



REGULATORY GUIDE: Use of sealed sources beyond their recommended working life

Background

The concept of 'recommended working life' was introduced by Amersham (Radiochemical Centre Ltd) in 1977 to draw the user's attention to the fact that, like any manufactured article, a sealed source has a finite life¹. The recommended working life was intended as a guide to create an awareness of the need for regular inspection and reasonable judgements to be made about the continued suitability of a source for a particular application.

There are documents that provide information on sealed sources, such as ISO2919:1999 *Radiation protection – Sealed radioactive sources – General requirements and classification*, ISO9978:1992 *Radiation protection – Sealed radioactive sources – Leakage test methods* and Australian Standard AS2243.4:1998 *Safety in laboratories – Part 4 Ionizing radiations*, but all are silent on use of sources beyond their recommended working life.

AS2243.4 recommends 10 yearly leak tests and annual wipe tests. However it is reasonable to assume this requirement applies to sources within their recommended working life. For sources that have exceeded their recommended working life the frequency of testing needs to be increased to more closely monitor the integrity of the source capsule and its housing. This approach is recommended by the UK's Health & Safety Executive².

ARPANSA produced an interim statement on the use of sealed sources beyond their recommended working life in April 2005, and this guidance supersedes that information. Note that the requirement for leak testing as per the method described in ISO9978:1992 has been removed and wipe testing considered a suitable means of source assessment as long as the following guidelines are met.

Current guidance

Where a recommended working life has not been assigned by the sealed source manufacturer, ARPANSA has determined that a recommended working life of:

- 15 years be assigned to the following sealed sources: Cs137, Co60, Ba133, Am241, Am241/Be, Ra226.
- 10 years be assigned to Ni63 sources, provided that wipe test results are satisfactory.
- 5 years be assigned to all other sources, unless the user can demonstrate to the satisfaction of the CEO ARPANSA that it should be extended.

ARPANSA will allow the continued use of a source in the Group 1³ or low hazard category beyond its recommended working life – up to a period of one additional working life - subject to the following conditions:

¹ E A Lorch. *The concept of recommended working life applied to radiation sources*. Radiological Protection Bulletin No 34, May 1980

² Health & Safety Executive *Radiation Protection Series No 8* October 2001

³ Australian Radiation Protection and Nuclear Safety Regulations 1999 Schedule 3C Part 1

| | | |
|--|-----------------|--|
| Title: REGULATORY GUIDE: Use of sealed sources beyond their recommended working life | | |
| Document ID: RPB-COM-SUP-270A | | Version 2 |
| Issue Date: September 2009 | Prepared by: JS | Approved by: RE <i>RE</i> Page 1 of 2 |

1. The source must be wipe tested at six monthly intervals; and
2. All results of wipe tests must be recorded and retained with the source records.

In addition to Group 1 sources, ARPANSA will allow the continued use of the following types of Group 2 sources or medium hazard category beyond the recommended working life - up to a period of one additional working life:

- Portable density/moisture gauges containing radioactive sources.
- Fixed radiation gauges containing radioactive sources.

This extension of recommended working life is subject to the following conditions:

1. For **portable density/moisture gauges** containing radioactive sources, the source, or its housing at point of closest approach to the source, must be wipe tested at six monthly intervals in accordance with Annex F of Radiation Protection Series No.13⁴. (Note that the relevant code of practice Radiation Protection Series No.5⁵ does not provide specific guidance on this matter.)
2. For **fixed radiation gauges**, the source, or it's housing at, or immediately adjacent to, the gauge shutter or source control mechanism, must be wipe tested at twelve monthly intervals in accordance with Annex F of Radiation Protection Series No.13.
3. For both types of gauge, all results of wipe tests must be recorded and retained with the source records.

If the wipe tests reveal contamination levels on the closest accessible surfaces to the sealed source in excess of 200 Bq⁶, the source is not considered to be leak tight and should be withdrawn from use.

Continued use of other higher hazard sources in Group 2 or 3 beyond one recommended working life or **any** source beyond a second recommended working life (whether Group 1, 2 or 3) will be considered on a case-by-case basis, taking into account:

- Activity of the source
- Toxicity of the radionuclide and its half life
- Source construction
- Type of dealing
- Environment in which the source has been/will be used

A written submission should be made to ARPANSA for such cases.

Any sources that have exceeded their recommended working life should be clearly identified in the Source Inventory Workbook.

⁴ ARPANSA Radiation Protection Series No.13 *Safe Use of Fixed Radiation Gauges*

⁵ ARPANSA Radiation Protection Series No.5 *Portable Density/Moisture Gauges Containing Radioactive Sources*

⁶ ISO9978 : 1992 Radiation protection – Sealed radioactive sources – Leakage test methods

| | | | |
|---|-----------------|---------------------------|-------------|
| Title: REGULATORY GUIDE: Use of sealed sources beyond their recommended working life | | | |
| Document ID: RPB-COM-SUP-270A | | | Version 2 |
| Issue Date: September 2009 | Prepared by: JS | Approved by: RE <i>Rt</i> | Page 2 of 2 |