

		WORKING PROCEDURE	Allocation Centre 38A	Reference Number KWH-S-007	Rev 10
NNR: NO No.:	LEAKAGE TESTS ON SEALED RADIOACTIVE SOURCES				PAGE 1
KORC NO	ACCESS Nuclear Restricted	IMPORTANCE CATEGORY CSR	NEXT REVIEW DATE 2023-04-09	DATE AUTHORISED 2018-04-09	

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DATE 2018-04-06	DATE 2018-04-06	DATE 2018-04-09

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CATEGORY 3 – PROCEDURE FOR REFERENCE

FCA PROTECTION	ALARA REVIEW YES 2018-03-07	SUPERSEDES KWH-S-007. Rev 9a dd. 2015-10-07 FULL REVIEW
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1.0 PURPOSE

- 1.1 To describe a safe method for leak-testing sealed radioactive sources.

2.0 SCOPE

- 2.1 Applicable to all sealed radioactive sources listed in the Sealed Source Register at Koeberg and also pertinent to the equipment containing sealed sources as listed in Hazardous Substances Act No. 15 of 1973.
- 2.2 Exemption is granted in the case of KRT and incore sources (KWH-S-041).

3.0 DEFINITIONS AND ABBREVIATIONS

3.1 Definitions

- 3.1.1 **Alternate Radiation Protection Officer (Source Control)** – A person who has been authorised by the employer to assist the Radiation Protection Officer with execution and administration obligations in respect of radioisotopes and listed electronic products at a certain site. Deputy to RPO (Source Control).
- 3.1.2 **Radiation Protection Officer (Source Control)** – A person who has been authorised by the employer to control and execute the administrative obligations in respect of isotopes and listed electronic products at a certain site.

3.2 Abbreviations

- 3.2.1 **μSv** – Microsievert (1E-6 Sv)
- 3.2.2 **ACP** – Access Control Point
- 3.2.3 **ARPO** – Alternate Radiation Protection Officer (Source Control)
- 3.2.4 **DRC** – Directorate: Radiation Control, Department of Health
- 3.2.5 **EPD** – Electronic Personal Dosimeter
- 3.2.6 **KRT** – Plant Radiation Monitoring System
- 3.2.7 **NNR** – National Nuclear Regulator
- 3.2.8 **RCZ** – Radiation Controlled Zone
- 3.2.9 **RP** – Radiation Protection
- 3.2.10 **RPC** – Radiation Protection Certificate

- 3.2.11 **RPM** – Radiation Protection Monitor
- 3.2.12 **RPO** – Radiation Protection Officer (Source Control)
- 3.2.13 **SRPA** – Senior Radiation Protection Assistant
- 3.2.14 **TLD** – Thermoluminescent Dosemeter

4.0 REFERENCES

4.1 Referenced Documents

- 4.1.1 238-54, Rev 0: Radiological Protection Licensing Requirements for Koeberg Nuclear Power Station
- 4.1.2 335-2, Rev 4: Koeberg Nuclear Power Station Management Manual
- 4.1.3 Government Gazette No. 14956, dated 26 February 1993
- 4.1.4 KAA-500, Rev 13: The Process for Controlled Documents
- 4.1.5 KAA-633, Rev 11: Control of Radioactive Sources and X-ray Equipment
- 4.1.6 KSA-011, Rev 14: The Requirements for Controlled Documents

4.2 Applicable Documents

- 4.2.1 KSH-008: Radiation Protection Records, Data and Information Management
- 4.2.2 KWH-S-041: Radiation Protection Source Control

5.0 PREREQUISITES

- 5.1 Individuals performing leak tests on sealed sources must have successfully completed the Source Handlers course.
- 5.2 A Radiation Protection Certificate (RPC) is required for all leakage tests on sealed radioactive sources irrespective of their location (controlled zone and non-controlled zone).

6.0 PRECAUTIONS AND LIMITATIONS

- 6.1 If practical, testing of high activity sources (with a contact dose rate greater than 500 μ Sv/ on contact) must be performed using remote handling tools, e.g. tongs, as prescribed by the RPC.
- 6.2 The leak test itself must be conducted so as not to damage the source. Electroplated sources, e.g. alpha sources, must not be smeared on the active deposit because this process could result in the removal of activity. These sources must be smeared around and in the proximity of the source.
- 6.3 Testing of high activity sources must be carried out in an area where access by non-involved personnel can be restricted.
- 6.4 On approval from the DRC, an exemption may be granted from the 24 month interval for leakage tests, subject to the following provisions being satisfied:
 - 6.4.1 The exemption is applicable to sealed sources which form an integral component part of an item or equipment and which are inaccessible under normal operating conditions.
 - 6.4.2 All sealed sources must, if possible, be leak tested before being installed in such equipment.
 - 6.4.3 Smears must be taken on the outside surfaces of the equipment before it is removed from the installed location for maintenance or repairs. This will prevent the inadvertent spread of contamination.
 - 6.4.4 On dismantling of the equipment, smears must be taken to ensure that there has been no leakage from the source before proceeding with maintenance work or repairs.
- 6.5 Results of smear tests must be recorded in the Source Register.
- 6.6 If, as a result of the test procedure, the source is suspected of being contaminated, the matter must be reported to the RPO (Source Control), who must investigate the matter and arrange for decontamination, as appropriate.
- 6.7 All contaminated smears must be disposed of as radioactive waste.

7.0 PROCEDURE

- 7.1 Have ready a supply of smear papers or swabs and gloves, and two pairs of tweezers.
- 7.2 Have ready a dose rate meter and contamination monitor appropriate for the type of source.
- 7.3 Make sure that a TLD and an EPD are worn during all work with sources within Controlled Zones.
- 7.4 Remove the source (in its container) from storage and, if necessary, transport it to the test area. Update the Source Movement Log, if necessary.
- 7.5 Remove the source from its container, using the remote handling tools available, if necessary.

NOTE: *Shielding must be used during the handling of high activity sources to maintain exposures ALARA.*

- 7.6 No source is to be handled with bare hands.
- 7.7 Take a clean smear paper and carefully wipe the surface of the source with the smear paper, taking care not to touch or wipe the active deposit in the case of electro-plated sources. Seal the smear paper and mark it with the source number for identification afterwards. On completion of the leak tests, determine the activity, if any, on the smear papers using suitable counting equipment.
- 7.8 Upon completion of leak testing, sources must be placed in their containers and returned to the storage area. Update the Source Movement Log, if necessary.
- 7.9 Leaking sources must be removed from operation. Seal the leaking source in a red plastic bag and inform the RPO (Source Control), or his deputy, who will in turn, report it to the Generation Safety & Assurance Manager, or his deputy, the NNR, the DRC and the RP Manager.
- 7.10 An identified damaged source must not be used; it must be disposed of as described in KWH-S-041, or returned to the manufacturer.

8.0 ACCEPTANCE CRITERIA

- 8.1 A leaking source is defined as giving rise to any level of detectable activity when tested as described in this procedure.

9.0 RECORDS

- 9.1 All leak tests must be reported on the Source Register and be forwarded to Documentation on disposal of source.
- 9.2 The Source Register is a permanent record and must be handled in accordance with KSH-008 requirements.

10.0 ATTACHMENTS

Appendix 1 – Justification

APPENDIX 1
JUSTIFICATION

Revision 10

1. Full review.