Document Preparation Profile (DPP)
Version 3 dated 21 December, 2013

1. IDENTIFICATION

Document Category	**Safety Guide**
Working ID:	**DS 485**
Proposed Title:	**Ageing Management and Long Term Operation for Nuclear Power Plants**
Proposed Action:	**Revision of document - NS-G-2.12 "Ageing Management for Nuclear Power Plants", 2009**
Review Committee(s) or Group:	**NUSSC, WASSC**
Technical Officer(s):	**Robert Krivanek**

2. BACKGROUND

The IAEA Safety Guide NS-G 2.12 "Ageing Management for Nuclear Power Plants" is dedicated to ageing management activities. It was published in 2009. Since this time, many important changes occurred in IAEA documents relevant to this safety guide and they are not reflected in the current version of safety guide:

- SSR-2/1 "Safety of Nuclear Power Plants: Design" in 2012;
- SSR-2/2 "Safety of Nuclear Power Plants: Commissioning and Operation" with a new requirement 16: Programme for long term operation in 2011 which is not reflected in any safety guide;
- SSG-25 "Periodic Safety Review of Nuclear Power Plants" with a new Section 3 "Input from the periodic safety review in assessing long term operation or licence renewal" in 2013;
- Safety Reports Series No. DD1085 "International Generic Ageing Lessons Learned for Nuclear Power Plants (Proven Ageing Management Programmes and Typical Time Limited Ageing Analysis)" in 2013.

On top of that, some sections of this safety guide are already obsolete and do not reflect a current state-of-the-art of industry practices and research and development results and need updating. Those are for example:

- Application of ageing management to long term operation;
- Management of obsolescence;
- Review of ageing management for long term operation;
- Interfaces with other technical areas (periodic safety review).

3. JUSTIFICATION FOR THE PRODUCTION OF THE DOCUMENT

With continuous ageing of fleet of nuclear power plants, long term operation has become a major topic for majority of operating units. Member States repeatedly request the IAEA to provide Safety Standards for a process of preparation for safe long term operation.

IAEA Safety Guide NS-G 2.12 "Ageing Management for Nuclear Power Plants" was published in 2009. Since this time, significant changes were performed in IAEA Safety Standards connected with ageing management and long term operation. A new SSR-2/2 on Commissioning and operation was

published in 2011 and particularly its new Requirement 16: Programme for long term operation is not reflected in any safety guide. A new safety report on IGALL was published in 2013.
Current safety guide is also not reflecting the current state-of-the-art practices in areas like application of ageing management to long term operation, management of obsolescence, review of ageing management for long term operation and interfaces with other technical areas (e.g. a new Safety Guide SSG-25 Periodic safety review published in 2013).
A new revision of this safety guide should resolve all those deficiencies.

4. OBJECTIVE AND SCOPE

The objective of this revision is to provide sufficient guidance to implement requirements SSR-2/1 and SSR-2/2 on ageing management and long term operation, assure consistency and harmonize the document with all updated IAEA Safety Standards and safety reports in the area of ageing management and long term operation and update the content of obsolete sections of the current version of safety guide.

5. PLACE IN THE OVERALL STRUCTURE OF THE RELEVANT SERIES AND INTERFACES WITH EXISTING AND/OR PLANNED PUBLICATIONS

SSR-2/1 "Safety of Nuclear Power Plants: Design" provides requirements relevant to this safety guide related to design, fabrication and construction phases. Requirement 31: Ageing management is the most relevant to this safety guide.

SSR-2/2 "Safety of Nuclear Power Plants: Commissioning and Operation" provides requirements relevant to this safety guide related to commissioning and operation.
Requirement 13: Equipment qualification, Requirement 14: Ageing management, Requirement 15: Records and reports and Requirement 16: Programme for long term operation are relevant to this safety guide.

