Summer 2024

The Atom

Newsletter of the Division of Radiation Safety

All radiation-producing (X-Ray) devices must be registered with the Division of Radiation Safety by completing and submitting a New X-Ray Unit Registration Form to the DRS. In addition, individuals wanting to use an X-Ray device must register with DRS and complete training appropriate for that type of device.

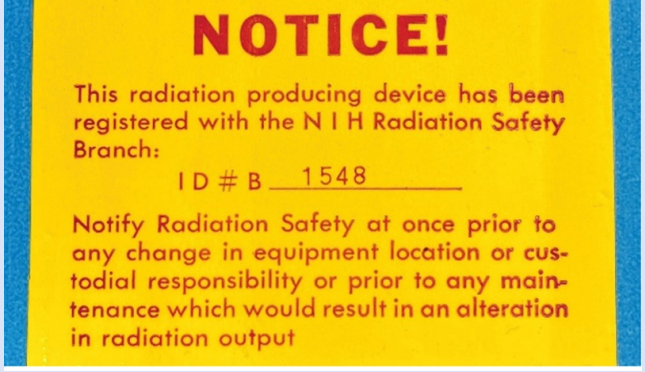
DRS manages a medical physics contract to conduct annual safety inspections of all X-Ray units in accordance with the Code of Maryland Regulations (COMAR) and best practices from the American College of Radiology (ACR) and the American Associates of Physicists in Medicine (AAPM). DRS also performs shielding evaluations for surrounding walls and floors in rooms containing X-Ray devices to ensure radiation doses outside the facility are minimal. In addition, annual safety evaluations of all personnel shielding (lead aprons) are performed through the medical physics contract.

Upon registration, the unit will be labeled with a yellow registration sticker with a unique ID number. The unit will then be enrolled in an annual inspection schedule. The custodian can expect an email notification that the annual survey is due with date options for a survey. Depending on the complexity of the unit, surveys may take from 30 minutes up to 2 hours. Always contact DRS if you are planning to relocate an X-Ray unit to ensure its accessibility for its annual safety evaluation when it comes due. If you are already using an X-Ray unit that does not possess a yellow registration sticker, please contact DRS immediately to register the device.

Types of X-Ray Devices

Radiation-producing devices may include the following:

- Linear Accelerators
- Bone Mass Absorption or DEXA
- X-Ray Irradiators or cabinet units
- X-Ray cabinets for security screening
- Computed Tomography (CT, PET/CT, SPECT/CT, cone beam, microCT)
- Dental units (handheld, panoramic, dental cone beam CT)
- Fluoroscopy units (fixed, mobile, C-Arm, under table/over table)
- Mammography
- Radiographic units
- X-ray Diffraction and open beam x-ray tubes



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 emission. 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 Nuclear Regulatory Commission's (NRC's) unrestricted contamination area limits and difficult at best to detect to the restricted area 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 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 detecting 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

[1] – These nuclides emit energetic particles or gammas. However, the percentage of the time they decay this way is small. Thus, when these are detected by a hand-held instrument the contamination level is well above the lab limits.

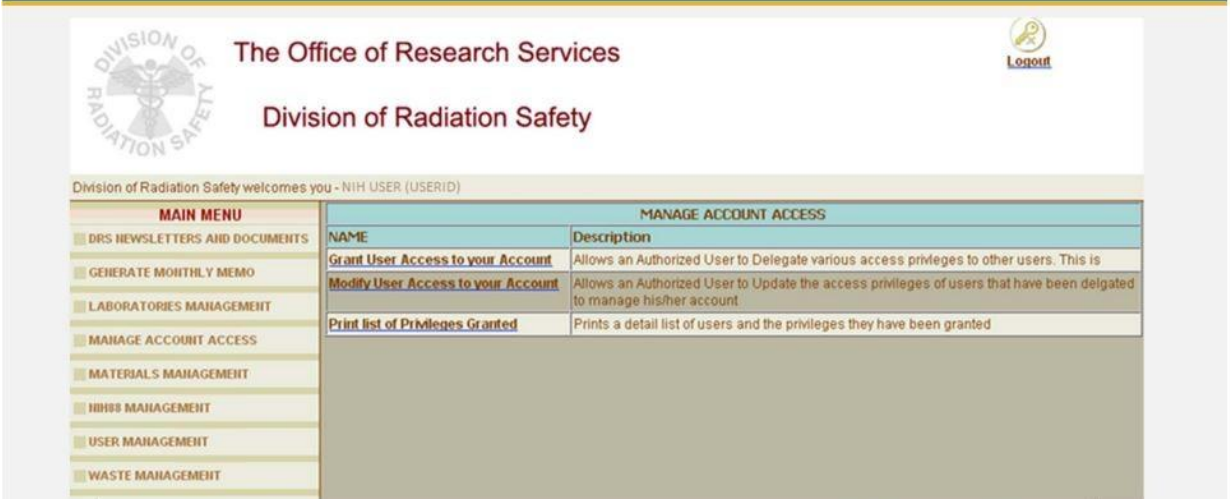
Estimates of detector efficiencies for selected nuclides:

