

University of Aberdeen

Ionising Radiation Safety Arrangements

APPENDIX 4 Template for Local rules

Version 3

May 2017

Authorised by Radiation Hazards Sub Committee

APPENDIX 4

Template for Local rules

The template shown overleaf should be used for local rules. It is the RPS responsibility to write and maintain the document. Much of the important information has already been included in the template assuming a general purpose laboratory using the radionuclides at activity levels below those quoted in appendix 2 table A2.3. However the content should be modified and additions included reflecting local procedures and any unnecessary information removed. If you are putting together local rules for the first time the RPA should be consulted for advice on content. The instructions are not exhaustive and for labs working with higher energy gamma emitters and X-ray equipment then additional procedures will be required - when in doubt seek advice from the RPA.

Name of School

Ionising Radiation Regulations 1999

LOCAL RULES

These rules apply to the following areas:-

List labs where rules apply

Issue date insert issue date

Review date insert date for next review

**Note If you are readings this document after the review date please
check with your RPS that you have the latest version**

Overview

- Only registered and suitably trained workers are permitted to work with isotopes in the university of Aberdeen.
- Registration is initiated using the Iso Inventory software (<http://isoinventory.abdn.ac.uk/>).
- Completion of the online radiation user training course (accessed via <https://www.abdn.ac.uk/safety/resources/radiation/ionising/>) is mandatory before users can be registered. It is also mandatory for new users even if they have completed a similar course elsewhere.
- Supervisors and/or line-managers are responsible for ensuring that all technical or research staff and post-graduate students in their groups are registered to use isotopes *before* any such work commences.
- Supervisors and/or line-managers are responsible for ensuring that all workers are fully familiar with the IsoInventory software system that is used for isotope registration and the keeping of records of their usage and disposal.

Isotope users who do not comply with these rules may be subject to disciplinary action including being barred from working with isotopes.

| 1. Radiation protection supervisor is: | | | |
|--|-----------|----------------------------|-----------------------|
| 2. Designated areas | | | |
| Controlled radiation areas | | Supervised radiation areas | |
| None | | | |
| 3. Unsealed Radionuclides used | | | |
| Radionuclide | Half Life | Emissions | Contamination monitor |
| | | | |
| | | | |
| | | | |
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| | | | |
| 4. Radiation Equipment used in the area | | | |
| 5. General Lab arrangements | | | |
| <p>These rules must be posted in each laboratory radioactive materials are handled. A prior risk assessment must be carried out before commencing new work activities and recorded using form on the iso-inventory system.</p> <p>Access to the lab</p> <ul style="list-style-type: none"> • Access to radiation areas should be restricted to those who have been trained and are directly involved in the experiment unless authorised unless they are under the close supervision of the RPS. <p>General</p> <ul style="list-style-type: none"> • Work with radioactive materials should only be carried out in designated areas identified in section 2. If you wish to carry out work in an area not identified in section 2 then contact your RPS for advice. • Experiments should be carefully planned and should only take place if no other equivalent experiment which does not involve radioactive substances exists. We are obliged by legislation to ensure that any experiments that require the use of an isotope utilizes the minimum quantity of radioactivity that will ensure a viable result. • Consideration should be always be given to using the least hazardous radionuclide for example P-33 should be used in preference to P-32. • Experiments involving radioactive materials should only be carried out by suitably trained | | | |

staff/students. Any new member of staff or student wishing to undertake work with unsealed radioactive substances must first have completed the basic radiation safety course. Additionally the principle investigator/RPS should ensure that all staff or students working on the experiment are proficient in basic laboratory techniques before they start manipulation of radioactive substances unsupervised. It is important that all staff involved in this work are suitably trained in carrying out contamination monitoring.