Concerned **NS-G-2.12 "Ageing Management for Nuclear Power Plants"** provides recommendations for managing ageing of SSCs important to safety in nuclear power plants, including recommendations on key elements of effective ageing management. The Safety Guide is intended for use by operators in establishing, implementing and improving systematic ageing management programmes for nuclear power plants. The Safety Guide may be used by regulators in preparing national regulatory standards and guides, and in verifying that ageing in nuclear power plants is being effectively managed.

SSG-25 "Periodic Safety Review of Nuclear Power Plants" provides recommendations and guidance on the conduct of a PSR for an existing nuclear power plant. The Safety Guide is directed at plant operating organizations and regulatory bodies. This safety guide provides inputs for long term operation in its Section 3. The revised safety guide provides guidance connected with Safety Factors 3 – "Equipment Qualification" and 4 – "Ageing".

Safety Reports Series No. 57 "Safe Long Term Operation of Nuclear Power Plants" supports NS-G-2.12 by providing with more detail information on key technical considerations and activities to ensure safe LTO of nuclear power plants in accordance with regulatory requirements. It aims to support operating organizations in demonstrating the safety of their nuclear power plants during LTO and regulatory bodies in verifying their safety. It provides information on a step by step approach that may be taken by operating organizations and regulatory bodies considering LTO.

Safety Reports Series No. DD1085 "International Generic Ageing Lessons Learned for Nuclear Power Plants (Proven Ageing Management Programmes and Typical Time Limited Ageing Analysis)" supports NS-G-2.12 by providing with a technical basis for development and

implementation of ageing management programmes as well as performing of ageing management review during original design life time and also for long term operation. It also provides information on typical time limited ageing analyses which are revalidated for safe long term operation.

6. OVERVIEW

In **Section 1,** "Introduction, background, objective and scope" of this guide is provided.

Section 2 "Basic concepts" presents basic concepts of ageing management, obsolescence management and long term operation.

Section 3 "Proactive strategy of ageing management" provides basic information on approach to ageing management during the whole nuclear power plant life cycle.

Section 4 "Management of physical ageing" provides detail information on management of physical ageing in operational phase of nuclear power plant life cycle.

Section 5 "Management of conceptual obsolescence" provides detail information on management of conceptual obsolescence in operational phase of nuclear power plant life cycle.

Section 6 "Management of technological obsolescence" provides detail information on management of technological obsolescence in operational phase of nuclear power plant life cycle.

Section 7 "Ageing management in operation" provides more detail information on ageing management in operational phase of nuclear power plant life cycle.

Section 8 "Plant activities relevant to ageing management and long term operation" provides overview of plant reports and programmes relevant to ageing management and safe long term operation of nuclear power plant life cycle.

Section 9 "Programme for long term operation" provides overview of activities important for safe long term operation of nuclear power plant life cycle.

Section 10 "Time limited ageing analysis" provides overview of revalidation of time limited ageing analysis for safe long term operation of nuclear power plant life cycle.

Annex I. "Existing publications on ageing management" provides overview and explains structure of current IAEA publications on ageing management and long term operation.

Annex II. "Examples of contents of data collection and record keeping systems" provides overview of data required for ageing management programme and examples of relevant data.

Annex III. "Examples of significant ageing mechanisms and susceptible materials and components" provides examples of ageing mechanisms for mechanical components, electrical and I&C components and civil structures.

Annex IV. "Examples of ageing management programmes" provides examples of ageing management programmes implemented and proven in some Member States.

Annex V. "Examples of typical time limited ageing analysis" provides examples of typical time limited ageing analyses which are the matter of revalidation for safe long term operation in some Member States.

