

# SPESS F

## Document Preparation Profile (DPP)

### Version 3 dated 11 May 2023

#### 1. IDENTIFICATION

**Document Category**    **Safety Guides**

**Working ID:**            **DS546**

**Proposed Title:**        **Ageing Management and Maintenance of Radioactive Material Transport Packages**

**Proposed Action:**      **New publication**

**Review Committee(s) or Group:** **TRANSSC, WASSC, RASSC, NUSSC**

**Technical Officer(s):** **Nancy Capadona, TSU**

#### 2. BACKGROUND

The Transport Regulations SSR-6 (Rev.1), implement new requirements for shipment after storage and ageing of transport packages. These new requirements apply to all types of packages. Thus, the guide contributes to the harmonised implementation of new requirements of the IAEA Transport Regulations, SSR-6(Rev. 1), and is applicable to all transport packages for radioactive material worldwide.

Further, the Transport Regulations SSR-6 (Rev.1), also sets requirements for maintenance in a rather general manner in paragraphs 104, establishing that the requirements to comply with the objective of the transport regulations are achieved, inter alia, imposing conditions on the maintenance of packagings, and in paragraph 106, where maintenance is included as one of the operations comprising transport. Package designs requiring a certificate of approval by the competent authority need that maintenance instructions are included in the application for competent authority approval, while packages not requiring a certificate of approval from the competent authority also need to be maintained. For this reason, SSG-66, "Format and Content of the Package Design Safety Report for the Transport of Radioactive Material", includes maintenance as one of the topics to evidence compliance with the requirements of the Transport Regulations SSR-6 (Rev. 1) when preparing the package design safety report, for both approved and non-approved transport packages. There is also pressing need to document related practical experience and lessons learned by the designer, manufacturer, users and competent authorities to have common approach particularly for packages which are used for transport of radioactive material.

#### 3. JUSTIFICATION FOR THE PRODUCTION OF THE PUBLICATION

The TRANSSC Technical Expert Group "Package Performance and Assessment" (TTEG-PPA) was founded during the TRANSSC 36 Meeting in June 2018. As a result of a questionnaire, a significant number of Member States and observer organizations expressed the need for an additional and comprehensive guidance on ageing of transport packages to support Member States in implementing the new requirements stipulated in the Transport Regulations. Hence, the TRANSSC agreed to the production of an ageing guide under the leadership of the Working Group Ageing (WG-AG) established for this purpose.

The safety of the packages designed to be used for longer period of time and in wide varieties of environment may be compromised, if not managed properly. The ageing mechanism of components important for the safety

of the packaging should therefore be identified from the design stage, then studied throughout the life of the package by periodic assessment. The packaging must be subject to maintenance which also takes into account the phenomena of ageing.

In addition, the lack of guidance material on maintenance of packaging to assist designers, manufacturers and users of transport packages has been a concern of the transport community for several years. A large number of transport packages are being maintained for repeated use with diverse approaches worldwide. States also requested for a comprehensive guidance on maintenance. A significant number of member states and observer organizations have requested additional and comprehensive guidance for ageing management and maintenance of transport packages, which are particularly foreseen for “shipment after storage”.

Some advice is provided by the “Advisory Material” SSG-26 (Rev. 1). The current SSG-26 is around 500 pages and difficult to process during review and publication. An additional increase due to the expected content for ageing management of transport packages would take the document towards its limit of size as a user-friendly document.

Additionally, SSG-26 (Rev. 1) addresses specific interfaces beyond the transport stakeholders. So, it would not be an option to add new content to existing “Advisory Material”. It is rather reasonable to develop a stand-alone guide for issues of ageing management of transport packages.

The document preparation process will consider existing IAEA Safety Guides and Requirements related to spent fuel, radioactive material and to ageing mechanisms of NPP, as well as existing guides provided by Member States. In particular, the existing drafts of the working group WG-AG and WG Maintenance of the TRANSSC TTEG PPA will be used as a basis for the development of the document.

The intended target group includes package designers, manufacturer, consignors, operators including those of storage facilities and competent authorities.