lab procedures

- Observe all the basic laboratory safety procedures:
 - There must be No eating, drinking or applying cosmetics in the laboratory
 - Never use your mouth to pipette
 - If you see a colleague doing something dangerous, point it out to him/ her immediately and if necessary report it to the RPS
 - Work must not be carried out by a person with an undressed cut or abrasion below the wrist
- Lab coats or other suitable protective clothing should be worn at all times when entering a supervised area. Disposable gloves and protective eyeglasses should be worn whenever unsealed sources are being handled or manipulated.
- Work should be carried out over trays wherever possible.
- Contamination monitoring should take place **before** starting work and **after** the work is completed. Procedures for carrying out and recording contamination monitoring are explained in section 10.
- If using isotopes other than Tritium always check your gloves, hands and laboratory coat for radioactive contamination before leaving the laboratory.
- Wash your hands using the hand wash sink before leaving the laboratory.
- All apparatus being used with radioactive materials must be labelled using “radioactive” warning tape. The tape must be removed when the apparatus has been washed and found to be clear of contamination.
- Radioactive substances must only be removed from controlled or supervised areas in closed uncontaminated containers.
- Radionuclides emitting penetrating radiations must be adequately shielded. Lead shielding must be used for gamma emitters and perspex shielding for beta emitters.
- Containers for radioactive materials other than Carbon - 14 and tritium should not be directly held in the unprotected hand. (Note: the outside of containers of Carbon-14 and H-3 can become contaminated so it is good practice to wear gloves when handling them). Tweezers should be used for handling sealed radioactive sources.
- Contamination must be contained without delay and you must be familiar with the contingency procedures given in section 14
- Keep time manipulating radioactive substances to a minimum.
- Place any waste items in the appropriate bin as described in section 13
- Keep all radioactive materials in labelled containers and stored in designated fridge. In general, fridges that are used to store radioactive materials should not be used to stored

non active items. If it is necessary to use a fridge for active and non active items there should be clear demarcation and additional containment for the active items.

- In case of emergency remain calm and follow the contingency procedures section 14.

6. Local arrangements and procedures

7. Pregnant and breast feeding

Any worker who becomes pregnant should inform the Radiation Protection Supervisor as soon as possible and discuss the situation. It is also the University's policy that anyone who works with any form of ionising radiation and becomes pregnant should be given the option of alternative work. This recommendation would also apply to breast feeding mothers. However if the pregnant or breast feeding female continues working a risk assessment should be carried out to assess the hazard and additional protection measures that may be required. The RPA can advise.

8. Personal Monitoring

If you are issued with a personal dose monitor you must wear it and it is your responsibility to look after it. These badges should be worn at hip or waist level. For work with certain isotopes, additional dosimeters may have to be worn on the fingers or at neck level. If you lose your dosimeter or it is damaged (or goes through a washing machine) tell your RPS without delay and arrangements will be made to issue a replacement. You should stop working with radioactive materials until a replacement monitor has arrived.

Arrangements for issuing and collecting dosimeters if issued.

9. Dose investigation levels

The following dose investigation levels apply.

| | Effective whole body dose (mSv) | Equivalent dose to the skin (averaged over <100cm ²) (mSv) | Equivalent dose to lens of the eye. (mSv) | Equivalent dose Hands, forearms, feet and ankles (mSv) |
|---|---------------------------------|--|---|--|
| Investigation level (over the wear period of the dosimeter ¹) | 0.3 | 7.5 | 2 | 7.5 |

¹wear period will be either 1 or 2 months as directed by RPA

If one of these levels is exceeded an immediate investigation should take place to establish why the level has been exceeded and any preventative actions that are required.

10. Contamination monitoring

Local arrangements making reference to the contamination monitoring procedure

11. Ordering radioactive materials

Sealed sources must not be ordered

Describe the local system for placing orders and receiving unsealed radioactive sources

12. Storing radioactive materials

Describe local arrangements for storing radioactive sources

13. Disposing of radioactive waste

This section should summarise procedures for measuring or estimating the activity of each waste item. For instance an experiment may produce both liquid waste and solid waste, the majority of waste activity will be disposed of as aqueous liquid but typically there will be a residue deposited in vials on other experimental disposables, there must be a documented method for estimating or measuring the activity of the residuals.

