



RP CoP010 – Accounting procedures for unsealed radioactive material

1. Introduction

If you are using and disposing of unsealed radioactive material within the University, it is expected that you know where it is, or by what route you have disposed of it. This Code of Practice concerns the accounting for unsealed radioactive material that is consumed as part of its use. "Consumed" in this context means acquired from a source of supply, manipulated in some way, and disposed of, or allowed to decay to a defined mass specific activity level. General guidance on source accounting for sealed sources and non-consumed open sources can be found in RP COP005.

2. Legal Requirements

There are two sets of regulations that impose requirements on source accounting: the Environmental Authorisations (Scotland) Regulations 2018 (EASR), regulated by the Scottish Environment Protection Agency (SEPA) and the Ionising Radiations Regulations 2017 (IRR17), regulated by the Health and Safety Executive (HSE).

The EASR is an inclusive regulatory regime and applies to most uses of radioactive substances at the University. Almost all uses of unsealed radioactive material at the University will fall under the regulation of EASR. There are four tiers of authorisation under EASR. These are shown below; listed from low risk to high risk uses.

- General Binding Rules (GBRs);
- Notifications;
- Registrations;
- Permits.

All of the different authorisation tiers place record keeping requirements on those holding radioactive substances. For the University's work with unsealed radioactive material, the work falls within the highest tier, Permits. Record keeping requirements for Permit holders are detailed in the EASR "[Standard Conditions for radioactive substances](#)" document issued by the SEPA.

A radioactive substance is defined as either radioactive material or radioactive waste. If there is no further use for some radioactive material it automatically becomes radioactive waste. The following gives some examples of uses of radioactive substances at the University and when they might be defined as 'radioactive material' or 'radioactive waste':



Radioactive Material

- New Stock
- Experimental samples
- Contaminated reusable equipment
- Samples kept for future reference/reuse

Radioactive Waste

- Contaminated disposable equipment
- Samples kept for decay before transfer/disposal
- Waste

It is important to note that under the EASR, the radioactive waste storage period must be as short as reasonably practicable. Storage and disposal must follow Best Practice Means. SEPA recognises that there may be financial justification for accumulating some waste, as it will reduce overall costs of uplift and disposal. However, long-term storage is generally unacceptable.

EASR does not specify any source accounting requirements in detail but under standard condition A.4.1 “You must make, as soon as reasonably practicable, true, accurate and legible records that ensure and demonstrate compliance with the requirements of your authorisation.” To comply with the authorisation this requires a record to be made of the following information:

- Details of the sources (This must include means of uniquely identifying the source.);
- Activity (In the case of short half-life sources, this will need to include a reference date for the activity stated.);
- Arrival date;
- Location;
- Disposal date; and
- Disposal route.

The IRR17 and accompanying Approved Code of Practice and Guidance Note are more detailed, but basically contain the same requirements as listed above. The



steps taken to comply with the requirements of the EASR will also meet the requirements of the IRR17.

Failure to maintain adequate records can result in a number of actions. It might mean that you are unable to explain where a radioactive source is or went, which would therefore result in the source being defined as missing. This would require notification to the Enforcing Authorities, and would likely result in enforcement action being taken against the University. Since a loss clearly requires a subsequent investigation, time would have to be devoted to the investigation rather than to the research work. Loss of radioactive material, whether actual or perceived, can give rise to concern to the public, and considerable adverse publicity to the University and your Research Group. Similar actions would occur if you simply failed to keep adequate records - a breach of the law occurs if records are insufficient to identify the matters listed above - there does not necessarily have to be a loss of radioactive material.

It is important to understand that the requirement to adequately record the use and disposal of radioactive material is not confined to large quantities or those quantities that any one researcher believes is harmful. The requirement for adequate record keeping applies to all quantities of radioactive substances which are in-scope of the EASR. Out-of-scope values are available in some cases but don't apply to aqueous-based liquids (i.e. all aqueous based liquids are in-scope of EASR). Specific information on what would fall under out-of-scope or GBR's can be obtained from the University Radiation Protection Adviser (RPA).

