

## Document Preparation Profile

### 1. IDENTIFICATION

Category:	Safety Guide
Working ID:	DS412
Proposed Action:	New document
Existing Series number(s):	n/a
Published title/date:	n/a
Proposed Title:	Ageing Management for Research Reactors
Review Committee:	NUSSC
Technical Officer:	Shokr, A. M., Research Reactor Safety Section

### 2. OBJECTIVE

The objective of the proposed Safety Guide is to provide practical guidance and recommendations on ageing management for the safety related systems, structures, and components (SSCs) of research reactors (RRs) on the basis of the current international good practices. The proposed Safety Guide is intended for the use of RRs operating organizations in establishing, implementing, and improving ageing management programme (AMP) and the regulatory body in verifying that ageing of RRs is being effectively managed.

This Safety Guide will address and elaborate the requirements established in paras 6.68-6.70 and 7.109 of the Safety Requirements publication, NS-R-4, "Safety of Research Reactors".

The scope of the proposed Safety Guide will be restricted to the scope of the NS-R-4, that is, heterogeneous, water-cooled, thermal spectrum reactors up to several tens of megawatts in power rating.

### 3- BACKGROUND

Full compliance with the safety principles and requirements may be compromised because of ageing of the safety related SSCs. Therefore, RRs operating organizations should establish an up to date and effective ageing management programme based on the actual conditions of the facility. Managing the safety aspects of reactor ageing requires implementation of an effective programme for the timely prediction, detection and mitigation of ageing deterioration of the reactor's safety related SSCs, so as to ensure their integrity and functional capability throughout the reactor service life.

In 2004, the IAEA proposed a Safety Guide on "Ageing Management for Nuclear Power Plants and Research Reactors (DS 382)". This Guide was proposed to "fulfill the role of a higher level umbrella that identifies the key elements of effective ageing management and shows how they fit together by articulating what should be done to achieve an effective ageing management programme in nuclear Power Plants (NPPs) and RRs".

The DPP of DS 382 was approved by the CSS in June 2005. However, in that CSS meeting, the fact that ageing management practices of RRs are much different from those of NPPs was commented by several members of the Commission. The decision of the CSS meeting was basically that the NUSSC and the CSS would consider again the matter one year later based on a report from the IAEA and decide whether or not to produce two separate Safety Guides.

The experience acquired from the development of the first draft of the DS 382 showed that, the differences in the design, operation, and utilization philosophy of RRs from those for NPPs require that separate criteria be established for RRs and NPPs even though many ageing related degradation mechanisms are similar.

In March 2006, the NUSSC agreed to split the draft DS 382 in two Safety Guides, one for NPP (DS 382) and one for RRs (for which a DPP has to be prepared according to the IAEA procedures on the preparation of IAEA safety standards). The drafting of the new Safety Guide for RRs could be based on the previous main text and Appendix II (Specific recommendations for RRs) of the DS 382 and on the already existing TECDOC 792. The proposed Safety Guide on “Ageing Management for RRs” will start from that base.

#### **4. INTERFACES**

The proposed Safety Guide will interface with relevant parts of the following documents:

1. FS-1, “Fundamental Safety Principles”.
2. Safety Requirements NS-R-4, “Safety Requirements of Research Reactors”.
3. Safety Guide 35-G2, “Safety in the Utilization and Modification of Research Reactors”.
4. GS-G-3.1, “Application of Management System for Facilities and Activities”.
5. NS-G-4.2, “Maintenance, Periodic Testing and Inspections of Research Reactors”.
6. DS 261, “Operational Limits and Conditions and Operating Procedures for Research Reactors”.
7. DS 325, “The Operating Organization and the Recruitment, Training and Qualification of Personnel for Research Reactors.”
8. DS 350, “Core Management and Fuel Handling for Research Reactors”.
9. DS 382, “Ageing Management for Nuclear Power Plants”.
10. Service Series No.1, “Guidelines for the Review of Research Reactor Safety”.
11. TECDOC 792, “Management of Research Reactors Ageing”.
12. TECDOC 1236, “Applications of Non-Destructive Testing and In-Service-Inspection to Research Reactors”.
13. TECDOC 1387, “Safety Considerations for Research Reactors in Extended Shutdown”.

#### **5. CONTENTS**

The intended Table of Contents for the proposed Safety Guide is as follows:

- 1-Introduction
- 2- Management system for ageing management
- 3- Ageing and safety of RRs
- 4- Ageing considerations in different phases of RRs lifetime
- 5- Basic elements of ageing management programme

6. Managing of Obsolescence

7- Interfaces with other technical areas

Extended Table of Contents is attached.

**6. PRODUCTION**

Submittal of DPP to SC for approval	Feb 07
Submittal of DPP to NUSSC	March 07
Approval of DPP at NUSSC meeting	April 07
Submittal of DPP to CSS	September 07
Approval of DPP at CSS meeting	November 07
Preparation of the Draft	April 08
CSM to comment on the Draft and incorporation of the comments	May 08
Revision of the Draft and approval by SC	June 08
Submittal of NUSSC for review	July 08
Approval by NUSSC to send to Member States for comments	Sep 08
Technical editing of the Draft	Oct 08
Submittal to Member States for comment	Nov 08
Receiving Member States comments	March 09
CSM to address Member States comments, if necessary	April 09
Submittal to NUSSC	July 09
Approval by NUSSC for submitting to CSS	Sept 09
Submittal to CSS	Oct 09
Approval by CSS	Nov 09
Target publication date	2 Q 10

**7- ESTIMATED RESOURCES**

From IAEA: 2-3 Staff-month

From Member States: 2-3 Man-week

## **Attachment**

### Extended Table of Contents

#### 1-Introduction

- Background
- Objective
- Scope
- Structure

#### 2- Management system for ageing management

- Management responsibility
- Resources management
- Process realization
- Measurement, assessment and monitoring

#### 3- Ageing and safety of RRs

- Basic concepts and definitions
- Safety requirements and ageing
- Service conditions and ageing
- Ageing mechanisms and effects

#### 4- Ageing considerations in different phases of RRs lifetime

- Design
- Fabrication and construction
- Commissioning
- Operation
- Utilization and modification
- Extended shutdown
- Decommissioning

#### 5- Basic elements of ageing management programme

- Identification of the degradation processes that affect safety
- Identification of SSCs important to safety
- Preventive actions to minimize expected ageing degradation
- Record keeping

- Detection and assessment of ageing effects
- Prevention and mitigation of ageing effects
- Continuous improvement of ageing management programme

## 6. Managing of Obsolescence

### 7- Interfaces with other technical areas

- Periodic safety review
- Equipment qualification
- Maintenance, periodic testing and inspection
- Guidelines for continued operation
- Post-service surveillance and testing

## References

Annex: Various service conditions and ageing

Annex: Screening of RRs components for ageing evaluation