#### **4. OBJECTIVE**

The objective of the proposed publication is to provide guidance on meeting the requirements of SSR-6 (Rev.1) related to ageing and maintenance with particular focus on radioactive material transport packages planned for shipment after long term storage. The content of the guide has to make sure, that safety of transport packages is assured before transport. Different ageing mechanisms for all types of packages are considered, with a graded approach following SSR-6 (Rev. 1) requirements. In addition, this guide will include advices on establishing maintenance instructions, performing inspections, and clarification of dependences between maintenance and ageing.

#### **5. SCOPE**

This guide covers all packages containing radioactive material (i.e. Excepted, Type IPs, Type A, Type B(U) or B(M), Type C packages, including packages containing fissile material or uranium hexafluoride). This guide also covers all activities during the different phases of the life of the package where ageing management and maintenance should be considered, such as design, manufacture, repair of packaging, consigning, that includes in-transit storage, shipment after storage, receipt and unloading at the final destination. A graded approach is applied, commensurate with the aspects in package use (i.e. once-through, repeated, or intended for shipment after storage).

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

- INTERNATIONAL ATOMIC ENERGY AGENCY, Leadership and Management for Safety. General Safety Requirements, No. GSR Part 2, IAEA, Vienna (2016).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, No. GSR Part 3, IAEA, Vienna (2014).

- INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Assessment for Facilities and Activities. General Safety Requirements No. GSR Part 4 (Rev. 1), IAEA, Vienna (2016).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Material. 2018 Edition, Safety Standards Series No. SSR-6 (Rev. 1), IAEA, Vienna (2018).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2018 Edition), Safety Standards Series No. SSG-26 (Rev. 1), IAEA, Vienna (2022).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Format and Content of the Package Design Safety Report for the Safe Transport of Radioactive Material, Safety Standard Series No. SSG-66, IAEA, Vienna (2022).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Methodology for a Safety Case of a Dual Purpose Cask for Storage and Transport of Spent Fuel. IAEA-TECDOC-1938, IAEA, Vienna 2020.
- INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for the Safe Transport of Radioactive Material, Safety Guide No. TS-G-1.4, IAEA, Vienna (2008).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Compliance Assurance for the Safe Transport of Radioactive Material, Safety Standards Series SSG-78, IAEA, Vienna, (202X). (Approved for Publishing)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Final Report of the Coordinated Research Project “Ageing Management Programmes for Dry Storage Systems”, IAEA, Vienna, (202X). (Approved for Publishing)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Operation and Maintenance of Spent Fuel Storage and Transportation Casks/Containers, IAEA TECDOC (CD-ROM) No. 1532, IAEA, Vienna (2007)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants: Commissioning and Operation, Safety Standards Series SSR-2/2 (Rev. 1), IAEA, Vienna, (2016)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Storage of Spent Nuclear Fuel, IAEA Safety Standards Series No. SSG-15 (Rev. 1), IAEA, Vienna (2020)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Assessment for Research Reactors and Preparation of the Safety Analysis Report, IAEA Safety Standards Series No. SSG-20, IAEA, Vienna (2012)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Periodic Safety Review for Nuclear Power Plants, IAEA Safety Standards Series No. SSG-25, IAEA, Vienna (2013)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Criticality Safety in the Handling of Fissile Material, IAEA Safety Standards Series No. SSG-27, IAEA, Vienna (2014)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Predisposal Management of Radioactive Waste from Nuclear Power Plants and Research Reactors, IAEA Safety Standards Series No. SSG-40, IAEA, Vienna (2016)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Predisposal Management of Radioactive Waste from Nuclear Fuel Cycle Facilities, IAEA Safety Standards Series No. SSG-41, IAEA, Vienna (2016)

- INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Fuel Reprocessing Facilities, IAEA Safety Standards Series No. SSG-42, IAEA, Vienna (2017)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Format and Content of the Safety Analysis Report for Nuclear Power Plants, IAEA Safety Standards Series No. SSG-61, IAEA, Vienna (2021)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Design of Fuel Handling and Storage Systems for Nuclear Power Plants, IAEA Safety Standards Series No. SSG-63, IAEA, Vienna (2020)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Equipment Qualification for Nuclear Installations, IAEA Safety Standards Series No. SSG-69, IAEA, Vienna (2021)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Operational Limits and Conditions and Operating Procedures for Nuclear Power Plants, IAEA Safety Standards Series No. SSG-70, IAEA, Vienna (2022)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Core Management and Fuel Handling for Nuclear Power Plants, IAEA Safety Standards Series No. SSG-73, IAEA, Vienna (2022)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Storage of Radioactive Waste, IAEA Safety Standards Series No. WS-G-6.1, IAEA, Vienna (2006)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Maintenance, Periodic Testing and Inspection of Research Reactors, IAEA Safety Standards Series No. NS-G-4.2, IAEA, Vienna (2006)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Core Management and Fuel Handling for Research Reactors, IAEA Safety Standards Series No. NS-G-4.3, IAEA, Vienna (2008)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Operational Limits and Conditions and Operating Procedures for Research Reactors, IAEA Safety Standards Series No. NS-G-4.4, IAEA, Vienna (2008)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection and Radioactive Waste Management in the Design and Operation of Research Reactors, IAEA Safety Standards Series No. NS-G-4.6, IAEA, Vienna (2009)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management for Research Reactors, IAEA Safety Standards Series No. SSG-10, IAEA, Vienna (2010)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Occupational Radiation Protection, IAEA Safety Standards Series No. GSG-7, IAEA, Vienna (2018)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Functions and Processes of the Regulatory Body for Safety, IAEA Safety Standards Series No. GSG-13, IAEA, Vienna (2018)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Leadership, Management and Culture for Safety in Radioactive Waste Management, IAEA Safety Standards Series No. GSG-16, IAEA, Vienna (2022)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants, IAEA Safety Standards Series No. SSG-48, IAEA, Vienna (2018)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management and Long Term Operation of Nuclear Power Plants: Data Management, Scope Setting, Plant Programmes and Documentation, Safety Reports Series No. 106, IAEA, Vienna (2022)
- INTERNATIONAL ATOMIC ENERGY AGENCY, Handbook on Ageing Management for Nuclear Power Plants, IAEA Nuclear Energy Series No. NP-T-3.24

## 7. OVERVIEW

1. Introduction
2. Definitions
3. Graded Approach Applied to the Considerations of Ageing Mechanisms
4. Package Operating Conditions, Relevant Ageing Mechanisms and Effects
5. Ageing Considerations in Package Design
6. Operational Aspects of Ageing Management
7. Maintenance Generalities
8. Parts Identification, Inspection and Testing
9. Maintenance Program
10. Authority Control
11. Administrative Issues
12. Storage and Transport Interface Issues
13. Conclusions

### References

Appendix 1. Examples of Approaches to Consider Ageing Mechanisms in Package Design

Appendix II. Typical Content of an Ageing Management Programme

Appendix III. Summary of Roles and Responsibilities

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

	A*	B*	C*
STEP 1: Preparing a DPP	DONE	DONE	DONE
STEP 2: Internal review of the DPP (Approval by the Coordination Committee)	Sept. 2022		
STEP 3: Review of the DPP by the review Committee(s) (Approval by review Committee(s))	Nov. 2022		
STEP 4: Review of the DPP by the CSS (approval by CSS) or information of the CSS on the DPP	March 2023		
STEP 5: Preparing the draft publication	March 2023		
STEP 6: First internal review of the draft publication (Approval by the Coordination Committee)	April 2023		
STEP 7: First review of the draft publication by the review Committee(s) (Approval for submission to Member States for comments)	June 2023		
STEP 8: Soliciting comments by Member States	June-Oct 2023		
STEP 9: Addressing comments by Member States	Feb. 2024		

STEP 10: Second internal review of the draft publication (Approval by the Coordination Committee)	March 2024		
STEP 11: Second review of the draft publication by the review Committee(s) (Approval of the draft)	June 2024		
STEP 12: (For Safety Standards) Editing of the draft publication in MTCD and endorsement of the draft publication by the CSS (For nuclear security guidance) DDG's decision on whether additional consultation is needed, establishment by the Publications Committee and editing	Nov. 2024		
STEP 13: Approval by the Board of Governors (for SF and SR only)	N/A		
STEP 14: Target publication date	June 2025		