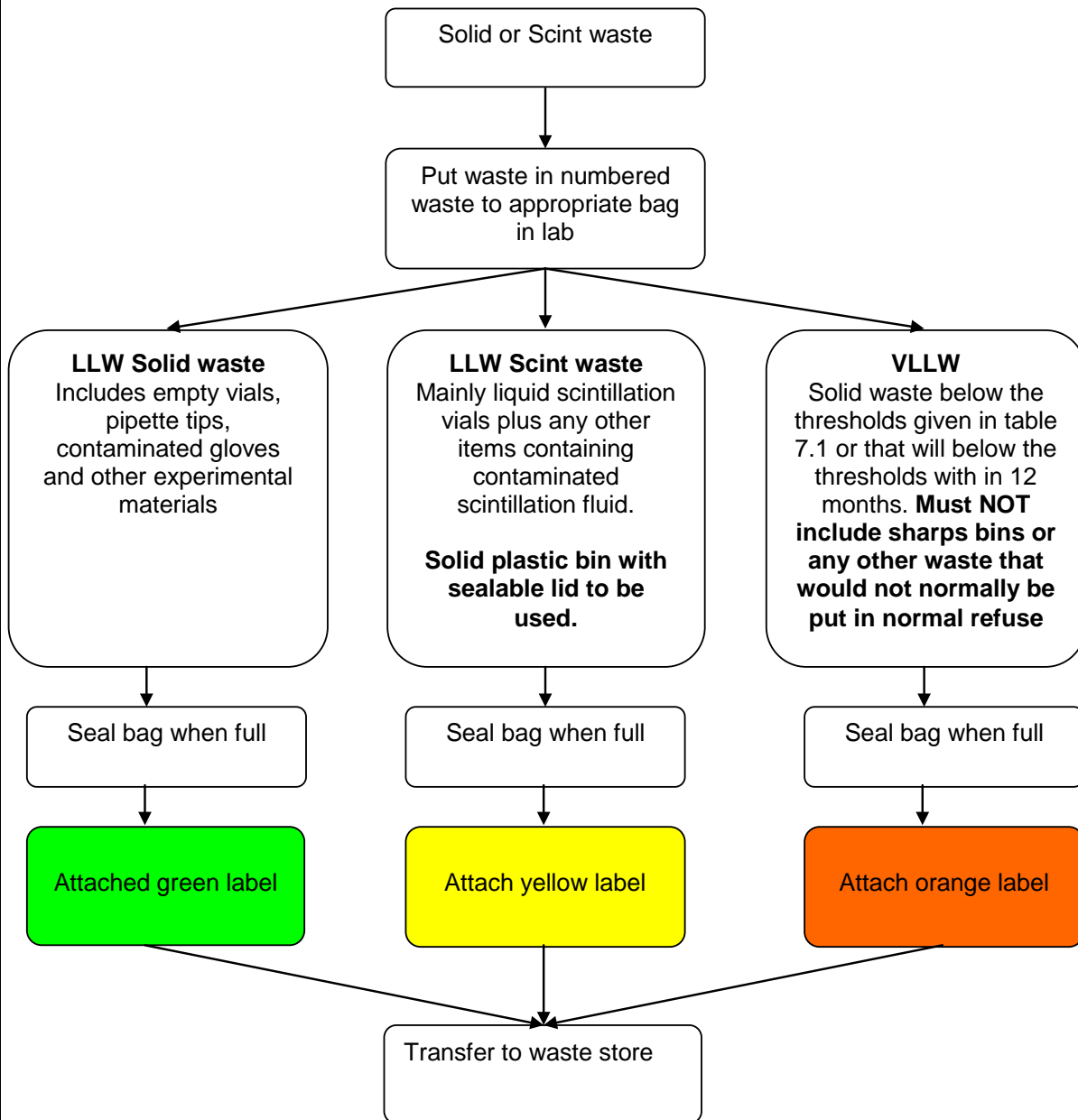
Aqueous Liquid Waste

This may be disposed of only via the approved sinks in the radioactive laboratories and with the following precautions:

- The radioactive waste should be poured carefully and directly into the waste outlet.
- The total activity of waste discharged per month must not exceed the maximum permitted under the terms of the Authorisation Certificate for the school given in section 3. Liquid waste disposals should be logged onto the iso-inventory system before disposal is made to ensure limits are not breached.

Solid waste

Solid waste should be disposed of according to the following diagram.



Add in any information about which bins should be used for each category of waste and location of spare bags, who can seal bags etc.

Scintillation waste and vials must be disposed of using a solid plastic bin/tube with a sealable lid to prevent leakage in the waste store.

Never dispose of non-radioactive waste with radioactive waste. If you are unsure check the waste with a suitable contamination monitor. Cans and packaging in which radioactive material has been supplied are not normally contaminated. These should be checked with a suitable monitor and, if no contamination is detected, treated as non-radioactive waste. Be sure to remove references to radioactivity; for example, the outer labels of cans should be removed or obliterated or otherwise defaced.

14. Contingency arrangements

RADIATION SPILLAGE

1. Immediately alert personnel working near the area of the radiation spill and if possible alert RPS. If in doubt contact radiation protection service for help and advice. Any personnel not required to deal with the spillage should remove themselves from the area after checking themselves for contamination.
2. Put on apron, over shoes and gloves
3. Do not allow anyone to walk through the spillage and spread the contamination. If possible isolate and cordon off the area.
4. Use a contamination monitor to locate areas of contamination on the work bench, floor and workers.
5. **If a worker has become contaminated deal with them first** (although it would be prudent to cover the spillage with absorbent material such as paper towels to prevent it from spreading.)
 - If a member of worker believes they are contaminated they should always attempt to locate the contaminated area and decontaminate just that area. Only if large areas of the body are contaminated should staff resort to a full body shower.
 - **Contamination of the skin, hands, arms.** If significant contamination is found on the hands staff should remove and discard gloves and re-monitor their bare hands. If still contaminated then the hands should be washed using a suitable detergent and then re-monitored and if necessary a soft brush should be used. Care should be taken not to break the skin. Other areas of exposed skin should be washed in a similar manner and re-monitored. The RPS should make a suitable report of any incident, including an estimation of dose, and submit to the RPA.
 - **Contamination in the eyes.** If a member of staff suspects that radioactivity has splashed into their eyes, they should use an eye bath. Another member of staff should then take a reading using the contamination monitor. If contamination persists then contact the RPA. The RPS should make an appropriate report of any incident, including an estimation of the dose, and submit it to the RPA.
 - **Contamination on clothing.** If contamination is found on a lab coat or other clothing it should be removed, bagged and either disposed of or be allowed to decay.
6. Cover the spillage with absorbent material such as paper towels to prevent it from spreading.
7. Remove as much contamination as possible by absorbing the spill on paper towels. Contaminated towels should be disposed of as radioactive waste.
8. Ensure that any glass that has broken is placed in a sharps bin and label as radioactive.
9. Any residual contamination should be cleaned using a detergent, when mopping up always work from the outside in.
10. Monitor the area to ensure that all the activity has been removed.

11. If the area has been cleared of radioactivity, remove the tapes and signs.
12. Remove apron, shoes, gloves and place in the plastic bag monitor and dispose as radioactive waste if necessary
13. Monitor hands, clothes and feet to ensure that they are not active.
14. If clothes or shoes become contaminated, remove them and bag them. If mildly contaminated they should be washed as normal before they are worn again.