The general content of this Safety Guide could include:

1. INTRODUCTION
   - Background
   - Objective
   - Scope

Structure

2. BASIC CONCEPTS
   Ageing management
   Obsolescence management
   Long term operation

3. PROACTIVE STRATEGY OF AGEING MANAGEMENT
   Design
   Fabrication and construction
   Commissioning
   Operation
   Long term operation
   Decommissioning

4. MANAGEMENT OF PHYSICAL AGEING
   Scoping and screening of SSCs for AM and LTO
   Assessment of the current physical status of SSCs for AM and LTO
   Ageing management review
   Ageing management programmes

5. MANAGEMENT OF CONCEPTUAL OBSOLESCENCE
   Periodic safety review
   Other plant activities

6. MANAGEMENT OF TECHNOLOGICAL OBSOLESCENCE
   Systematic assessment of obsolescence
   Solving of obsolescence issues

7. AGEING MANAGEMENT IN OPERATION
   Organizational arrangements
   Data collection and record keeping

8. PLANT ACTIVITIES RELEVANT TO AGEING MANAGEMENT AND LTO
   Safety reports relevant to ageing management and LTO
   Plant programmes relevant to ageing management and LTO
   Review of plant programmes for LTO
   Demonstration that ageing effects are managed
   Documentation of the evaluation

9. PROGRAMME FOR LONG TERM OPERATION
   Principles and approach to long term operation
   Regulatory requirements and oversight
   Organizational structure for LTO
   Plant policy for LTO
   Long term operation implementation programme
   Feasibility studies
   Documentation

10. TIME LIMITED AGEING ANALYSIS
    Existing time limited ageing analysis
    Revalidation of time limited ageing analysis
    Documentation of revalidation of time limited ageing analysis

REFERENCES

ANNEX I: EXISTING PUBLICATIONS ON AGEING MANAGEMENT

ANNEX II: EXAMPLES OF CONTENTS OF DATA COLLECTION AND RECORD KEEPING SYSTEMS

ANNEX III: EXAMPLES OF SIGNIFICANT AGEING MECHANISMS AND SUSCEPTIBLE MATERIALS AND COMPONENTS

CONTRIBUTORS TO DRAFTING AND REVIEW

BODIES FOR THE ENDORSEMENT OF IAEA SAFETY STANDARDS

7. PRODUCTION SCHEDULE: Provisional schedule for preparation of the document, outlining realistic expected dates for *(fill the column corresponding to your proposed document and delete the other columns)*:

	A*	B*	C*
STEP 1: Preparing a DPP	DONE	DONE	DONE
STEP 2: Approval of DPP by the Coordination Committee	November 2013		
STEP 3: Approval of DPP by the relevant review Committees	July 2014		
STEP 4: Approval of DPP by the CSS	October 2014		
STEP 5: Preparing the draft	February 2015		
STEP 6: Approval of draft by the Coordination Committee	March 2015		
STEP 7: Approval by the relevant review Committees for submission to Member States for comments	June 2015		
STEP 8: Soliciting comments by Member States	October 2015		
STEP 9: Addressing comments by Member States	February 2015		
STEP 10: Approval of the revised draft by the Coordination Committee Review in NS-SSCS	March 2016		
STEP 11: Approval by the relevant review Committees for submission to the CSS	June 2016		
STEP 12: Endorsement by the CSS	October 2016		
STEP 13: Establishment by the Publications Committee and/or Board of Governors (for SF and SR only))	December 2016		
STEP 14: Target publication date	March 2017		

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- *Column A for Safety Fundamentals, Safety Requirements and Safety Guides.*
- *Column B for Nuclear Security Series publications noting that for Technical Guides a fast track may be proposed and justified for approval by the NSGC at step 3. If approved, the draft will not be subject to the steps 4 to 10 and, be provided at step 11 to the NSGC to take note of it before its publication*
- *Column C for TECDOCs, safety reports and other publications*

8. RESOURCES

Safety Guide on Ageing Management for Nuclear Power Plants are reviewed by the IAEA technical officer with support of a group of external experts.

Estimated staff—Secretariat—resources required: 10 person-weeks

Estimated Member States: 20

3 consultancy meetings: 120 person-weeks

1 technical meeting: 40 person-weeks