3. Accounting Procedures

3.1 General procedures

NB: The old paper-based system is almost phased out across the University in favour of the electronic recording system, RETAIN. If you currently use a paper-based system but haven't yet moved online, contact your RPS or the RPU @ radiation@ed.ac.uk

Radioactive stock will normally come from a supplier, and aliquots are commonly drawn off by a number of researchers. The "stock" could however be a discrete quantity of material used by one researcher in one experiment, or material made by the research group themselves, or acquired from another group within or out with the University. In order to achieve adequate accounting for all these various options the University uses RETAIN to record the various statutory information.

Each individual researcher who uses radioactive stock (whether in whole or aliquots) must enter into RETAIN the amount of stock they are using at the time it is used. In most cases, this creates a Container in RETAIN from which discrete quantities can be removed.



As an initial step, all stock containers are assigned a unique identification number; the ID in RETAIN must match the ID on the stock container. The method of assigning the code varies in between groups, and could be the stores staff, a Radiation Protection Supervisor, or other person given that responsibility. Whatever way is used should be specified in the Local Rules. This unique number is recorded in RETAIN.

When fractions are taken from the stock, RETAIN uses a parent / daughter relationship to keep track of where it came from. Users must ensure the aliquot reference number in RETAIN is the same as on the physical material/sample. However, this might not be reasonably practicable due to the physical size of the sample container. In this case it might be possible to label the rack or box holding the sample container(s), provided that it was being used only for those samples.

If samples are dispensed in one laboratory for use in another, RETAIN must be updated as soon as possible to note the location of the radioactive substances. In many cases, tablets or computers are present in laboratories to allow the RETAIN records to be updated immediately after the move.

Once the material is no longer required, it becomes waste. Waste radioactive material will be disposed of by one or more of the following routes:

- discharge to the drains/sewer (if aqueous based);
- released to the atmosphere;
- placed in a designated laboratory waste bin for either:
 - transfer and incineration by the University's waste contractor;OR
 - disposal via normal refuse; strict conditions (the Permit you are working under must have contain standard condition G for this disposal route to be viable).

Further information on disposal routes is given in RP CoP009 "The Management and Disposal of Radioactive Waste"

The activity disposed of to each of these routes must be entered into the appropriate boxes in RETAIN. It must be completed at the same time as the action to which it relates; it is not acceptable to record that radioactive material has been disposed of before the actual disposal takes place. "Disposal" in this context means any of the following:

- Discharge to the designated laboratory sink
- Release to the atmosphere



- Placement in the designated laboratory waste bin(s).

One of the many benefits of RETAIN is that radioactive decay is calculated automatically. Users must ensure the correct activity (or percentage) is recorded alongside the correct date. Guidance on a suitable protocol for estimating the fractions of waste to each waste route can be found in Radiation Protection Code of Practice RP CoP004. Users should also consult other researchers who have carried out similar experiments in the past as the likelihood is that there may already be a waste fraction estimate already in place for your work.

Note that samples left around the laboratory are deemed to be still in use, since they cannot have been recorded as disposed of. Bearing in mind the legal imposition of defining three-month-old radioactive material as waste unless proved otherwise (see "Legal Requirements" above), this means that keeping any radioactive material for this length of time must be justifiable.

Where material is to be transferred outside your research group or moved to another building, the transfer button on RETAIN must be used.

When all the useful radioactive material has been used from a stock container, it must be 'closed off' in RETAIN. Due to the inaccuracies of pipetting out exact volumes or quantities, the activity remaining in a stock container in RETAIN may still show a very small activity remaining (even though nothing is visible in the container by the naked eye) due to rounding errors. Users must select to 'Close container' in RETAIN when all material removed and follow the steps from their RETAIN training.

RETAIN records are kept by IS to ensure the University remains compliant with the EASR regulations.

If a researcher wishes to keep hold of some samples for a long time, it may be worth transferring the information to a Radioactive Closed-Source Record (see Radiation Protection Code of Practice RP CoP005).

3.2 Accounting Procedures - RETAIN

[RETAIN](#) is an online system developed by IS and the Health and Safety Department. It is intended to be used by those using unsealed radioactive material at the University of Edinburgh and replaces the old paper Usage and Disposal sheets. RETAIN is now in use by almost all areas of the University using radioactive material. Training on RETAIN is available on the P&M system (see below). Please speak with your RPS if you are unsure about use of RETAIN for your application.

