RP CoP005 - Accounting for Radioactive Substances

1. Introduction

There have been several cases in the U.K. of radioactive sources either being lost or been stolen for malicious purposes. There is clearly a potential risk if a radioactive source goes missing, and serious injuries have occurred as a result. Worldwide, high activity sources have been lost, resulting in fatal radiation doses to both adults and children. Added to this now is the threat of radioactive sources being stolen for use by terrorists. It is also the fact that the general public is easily alarmed by radiation, and the loss of a radioactive source, however insignificant, can cause both significant alarm and interest by the press media.

One part of the measures to prevent the loss of a source is security, which reduces the risk of the sources being stolen, but not lost. The other part is suitable accounting, which should help to reduce the risk of sources becoming lost, and quickly identify if they have been. This Code of Practice outlines the approach that University workers must adopt to ensure adequate accounting of radioactive sources in their care.

2. Legal Requirements

There are two sets of regulations that impose requirements of the record keeping of radioactive substances: the Ionising Radiation Regulations 2017 (IRR17) and the Environmental Authorisation (Scotland) Regulations 2018 (EASR). Record keeping requirements are given in EASR for substances held under General Binding Rules. Additional record keeping requirements, for example substances held under Registrations or Permits, are covered in the SEPA Standard Conditions. Standard Condition A.4 states "*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 and its physical form);
- Radionuclide and activity (including an activity reference date for the activity stated);
- Arrival date or date received onto premises;
- Location where kept;
- Date the substance left the premises; and
- Departure address / route.

The Ionising Radiations Regulations (IRR) and accompanying Approved Code of Practice and Guidance Note are more detailed, but basically contain the same requirements as listed above. One additional requirement is that the whereabouts of any source must be regularly checked. The period of check is not specified in the regulations, except that there is a maximum backstop of one month. Accounting

procedures are generally waived for consumable radioactive material i.e. most unsealed radioactive material, radioactive material with half-lives of less than 3h, radioactive material dispersed in a human body and low activity sources.

3. Procedures

3.1 Consumable Open Sources

The details about the source listed in the previous section must be kept on record. Note that there is no exception to this; neither low-activity sources nor sources that any one individual thinks are low risk can be ignored. Almost all of these details should inevitably be part of the Usage and Disposal records held in RETAIN and guidance on the usage and disposal of unsealed sources can be found in a separate Code of Practice (RP CoP006 Working with unsealed radioactive materials). Recording of the material usage and disposal in RETAIN is sufficient to meet the requirements for source accounting.

3.2 Closed and Non-consumable Open Sources

The source details listed in the previous section must be kept on record. Note that there is no exception to this; the public concern that can arise from the loss of even the smallest of sources is sufficient to justify rigorous accounting procedures in all cases. A suggested pro-forma is attached to this Code of Practice as Appendix 1 and can be downloaded from the 'forms' area of the RPU website.

The pro-forma includes sections to help identify and record clearly the details of the relevant authorisation under which the source is being held/disposed.

In addition, the whereabouts of a source must be checked at regular intervals. The frequency of checks depends upon the likely movement of the source, its potential for being displaced and its susceptibility to damage. Since there is a maximum backstop of monthly, even sources located in large immobile apparatus need to be checked. Some suggested periods in between checks is shown in the following table:

Radiation Application	Period of checks
Portable sources, used away from their storage location	Daily
Sealed/Closed test sources used more than once a week	Weekly
Sealed/Closed test sources used less than once a week	Monthly
Electron Capture Detectors (ECDs) used in, but removed from, gas chromatographs	Weekly
ECDs in situ within equipment	Monthly
Standards in liquid scintillation counters	Monthly
Gamma irradiators	Monthly

It is not always necessary to physically observe the radiation source, and indeed would be dangerous with some of the higher activity sources. Low activity sources, such as test sources, should be viewed as part of their check. However, it is not reasonable to view sources fixed within apparatus. Their presence should be inferred by some indirect means, e.g. does the equipment work? Is there a reading on a radiation meter? Is the source capsule still there?

Confirmation that the source is present must be recorded. The appropriate form will depend upon the frequency of checks, but a typical (monthly) pro-forma is included as Appendix 2.

4. Records

Accounting records must be kept for at least five years after the date of last entry or after the source is disposed of. Both source details and whereabouts checks should be held together in a laboratory file, where they can be seen and are readily available for inspection if required.

Details of what to do if a source cannot be found are in the relevant department's Local Rules.

Appendix 1 – Sealed/Closed Source Record Form

This form can be downloaded from the Radiation Protection Unit.

Sealed or Closed* Source Record Form

*This includes open sources which are not being consumed

Source Details:	
Department or School etc.:	
Location of Source:	
Isotope:	
Activity:	
Activity Reference Date:	Click or tap to enter a date.
	☐ Unknown Activity Reference Date
Serial Number or unique identifier:	
Type No. or manufacturer code:	
Purpose of Source:	
Description of source: *(e.g. physical dimensions, construction, source container, etc.)*	
Physical form:	Solid ☐ Liquid ☐ gas ☐ Other (specify):
Received from:	
Date of Receipt:	Click or tap to enter a date.

