surveys. The table distinguishes whether a lab is spot checking during an experiment (just looking for gross contamination) or verifying the lab is below the applicable contamination limits at the end of the day (more sensitive survey to assess against the allowable limits).

Of importance to note is that **some nuclides**, while having energetic emissions, **still require smears to verify lab contamination limits**. Why is that? Let's take a nuclide that is trending at NIH right now: Zr-89. It emits a 900 keV positron. A pancake GM probe can easily detect this. So why must we use smears to assess for contamination? It turns out that Zr-89 only decays this way about 23% of the time. Coupled with the estimated detection efficiency for its positron, this leaves an effective detection efficiency of 4-5%, which is too low to detect to the unrestricted limits and difficult at best to detect to the restricted limit. But what about energetic 511 and 909 keV gammas from Zr-89; can't the GM probe detect those? It turns out that most gammas pass through your detector without interacting. Thus, at most, only 1-2% extra efficiency could be added. Other nuclides that have this issue are Cr-51, Mn-52, Zn-65, and I-124.

DRS also wishes to point out that guidance for another nuclide, Fe-55, is different from past guidance. DRS now recommends smears for all types of Fe-55 surveys. The reason is that only

Please send comments to:

RadiationSafety@mail.nih.gov

or

DRSTraining@mail.nih.gov

one specific specialized hand-held instrument (Ludlum 44-172) is designed to detect Fe-55's extremely low-energy x-rays (just 6 keV), and even then the efficiency is just 7%. The NaI gamma scintillation probes that DRS has or that an I-125 lab may possess (Ludlum 44-9 or 44-17) are not suitable for energies below 10 keV.

Take a look at the table below and ensure YOUR lab is using the appropriate detection method to find contamination if it's there.

Nuclides	For personnel or check for gross lab contamination:	For verifying a lab is not contaminated at the lab limits (end of day or spill surveys)	Notes
H-3, Fe-55, Ni-63	smears	smears	Very low energy beta emitters that cannot be detected by hand-held instruments
C-11, N-13, F-18, P-32, Cl-36, Mn-51, Fe-59, Zn-65, Cu-64, Ga-68, Br-76, Y-86, Y-88, Sr-90, Tc-94m, I-131, Lu-177, Bi-205	Pancake GM probe	Pancake GM probe	High-energy beta or beta/gamma emitters
C-14, P-33, S-35, Ca-45, Cr-51 ¹ , Mn-52 ¹ , Zn-65 ¹ , Ga-67, Se-75, Zr-89 ¹ , I-124 ¹	Pancake GM probe	smears	Low energy beta emitters or low abundance emitters
I-125, I-129	NaI probe or smears	smears	Very low energy x-ray/gammas
Tc-99m, In-111, I-123, Gd-153, Tl-201, Pb-203	Pancake GM probe or NaI probe	smears	Low energy x-ray/gammas
At-211, Pb-212, Bi-213, Ra-223, Ra-224, Ac-225, Ra-226, Th-227, Am-241	ZnS probe	ZnS probe	Alpha emitters; a pancake probe can be used if ZnS meter fails

Cautions on Long-Term Storage of Radioactive Material

Is your lab storing long-lived radioactive material? We understand that researchers sometimes need to store radio-labeled cells or keep stock vials of long-lived radioactive material (think H-3 and C-14) for future use. But this can be problematic for the research lab. For one thing, the viability of the material may degrade with time. Though the radioactivity is long-lived, the ligand or compound may not be. From an Amersham safety sheet: "Chemical decomposition occurs as a natural process in all compounds during storage. However, this type of decomposition may be accelerated by free radicals which are formed as a result of the energy released in radioactive decay." DRS recommends that you have an awareness of the practical limitations of storing your research products. The safety guidance additionally cautions that microbial contamination is a possibility once the vial has been opened.

