



UMEÅ UNIVERSITET

Code of rules and procedures for disposal of radioactive waste

Document type:	<i>Code of rules and procedures</i>
Date:	<i>2020-08-25</i>
Reg. No:	<i>FS 1.1-1672-20 ¹</i>
Approved by:	<i>Vice-chancellor</i>
Validity:	<i>Until superseded or revised</i>
Field:	<i>Buildings, IT, Environment and Safety</i>
Office in charge:	<i>Buildings office (Lokalförsörjningsenheten)</i>
Replaces document:	<i>Rutin för kvittblivning av radioaktivt avfall 2016-12-20</i>

¹This document has been translated from Swedish into English. If the English version differs from the original, the Swedish version takes precedence.



UMEÅ UNIVERSITET

Content

1.	Description	3
2.	Background	3
3.	Equipment Containing Radioactive Substances	3
3.1.	X-Ray Equipment.....	3
4.	Disposal of radioactive waste	4
4.1.	Exempt Waste.....	4
	Solid Waste	4
	Water-soluble liquid waste	4
4.2.	Radioactive waste	5
	Solid waste	5
	Water-soluble liquid waste	6
4.3.	Non-Water-Soluble Liquid Waste	6
5.	The Waste Disposal Room.....	7
6.	Documentation.....	7
7.	Directions and contact information	8
	Contact information:	8
	Directions.....	8

1. Description

This document constitutes the code of rules and procedures regarding the disposal of radioactive waste at Umeå University.

This document has been translated from Swedish into English. If the English version differs from the original, the Swedish version takes precedence.

2. Background

Waste from work involving radioactive substances must be managed in such a way that it does not cause harm or pose unnecessary risk. How to manage the waste depends primarily on the characteristics of the waste. Disposal of radioactive waste must follow the regulations issued by the Swedish Radiation Safety Authority (SSM).

3. Equipment Containing Radioactive Substances

Certain equipment used at the university contain radioactive substances. Before the equipment can be discarded, the radioactive source must be removed and stored according to radiation safety standards. The university has an agreement with Region Västerbotten, which stores and later disposes of the radioactive sources. Examples of equipment that might contain radioactive substances are: Liquid Scintillators; Eliminators; X-Ray Fluorescence Analyzers; Nuclear Thickness or Density Gauges. Other types of equipment not listed here might exist. It is important to note that the equipment listed here might have different names, as an example Liquid Scintillators are often named Beta Counters or Alpha Counters.

Before discarding equipment, it must be ascertained that it does not contain any radioactive substance. If the symbol to the right of this text appears on any side of the equipment, then it contains a radioactive substance which must be removed before the equipment can be discarded. Take notice that no hazard symbol on the equipment does not necessarily mean it does not contain any radioactive substances. To be sure, read the equipment manual. If you feel unsure, contact Umeå University's Radiation Safety Expert.

The Radiation Safety Expert can also help with removing the radioactive source!

3.1. X-Ray Equipment

X-ray equipment that is no longer in use must be rendered unusable before being discarded. If you feel unsure, contact Umeå University's Radiation Safety Expert.



Figure 1. Hazard symbol – Ionizing radiation



UMEÅ UNIVERSITET

4. Disposal of radioactive waste

The procedure for disposing of radioactive waste depends on whether the combined activity of the disposed waste from the entire university over one calendar month is low enough for the waste to be exempt from certain regulations in the Swedish Radiation Protection Act. Since it depends on the combined activity of the waste from the entire university, each department must yearly send in their waste plan and their local procedures for disposal of radioactive to the university's Radiation Safety Coordinator for approval. This must be done by the end of April.

The procedure for disposing of radioactive waste also depends on whether the waste is solid or liquid, and, if it is liquid, whether it is water soluble.

The Radiation Safety Coordinator is responsible for monitoring that the combined radioactive waste from the entire university per calendar month do not exceed 10 times the limits set by the Swedish Radiation Safety Authority regulation SSMFS 2018:3, appendix 1.

The Head of the Department/Director is responsible for ensuring that the local waste plan and the procedures for disposing of radioactive waste are current, adhered to and compatible with this document.

4.1. Exempt Waste

Radioactive waste with an active low enough to be exempt from certain regulations in the Swedish Radiation Protection Act does not require any special disposal. Exempt waste can be incinerated or poured down the drain according to the instructions below. Exempt waste must not be mixed with the waste dropped off at Region Västerbotten's waste disposal room.

Solid Waste

Examples of exempt solid radioactive waste are disposable materials such as medical gloves, bench protector sheets, syringes, tubes, and containers, that have been used for work involving solutions containing radioactive isotopes. Exempt solid waste must be collected in a plastic bag inside a marked container with a lid. When full, the plastic bag must be tied. It can then be disposed of together with the regular waste that is to be sent to incineration.

Water-soluble liquid waste

Exempt water-soluble liquid radioactive waste may be poured down the drain, provided that the activity on each occasion does not exceed the limit set by the Swedish Radiation Authority regulation SSMFS 2018:3, appendix 1.

When pouring radioactive waste down the drain, make sure to flush thoroughly with water.