Nuclides	Detection Efficiency Estimates
H-3, Fe-55, Ni-63	not detectable
Cr-51, Zn-65, Ga-67, Tc-99m, In-111, Tl-201	1-2% (pancake GM)
C-14, P-33, S-35, Ca-45, Mn-52, Zr-89, I-124	5% (pancake GM)
Cu-64, Br-76, Y-86, Lu-177	10-15% (pancake GM)
I-125, I-129	15-20% (NaI probe)
F-18, Ga-68, Tc-94m	20% (pancake GM)
At-211, Pb-212, Bi-213, Ra-223, Ra-224, Ac-225, Ra-226, Th-227, Am-241	20% (ZnS probe)
C-11, N-13, P-32, Cl-36, Mn-51, Sr-90	25% (pancake GM)

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.

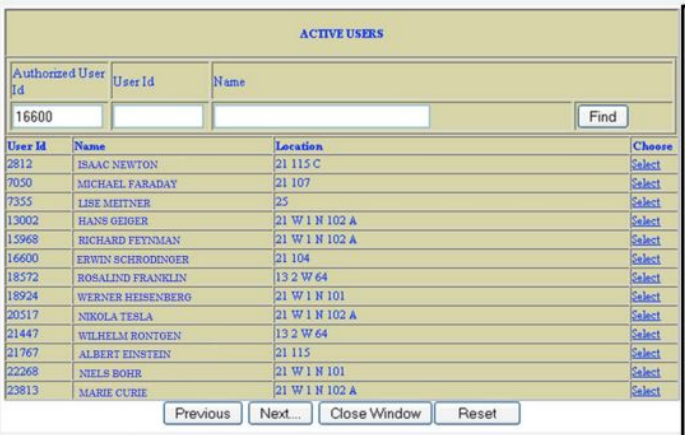
Manage Account Access



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



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 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.

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

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 June 10, 2024 a truck containing a nuclear gauge was stolen from the RSO of a contractor in Maryville, Missouri. The RSO promptly reported the incident to the NRC. The nuclear gauge contained an Am-241-Be source of approximately 44 mCi. The truck was later recovered and the source was found in its case. A review of surveillance camera footage revealed that the theft was partially enabled by the driver of the truck leaving keys in the ignition.

· On July 17, 2024, the Arizona Department of Health Services received notification from Banner Boswell Medical Center about the loss of an I-125 seed used for localization. A patient was implanted with a 0.150 mCi seed on July 15, 2024. When the patient returned the following day to have the seed removed, the surgeon was unable to detect it. The patient and Operating Room were both surveyed but the seed could not be located. The event is still under investigation.

On July 22, 2024, New York State Department of Health (NYSDOH) received an email from the Radiation Safety Officer (RSO) of State University of New York (SUNY) at Stony Brook to report a lost Fe-55 source. The source in question was last seen during routine inventory in January 2023 and was not accounted for since that time. The source was approximately 1.58 mCi at the time it was lost. This activity is 15.8 times the quantity requiring labeling as stated in Appendix C of 10 CFR 20.

Important Dates | Summer 2024

Aug 22	Aug 31	Sept 23-25
RSC Meeting	Deadline for Irradiator User Refresher Training	NIH Research Festival Stop by our table! 9/23 (10 am - 2 pm)

National Institutes of Health
Division of Radiation Safety
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Building 21
Bethesda, MD 20892
https://drsportal.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