Secondly, there can be significant issues with H-3 (and to a lesser extent, C-14) compounds seeping through the plastic or glass of the container itself, leading to contamination of your freezer or refrigerator over time. This is especially true for H-3 atoms, which of course are just hydrogen, inter-changing with hydrogen atoms of the plastic polymer, then the freezer frost and

ice when in long-term storage. When defrosted, the freezer will spread contaminated water throughout the appliance and onto lab surfaces. The longer the storage time, the more opportunity for atoms to migrate. This will be a real headache when it's time to decommission your lab! Double-containment of all H-3 and C-14 containers, especially if they are to be held for long-term storage, is essential.

Improper storage of radiolabelled compounds can include:

- Centrifuge tubes not stored in racks, eventually tipping sideways, and contents will eat through the caps, then the shelving materials (steel, wood, plastic)
- Similarly, scintillation vial lids are likely not compatible with the chemicals used and may completely get dissolved, whereupon vial contents will eat surrounding materials and run down shelving, soaking into anything porous
- Highly volatile materials will seep/weep out of vials/containers and spread contamination
- Plastic vials containing H-3 compounds will eventually develop tritium contamination on the external surface, spreading contamination

A third problem of long-term storage is a practical one: the longer a source vial is stored, the greater the chances it has of being forgotten. Authorized Users are accountable for their radioactive materials inventory and no one wants the hassle of a potentially lost item on their watch.

DRS encourages you to dispose of radioactive samples and vials you no longer need. The longer you store a sample, the more likely it is to degrade and lead to contamination issues. Use the annual inventory time as an opportunity to assess your radiological needs. To request disposal of any radioactive sample (even if after many half-lives) call the Radwaste Service at 301-496-4451.

Delegating Portal Privileges: A Brief How-To

One question we commonly receive here at DRS is how an Authorized User can designate AU Portal privileges to Individual Users. We are including the slides below as a simple guide for your convenience.

Manage Account Access



The Office of Research Services
Division of Radiation Safety

Division of Radiation Safety welcomes you - NIH USER (USERID)



MAIN MENU	MANAGE ACCOUNT ACCESS	
DRS NEWSLETTERS AND DOCUMENTS	NAME	Description
GENERATE MONTHLY MEMO	Grant User Access to your Account	Allows an Authorized User to Delegate various access privileges to other users. This is
LABORATORIES MANAGEMENT	Modify User Access to your Account	Allows an Authorized User to Update the access privileges of users that have been delegated to manage his/her account.
MANAGE ACCOUNT ACCESS	Print list of Privileges Granted	Prints a detail list of users and the privileges they have been granted
MATERIALS MANAGEMENT		
HHS MANAGEMENT		
USER MANAGEMENT		
WASTE MANAGEMENT		

In this section, you can grant access to your account and designate various privileges to individual users registered with DRS.

This is useful for AUs who choose to designate certain responsibilities to their individual users such as waste management or 88-1 submission.

Manage Account Access, Grant User Access to your Account

ACTIVE USERS

Authorized User Id	User Id	Name	Location	Choose
16600				Find
2812	ISAAC NEWTON	21 115 C	Select	
7050	MICHAEL FARADAY	21 107	Select	
7355	LISE MEITNER	25	Select	
13002	HANS GEIGER	21 W 1 N 102 A	Select	
13968	RICHARD FEYNMAN	21 W 1 N 102 A	Select	
16600	ERWIN SCHRÖDINGER	21 104	Select	
18572	ROSALIND FRANKLIN	13 2 W 64	Select	
18924	WERNER HEISENBERG	21 W 1 N 101	Select	
20517	NIKOLA TESLA	21 W 1 N 102 A	Select	
21447	WILHELM RÖNTGEN	13 2 W 64	Select	
21767	ALBERT EINSTEIN	21 115	Select	
22268	NIELS BOHR	21 W 1 N 101	Select	
23813	MARIE CURIE	21 W 1 N 102 A	Select	

Previous Next... Close Window Reset

GRANT PRIVILEGES TO Ms. HOLLY ROBINSON (2812)