Disposal of exempt water-soluble liquid radioactive waste should be limited to one drain per laboratory, and at most two per each floor of the building. The designated drain must be visibly marked with a sign notifying that it is allowed to use the drain for disposal of radioactive waste.

UMEÅ UNIVERSITET

4.2. Radioactive waste

Radioactive waste with an activity that is too high for the waste to be exempt from certain regulations in the Swedish Radiation Protection Act, is considered a radiation risk and therefore requires certain special procedures for storing, managing and disposal of the waste.

Solid waste

Examples of solid radioactive waste are containers that have contained stock solutions, bench protectors and other materials that have been used together with stock solutions of high specific activity and therefore might be strongly contaminated, as well as animal cadavers and organs, and wood shavings from animal testing involving radioactive nuclides.

Solid radioactive waste must be put in a special container designed for hazardous waste (Figure 2). When the container is full, the lid must be properly sealed and labeled before it is dropped off at Region Västerbotten's waste disposal room (see chapter 5. The waste disposal room).



Figure 2. The hazardous waste container.

Make sure the lid is properly sealed!

If not, the content might be accidentally spilled when the container is lifted. This has occurred before, and it is potentially very harmful to the person lifting the container.

Do not mix isotopes!

Different isotopes must be sorted into different containers.

Animal cadavers and other waste that must be frozen.

Animal cadavers and other waste that must be frozen is not allowed to be mixed with the other radioactive waste and must be disposed of separately. Take note that animal cadavers that have been in contact with ether must be aired before they are packaged, as they might otherwise explode (!) upon freezing.

Bottles and ampoules

Bottles and ampoules that contains/have contained stock solutions, sealed sources, calibration sources etc. are not allowed to be mixed with the other radioactive waste and must be disposed of separately. These must be dropped off at the waste disposal room in the protective packaging (lead containers etc.) that they were originally delivered in.

Not correctly marked or packaged waste

The staff at the waste disposal room have the right to refuse radioactive waste that has not been correctly labeled, sorted, or packaged. Radioactive waste of unknown activity might have to be sent to Cyclife or a corresponding party for storage and disposal, which the university then will have to pay for.



UMEÅ UNIVERSITET

Water-soluble liquid waste

Water-soluble liquid radioactive waste must be delivered to the waste disposal room in a sealed container (see chapter 5. The waste disposal room).

Certain solutions should be treated as chemical waste and not radioactive waste. If in doubt, contact the Radiation Protection Expert.

Do not mix isotopes!

Different isotopes must be sorted into different containers.

4.3. Non-Water-Soluble Liquid Waste

Liquid waste that is not water-soluble must be dropped off at Region Västerbotten's waste disposal room (see chapter 5. The waste disposal room), regardless of whether it is classified as exempt waste or radioactive waste.

Scintillation liquid

The activity of scintillation liquids is usually low enough to be classified as exempt waste. However, since they are not water-soluble, they must be disposed of at Umeå University's Chem Shop.

If the scintillation liquid contains alpha radiating isotopes, or if the activity exceeds the limits set by the Swedish Radiation Safety Authority regulation SSMFS 2018:3, appendix 1, it must be disposed of at Region Västerbotten's waste disposal room (see chapter 5. The Waste Disposal Room).



UMEÅ UNIVERSITET

5. The Waste Disposal Room

Umeå University has an agreement with Region Västerbotten, for storing and disposing of radioactive waste. Waste that is not allowed to be sent to incineration or be poured down the drain, must be sent to Region Västerbotten's waste disposal room.

Before dropping of waste at the waste disposal room, the staff at the waste disposal room must be notified via e-mail (cmts.avfall@regionvasterbotten.se). The waste must be transported in an adequately safe manner from a radiation protection perspective. For directions and contact information, see the next chapter.

The Head of the Department/Director is responsible for ensuring that transport procedures are current, adhered to and compatible with this document.

Form to be filled out before dropping off waste

There is a form that must be filled out before dropping off radioactive waste at the waste disposal room. The form can be downloaded from the university's [Radiation Protection website](#) (under the headline 'Radioactive waste').

Two copies of the form should be filled out, one to be delivered to the Waste disposal room together with the waste, and one to be kept by the department that produced the waste as proof that the waste was disposed of in a correct manner.

Label for liquid waste

When dropping off liquid radioactive waste at the waste disposal room, the sealed container must be labeled with the following information:

1. Which isotope it contains
2. Start date, the date when the container was first taken into use.
3. End date, the date when the container was sealed.
4. Calculated activity, in Bq.
5. Contact information.
6. Which solvent it contains

6. Documentation

A department that produces radioactive waste must have a local waste disposal plan, and a local code of rules and procedures, that describes how the produced waste is to be disposed of. The department must document, in terms of activity per isotope, how much radioactive waste that is sent to Region Västerbotten's waste disposal room. The Head of the Department/Director is responsible for ensuring that there exists a local code of procedures that ensures that the information is documented correctly. The Head of the Department/Director is responsible for ensuring that the documentation is saved locally, and that a summary of the disposed waste is sent yearly to the university's Radiation Protection Coordinator before the end of April.

