

29 August 2022

## GUIDELINE ON DISPOSAL OF X-RAY UNITS AND TUBES CONTAINING BERYLLIUM

The objective of this guideline is to provide X-Ray equipment licence holders on how and where to dispose of electronic equipment that has reached end of life. The unit must be confirmed to be in a state where it will never be used for production of X-Rays.

### Document History

Final Version	Reason for Amendment	Effective Date
0	First issue and published for implementation	Jan 2013
1	<ul style="list-style-type: none"><li>- Content structured on the new SAHPRA Guideline Template</li><li>- A unique document number SAHPGL-RDN-XR-17 allocated to this Guideline</li><li>- Form RC002 changed to <b>GLF-RDN-XR-02A</b></li></ul>	August 2022

**DR BOITUMELO SEMETE-MAKOKOTLELA**  
CHIEF EXECUTIVE OFFICER

## Contents

Document History.....	1
Glossary .....	3
1. INTRODUCTION .....	4
1.1 Purpose.....	4
1.2 Scope .....	4
2. LEGAL PROVISION .....	4
3. X-RAY UNIT .....	4
4. X-RAY TUBE CONTAINING BERYLLIUM .....	5
5. REFERENCES.....	6
6. VALIDITY .....	6

## Glossary

Abbreviation/ Term	Meaning
ACT	Hazardous substances Act 15 of 1973
PCB	polychlorinated biphenyls oil
Beryllium	Silvery white metal used in X-Ray tubes to increase electrical and thermal conductivity. It is transparent to X-Rays; X-Rays pass through it without being absorbed. That is why it is sometimes used to make windows for some X-Ray machines
H:H	Hazard Rating deemed to be ranging from high risk to extreme risk
SAHPRA	South African Health Products Regulatory Authority
SANS	South African National Standards

## 1. INTRODUCTION

Equipment capable of producing ionising radiation must be rendered inoperable before disposal. The equipment is inoperable when it is not practicable for a person to restore the unit to a condition capable of producing radiation

X-Ray tube oil may contain polychlorinated biphenyls (PCBs). A determination regarding the presence of PCB in the X-Ray tube oil must be made prior to disposal. The disposal of oil becomes a regulated activity if the concentration of PCB is above a certain level. Some X-Ray tubes made before 1979 contain PCBs in cooling oil.

Transformers in some X-Ray equipment manufactured before 1979 may contain PCB dielectric oil. You must determine if the transformer contains PCB prior to disposal. The disposal of PCB dielectric oil is regulated if the concentration of PCB is above a certain level.

Housings are generally made of lead or cast steel with a lead lining. A scrap-metal dealer may recycle the housing. A prescribed waste determination of the lead contained in the housing must be performed if disposal of the housing is the preferred option.

X-Ray tubes with beryllium windows require a prescribed waste determination before disposal. Removing the head from the unit and cutting the electric cord.

### 1.1 Purpose

The purpose of this guideline document gives general recommendations and advice to licence holders on how to deal with X-Ray units which have been dismantled and are ready for disposal.

### 1.2 Scope

The scope of this guideline is to provide a framework with which dismantled X-Ray units can be disposed of in a safe manner.

## 2. LEGAL PROVISION

The guideline is implemented in promulgating the Hazardous Substances Act 15, 1973 (Act15 of 1973) the related Regulations R.1332. Condition of the license for X-Ray units in South Africa is to notify SAHPRA Radiation Control of the disposal of an X-Ray unit.

## 3. X-RAY UNIT

If an obsolete X-Ray unit cannot be returned to the manufacturer or supplier, the unit may be disposed of at any waste landfill site provided that:

- 3.1 The X-Ray tube **DOES NOT** contain beryllium. Should any doubt exist, treat the unit as if it does contain beryllium (see paragraph 2 below).
- 3.2 The unit is regarded inoperable only if it is not possible for anyone to restore it to a point where it

could again produce radiation. The X-Ray unit must be rendered inoperable as follows:

- Remove the tube from the unit.
- cut the electric cord
- Destroy vital components of the X-Ray generator.

3.3 Approval has been obtained from the SAHPRA: Radiation Control using the application form **GLF-RDN-XR-02A** (old Form RC002).

#### 4. X-RAY TUBE CONTAINING BERYLLIUM

4.1 According to the Hazardous Substances Act, Act 15 of 1973, Beryllium is classified as a Group 1 category B substance. As such any waste containing beryllium should be considered hazardous and be managed accordingly.

4.2 The management of this waste is explained in the document "Minimum Requirements for the handling, classification and disposal of hazardous waste" that was published by the Department of Water Affairs and Forestry in 2005.

According to SANS (South African National Standards) 10228 document, waste containing beryllium is classified as Class 6.1 hazardous waste and as such, be managed as follows:

- All containers containing such waste should be securely closed.
- All containers containing such waste should be clearly labelled.
- All such waste should be disposed of at an (H:H) Hazardous Waste Landfill Site.

4.3 Any of the approved H:H Hazardous Waste Landfill Sites in the RSA can be contacted regarding specific requirements for the disposal of X-Ray tubes containing beryllium.

*List of approved H:H Hazardous Waste can be found from <http://sawic.environment.gov.za/?menu=75> » List of licensed Waste Management Activities.*

## 5. REFERENCES

The following related documents are referenced:

- 5.1 Department of Water Affairs and Forestry, 2005. Waste Management Series. Minimum Requirements for the Handling, Classification and Disposal Hazardous Waste.
- 5.2 SANS 10228: 2012 Edition 6. Published by SABS Standards Division.
- 5.3 National Environmental Management: Waste Act, 2008
- 5.4 National Norms and Standards for Disposal of Waste to Landfill, 2013
- 5.5 Government Notice R636 of 2013
- 5.6 Published in Government Gazette no. 36784 on 23 August 2013
- 5.7 Waste in South Africa is currently governed by means of several pieces of legislation, including:
  - The South African Constitution (Act 108 of 1996)
  - Hazardous Substances Act (Act 5 of 1973)
  - Health Act (Act 63 of 1977)
  - Environment Conservation Act (Act 73 of 1989)
  - Occupational Health and Safety Act (Act 85 of 1993)
  - National Water Act (Act 36 of 1998)
  - The National Environmental Management Act (Act 107 of 1998)
  - Municipal Structures Act (Act 117 of 1998)
  - Municipal Systems Act (Act 32 of 2000)
  - Mineral and Petroleum Resources Development Act (Act 28 of 2002)
  - Air Quality Act (Act 39 of 2004)
  - National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
  - National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014)

## 6. VALIDITY

This guideline is valid for a period of 5 years from the effective date of revision and replaces the old guidelines for Disposal of X-Ray Units and Tubes Containing Beryllium, revised January 2013. It will be reviewed on this timeframe or as and when required.