CHECK THE PRIVILEGES you want TO GRANT

- ☐ MANAGE USERS
- ☐ MANAGE LABORATORIES
- ☐ VIEW NEWS FROM RSB
- ☐ MANAGE WASTE PICKUP REQUESTS
- ☐ MANAGE DISPOSAL OF MATERIAL RECORDS
- ☐ MANAGE NIH 88 FORMS
- ☐ PRINT AU MONTHLY MEMO

Grant Privileges Close Window Check All Reset

How to grant a user privileges to your account:

- Select the user to whom you want to grant privileges and select the privileges you would like them to have.
- For example, if you want a user to be able to submit 88-1 forms to order radioactive material on your behalf, grant them access to "NIH88 Management".
- **Note: even though an AU may grant an individual privileges, the ultimate responsibility for completion of requirements will still rest with the AU.**

Grant User Access to your Account (continued)

Users granted privileges will be able to log on to the AU Portal by using their own NIH login/password or PIV card/PIN.

Users with granted access will have a modified menu, as shown to the right, containing only menu items to which the AU has granted them access.

Each access request is reviewed prior to processing so access is not instantaneous. Users will receive a confirmation e-mail upon approval.

NIH National Institutes of Health
Office of Management

Division of Radiation Safety welcomes you - NIH USER (USERID)

MAIN MENU

- DRS NEWSLETTERS AND DOCUMENTS
- LABORATORIES & SURVEYS
- HRC FORMS & DOCUMENTS
- WASTE MANAGEMENT

DRS NEWSLETTERS AND DOCUMENTS

DRS FORMS

- Monthly Laboratory Contamination Survey (NIH 88-12)
- Protocol Application Form - Fillable
- Activity Limits that do not require a Radiation Safety Protocol (Excel Document)
- Declaration of Pregnancy Form
- Application for use of radioactive materials by a minor
- Application for radionuclide authorization (NIH 465-1)

DRS RSL TRAINING MATERIAL

- Radiation Safety in Laboratory Course Slides
- Radiation Safety in Laboratory Course Notes - Spanish Language
- Radiation Safety in Laboratory Course Notes - Korean Language
- Radiation Safety in Laboratory Course Notes - Japanese Language
- Radiation Safety in Laboratory Course Notes - Italian Language
- Radiation Safety in Laboratory Course Notes - Hindi Language
- Radiation Safety in Laboratory Course Notes - German Language
- Radiation Safety in Laboratory Course Notes - French Language

If you should have any further questions, please contact your Area Health Physicist.
We're here to help!

Do you have a Beckman LSC?

If you have a Beckman Liquid Scintillation Counter in your laboratory here on NIH campus, please be aware that Beckman will no longer be servicing these machines, although they are

currently providing source removal/decommissions.

See below for the important notice from the manufacturer.



April 7, 2023

To: Beckman Coulter Life Sciences LS 6000 Series Customers
From: Rodolfo Uribe, Service Marketing and Product Manager
Re: LS 6000-Series Service Discontinuance

Dear Beckman Coulter Life Sciences LS 6000 Series Customer:

Beckman Coulter Life Sciences ended the sales of our Liquid Scintillation Counter instruments as of March 23, 2010. Recently, we have maintained and repaired these instruments to the extent the necessary parts, software components, and other resources required for instrument support and maintenance were available.

Beckman Coulter is no longer able to service or decommission the radioactive source material, Cesium 137, in our liquid scintillation counters.

Due to this change and to limited parts availability, Beckman Coulter Life Sciences is discontinuing support of our Liquid Scintillation counters as of December 31, 2023. Through this date we will handle all other service and repair requests on a case-by-case basis. Service agreements will not be renewed.

There are many service providers across the US that can help replace sealed sources, assist in transportation and final decommissioning. The nuclear servicing industry websites are typically not highly optimized for search engine ranking, but many can be identified with search terms like "Radioactive Materials Consulting", "Radioactive Material Transportation Services", "Radiation Decommissioning Services", and "Radiological Material Technical Assistance". Another resource of local providers is the regulatory agency with which your liquid scintillation counter is registered (typically your state's radiation control regulator). If you do not know who your regulator is, please refer to this website <https://www.nrc.gov/agreement-states.html>.