7. Directions and contact information

Region Västerbotten's Waste Disposal Room is run by the Centrum för medicinsk teknik och strålningsfysik (the Center for medical Technique and Radiation Physics), CMTS.

Contact information:

cmts.avfall@regionvasterbotten.se

Building: 27, målpunkt QA, Norrlands universitetssjukhus
Floor: -1 (kulvert)
Room: 27-1020, skyltat 'Radioaktivt avfall'

Directions

Walk towards connection QA in the culvert (floor -1). (If you cannot find it, walk towards E, from there follow the signs to QA). Once you have reached connection QA, follow the passageway that turns slightly to the left. Pass under the sign labeled "F Klädbytesautomat 6-7" without turning, then continue to the end of that corridor. The Waste Disposal Room should now be on your left side, next to the elevator. There is a sign next to the door marked 'Radioaktivt avfall'. Figure 3 shows the door to the Waste Disposal Room and figure 4 shows a map of the culvert, with directions from connection E to the Waste Disposal Room (marked with an X).



Figure 3. The door to the waste disposal room.



UMEÅ UNIVERSITET

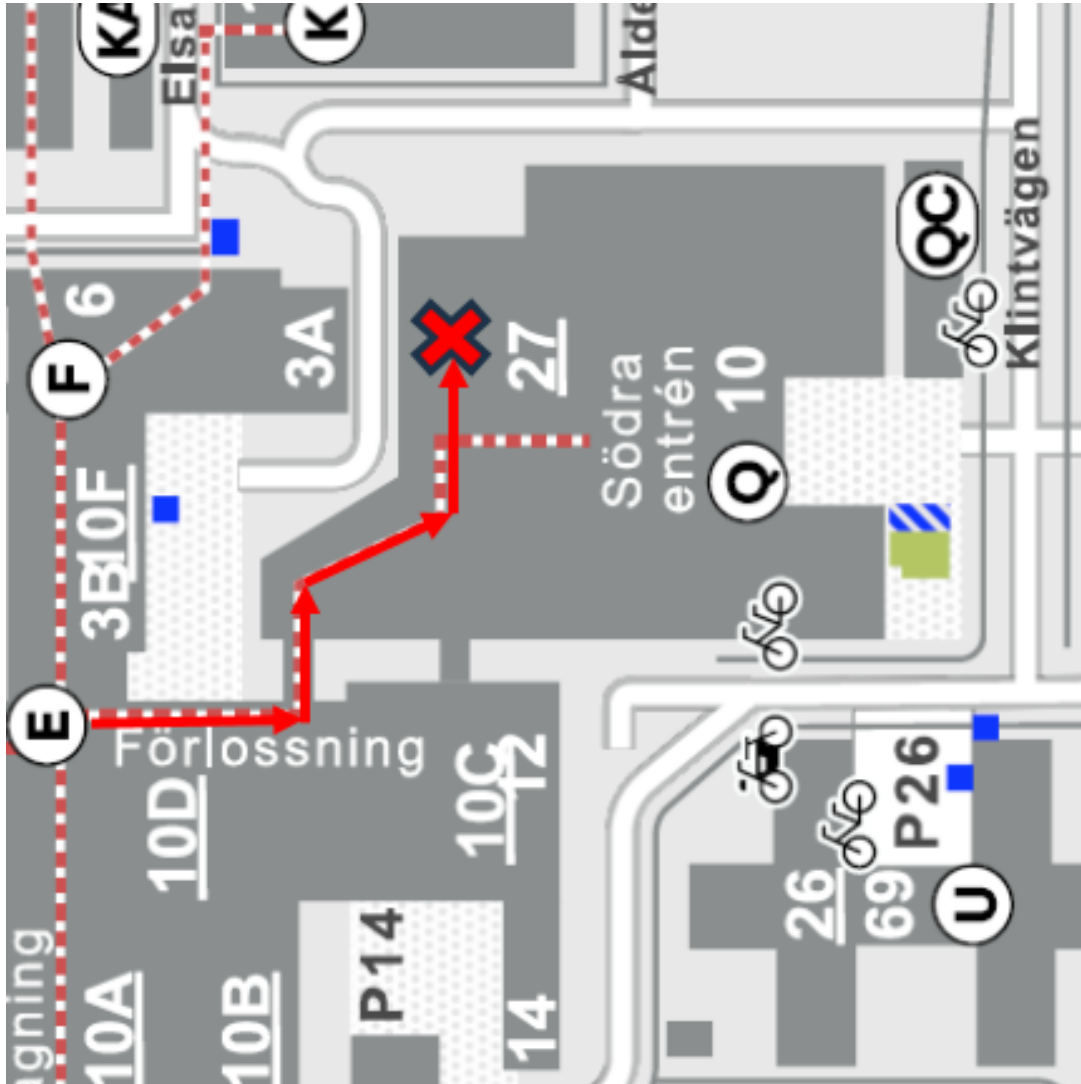


Figure 4. Directions from connection E to the Waste Disposal Room (X).