Working with ionizing radiation or radioactivity: a step-by-step guide

VU VRIJE UNIVERSITEIT AMSTERDAM

If you have any questions or doubts, contact the Faculty of Science's coordinating radiation expert.

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Does your sample or reagent contain any radioactive substances (however small or negligible the quantity may be)? Read the information below before you begin.

Yes? → Go to section 2

No? → Consult the Chemicals Action Plan to check whether there are any additional safety requirements you have to meet.

When to report and get an internal permit?

Even extremely small quantities of radioactive substances that would normally fall outside the control system must first be assessed by the coordinating radiation expert. For the joint complex permit of VU Amsterdam, Cyclotron and VU University Medical Center, all quantities must be added up and registered (the so-called summation principle).

Before having any radioactive substances sent to VU Amsterdam, you must first get an internal permit. The Faculty of Science's coordinating radiation expert can apply for this permit on your behalf. Contact them to discuss this. Go to section 2 to read about what you can do in the meantime to prepare.

Examples

- Certain samples are not classified as radioactive outside the VU campus. However, once they arrive on university grounds, they do fall under the control system. Think of rock or soil samples, for example, that are collected, or exempted sources that may be used for research. Even though these substances may be found in consumer products, the Faculty of Science's coordinating radiation expert must always assess the substances in question.
- Some (mercury) lamps contain thorium, which is added to the filament to increase its melting temperature.
- Natural zirconium contains trace amounts of uranium.

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Prepare the internal permit together with the coordinating radiation expert

2A. Assess the properties of the radioactive substances and the nature of the experiments

1. What nuclide(s) does the substance contain?
2. What is the chemical compound? For example: a salt, a compound or an elemental gas?
3. What are the physical properties? Is the substance a powder, a solution, a gas?
4. Is the sample possibly subject to other regulations as well? For example: biological samples or explosive compounds?
5. What quantity (in g, ml or cm^3) of the nuclide does the substance contain?
6. What is the nuclide's activity measured in Becquerel?
7. What kind of experiment do you intend to conduct with the radioactive substance(s)?
8. For example: weighing, diluting, dissolving, mixing, boiling, heating, irradiating, degassing, storing, melting, etcetera?
9. How long will the various processing steps of your experiment take? For example: boiling for 30 minutes and mixing for 10 minutes, degassing for 16 hours.
10. How often are the activities performed per year?
11. Where are the activities performed? For example: in a fume cupboard, a biosafety cabinet or on a table.

2B. Identify the potentially suitable workspaces

1. Does your work environment already offer a space that is rated for safely working with radioactive substances?
   - For example, is there an RA laboratory (D-, C- or B-lab)?
   - Is there a space that has already been marked as an RA zone by the coordinating radiation expert?
2. Assess the available spaces that may be suitable for working with radioactive substances.
   - Is there a fume cupboard?
   - Does the door of the room have a lock?
   - Is there a fireproof cabinet?
   - Is there a sink where you can wash your hands?

2C. Assess the supervisory structure that is in place for working with radioactive substances

1. Does your department have a supervising radiation protection officer with a certificate from an approved institute?
2. Is there someone in your department who could obtain such a certificate?

Good luck with your research!