If you have any questions regarding the information above, please contact our Customer Support Center or your local Beckman Coulter Representative for more details.

- From our web site <https://www.beckman.com/support/tech-support>
- For Technical Support: call 800-369-0333, Option 1 in the United States and Canada

Sincerely yours,

Rodolfo Uribe
Service Marketing and Product Manager
Beckman Coulter Life Sciences

**Therefore, if you are going to decommission your Beckman LSC,
do it before the end of the year!**

Are you interested in information on having your LSC decommissioned?

Yes

Don't Let This Happen at the NIH!

Don't Let This Happen at the NIH!

The following is a collection of recent enforcement actions taken by the NRC against other radioactive materials licensees and event notification reports made by licensees to the NRC.

Let's make sure these things don't happen at the NIH!

- On April 18, 2023, a recycling yard in Denver flagged a load of scrap metal as potentially radioactive. The load was returned to the point of origin and was separated. At that time, a radium-226:beryllium source was identified. The source container was mostly intact. The markings on the source container indicate the activity as 5 mCi radium-226:beryllium; and the reference date as 04/30/1963. It is still unknown how the source ended up at the recycling yard.

- A Radiation Safety Officer (RSO) filed a notification to regulators, concerning a possible excessive exposure. According to the RSO, an industrial radiographer had his December badge come back with a dose of 8000 mrem. The December badge was sent to Landauer with a set of March badges. The RSO states that the radiographer leaves his badge in his work bag with other tools. The radiographer thinks his bag was used by someone else while performing industrial radiography, leaving the bag near the exposed source. It is believed this is how the badge got exposed.

- A technician was performing a lung scan on a patient and accidentally grabbed the wrong dose. The patient received 4 mCi of Tc-99m before the technician realized her mistake. The prescribed dose was 10 mCi of Tc-99m tagged for a lung scan while the administered dose of Tc-99m was tagged for the liver. The total body effective dose equivalent to the patient was 80 mrem. The radiologist and the patient were both made aware of the incident.

The Radioactive Buzz

News from the radioactive world

Lab safety and research productivity are not at odds

New study draws on crackdown after chemist's 2008 death

By NATALIA MESA
8 JUN 2023

Prioritizing lab safety doesn't hamper research productivity. That's the main takeaway of a working paper published last week by the National Bureau of Economic Research and accepted for publication in Research Policy. Safety experts are cautiously optimistic these results may help support further cultural and institutional change to address poor laboratory practices in academia.

In recent decades, several laboratory disasters have killed or grievously injured young scientists, sparking outrage. Still, academic science has generally remained stubbornly blasé about lab safety. Some see it as directly at odds with getting work done in the lab.

"There's this perception that the more safety requirements you put on a laboratory, the lower the research output is going to be," says study co-author Alberto Galasso, an economist at the University of Toronto. A 2012 survey suggested that many scientists see laboratory safety as a "hassle." This can often lead to unsafe labor practices. For instance, a 2010 survey by the American Chemical Society found that 70% of faculty, 59% of professional staff, and 52% of graduate students work alone in laboratories "often" or "occasionally," which safety experts advise against.

[Click here to read more](#)

“Doing research safely doesn’t impede science. And scientists need to see that,” says Craig Merlic, an organic chemist at the University of California, Los Angeles (UCLA) and executive director of the UC Center for Laboratory Safety who wasn’t involved in the study.



Important Dates | Spring 2023

July 27

RSC Meeting

Aug 31

Deadline for Irradiator User
Refresher Training

Sept 18

NIH Research Festival

**National Institutes of Health
Division of Radiation Safety**
9000 Rockville Pike
Building 21
Bethesda, MD 20892
<https://drportal.ors.od.nih.gov>

Hours of Operation:
Monday - Friday
7:00 am - 5:00 pm

After-hours/weekends:
Call NIH Emergency
Communications Center:
(301) 496-5685

For more information contact:
Main: (301) 496-5774
Training: (301) 496-2255
Rad Waste Pickup: (301) 496-4451
Radioactive Shipping & Receiving:
(301) 496-3277



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