RETAIN must be used to record all the steps listed in section 3.1 of this Code of Practice. The major differences with RETAIN over the old paper system are:

- You will not need to keep a paper record trail when using RETAIN as all details are stored in RETAIN and are accessible by anyone who had permissions to log in;

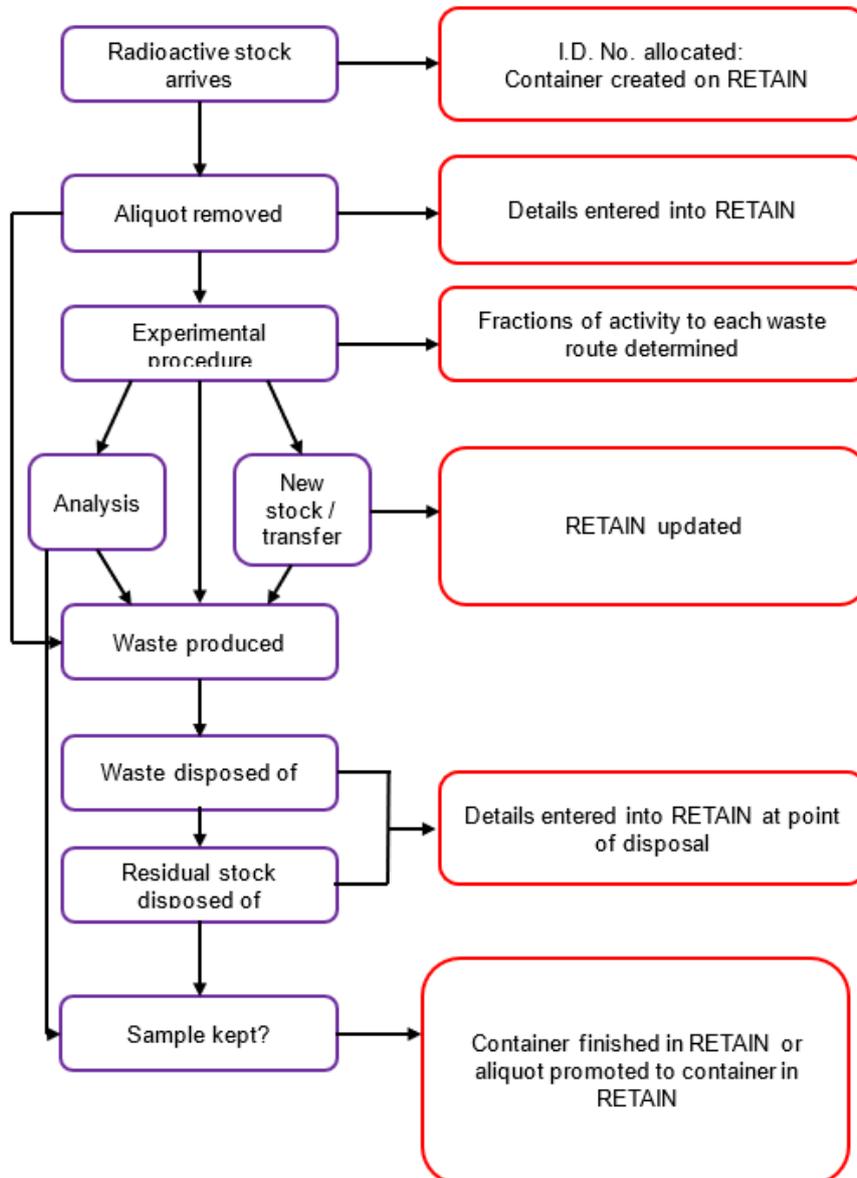


- You are required to take RETAIN training before using the system, details of the training can be found on the [RPU Training Webpage](#)
- RETAIN automatically decay-corrects so the responsibility for this no longer falls on the user
- RETAIN is able to follow the life cycle of a source and the training will demonstrate how to complete these steps.

If you need to use the old paper-based system, and require more information on the templates available and/or guidance on how to complete the templates, please contact the [Radiation Protection Unit](#).

4. Summary

A flow chart outlining the accounting procedure is show below:



For advice on any of the above topics please contact the [Radiation Protection Unit](#).



Document version

Version number	Summary of change	Date and by whom
V1.0	New version	October 2004 Colin Farmery
V1.1	Minor updates	December 2020 LW
V1.2	New template; Minor updates, Removed majority of references to paper based system in favour of RETAIN	October 2024 MG

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