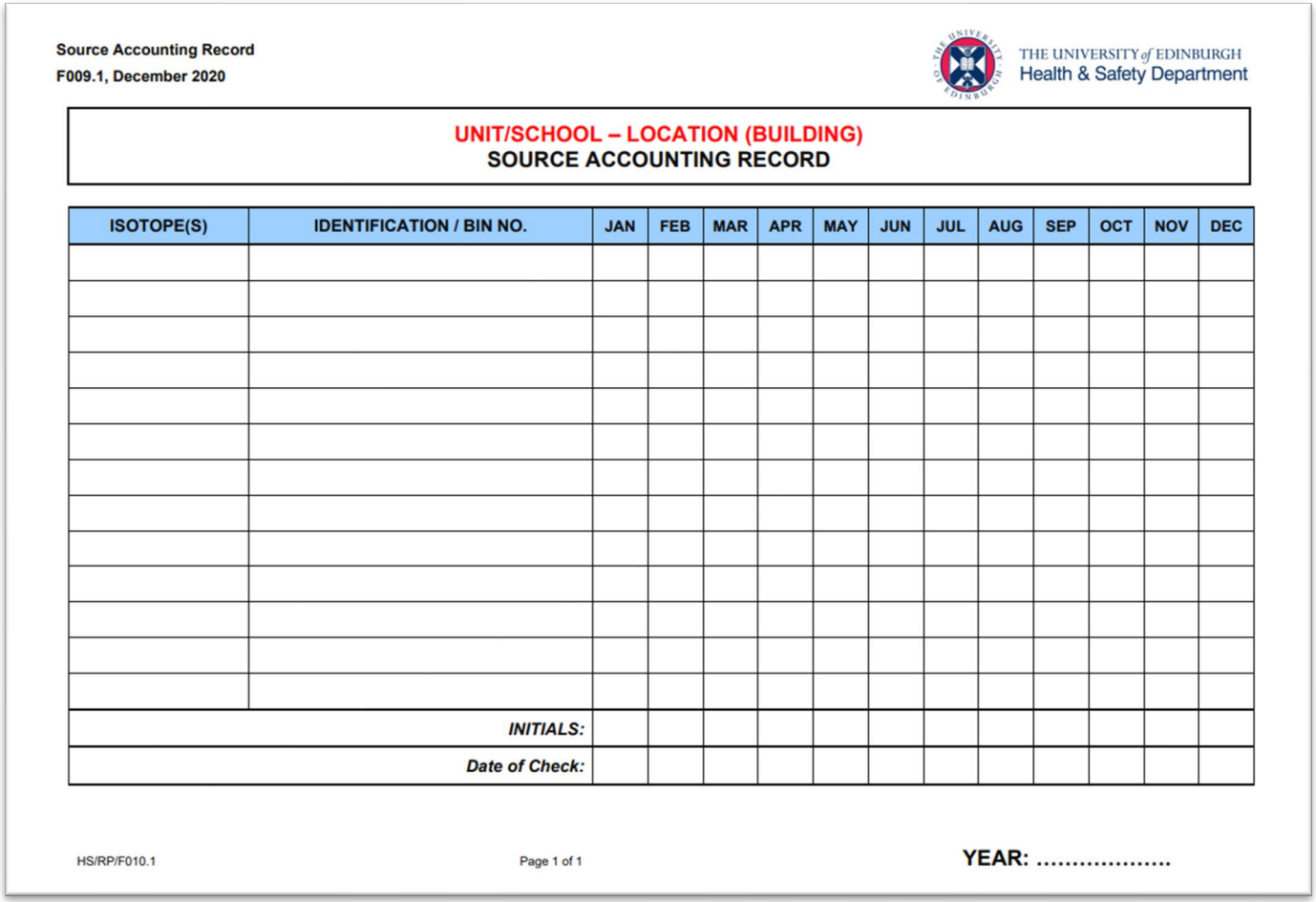
Disposal details (only fill in at time of disposal):	
Disposed/transferred to (name):	
Disposed/transferred to (address):	
Date of transfer/disposal:	Click or tap to enter a date.
Activity when disposed/transferred:	

Disposal details (only fill in at time of disposal):	
Disposed via which piece of legislation: *(For example, via a General Binding Rule or via an existing University Permit)*	GBR ☐ Permit ☐ GBR Number (See EASR): Permit Ref. No.:
Other notes/details (if required):	

Photo(s) of Source (insert below):

Appendix 2 – Accounting Record

This form can be downloaded from the Radiation Protection Unit.



Source Accounting Record
F009.1, December 2020

THE UNIVERSITY of EDINBURGH
Health & Safety Department

UNIT/SCHOOL – LOCATION (BUILDING)
SOURCE ACCOUNTING RECORD

ISOTOPE(S)	IDENTIFICATION / BIN NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	INITIALS:												
	Date of Check:												

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Document version

Version number	Summary of change	Date and by whom
V1.0	New version	July 2004 Colin Farmery
V1.1	Minor updates	Nov 2020 MG
V1.2	New template	November 2024 JC

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