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- Column A for Safety Fundamentals, Safety Requirements and Safety Guides.
- Column B for Nuclear Security Series publications
- Column C for TECDOCs, safety reports and other publications

## 9. RESOURCES

2 Consultancy Meetings, 1 week each, 5 consultants.

1 HBA for drafting revisions, 15 days

1 TSU staff

## ANNEX ANALYSIS REPORT

<b>TTEG PPA Report</b>	<b>No. 001</b>	<b>18 August 2021</b>
<b>Title</b> Ageing guide		
<b>Background</b> The IAEA Transport Regulations SSR-6 have introduced by the 2018 edition the new paragraph 613A, which requires the design of the package shall take into account ageing mechanisms. Additionally, requirements for shipment after storage have been incorporated in SSR-6, in particular, the paras 106 (scope) 503 (requirements before first shipment) have been amended. An important issue to be considered in the shipment after storage is the ageing mechanisms that may affect the package design after a long storage.		
<b>Justification</b> Many members of the TTEG PPA have requested additional guidance concerning the new requirements related to ageing introduced by the 2018 edition of the IAEA Transport Regulations SSR-6. In consequence, the TTEG PPA has established a working group to develop guidance material on this issue. The working group has developed an ageing guide draft based on a document project profile and considering existing guidance material of member states. The first draft of the ageing guide has already been updated following the comments of the TTEG PPA members. The current draft 2bis of the guide has been attached to this TTEG report. The table of contents of the guide with the title "Ageing Management Guide for Transport Packages Containing Radioactive Material" is as follows: <ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Definitions</li> </ol>		

3. Graded Approach of Package Useage 4. Ageing Management in Package Design 5. Package Conditions and Relevant Ageing Mechanisms 6. Ageing Effects on Packages 7. Operational Aspects 8. Administrative Issues 9. Conclusions References Appendix I: Example of Ageing Management Programme The TTEG PPA appreciates the work of the working group. The TTEG PPA supports the continuation of the development of the ageing guide. The ageing guide will be an important contribution for the harmonised implementation of the requirements on ageing and shipment after storage introduced by the 2018 edition of the IAEA Transport Regulations SSR-6. Member states have already invested significant resources in the drafting of the guide. To finalise the guide will need additional resources. The involved member states would like to get assurance that the final guide will be an official IAEA document to enable the broad international application.
<b>Conclusion</b> The TTEG PPA recommends continuing developing this guidance material which should be subject to the IAEA document preparation process to consider comments of the whole transport community and to enable the broad international application of the final guide. The TTEG PPA recommends classifying the ageing guide as a TECDOC and to launch the relevant document preparation process.
<b>Classification</b> This report is provided for TRANSSC information and feedback. TRANSSC feedback is expected with respect to the recommendation (see conclusion).
<b>Statement</b> (according to the TTEG ToR) The official IAEA position is as stated in the IAEA Safety Standards. This is a TTEG Report and as such it represents a preliminary position which may be incorporated into future revisions of the IAEA Safety Standards.
<b>Attachments</b> 1) Ageing guide draft rev. 2bis

<b>TTEG PPA Report</b>	<b>No. 002</b>	<b>18 August 2021</b>
<b>Title</b> Maintenance guide		
<b>Background</b> Maintenance is part of the objective (para 104) and the scope (para 106) of the IAEA Transport Regulations SSR-6. Additionally, SSR-6 requires to include maintenance instructions for package design in the application for approvals (para 809), but there is no reference to maintenance requirements for packages not subjected to approval.		
<b>Justification</b> SSR-6 and SSG-26 do not include many references to this important issue despite it is clearly included in the objective and scope of the IAEA Transport Regulations. Many members of the TTEG PPA have requested guidance concerning maintenance for approved and non-approved packages. In consequence, the TTEG PPA has established a working group to develop guidance material. The working group has developed a maintenance guide draft based on a document project profile and considering existing guidance material of member states. The first draft of the maintenance guide has already been updated following the comments of the TTEG PPA members. The current draft 3 of the guide has been attached to this TTEG report.		

The table of contents of the guide with the title "Maintenance Guide for the Packaging for Transport of Radioactive Material" is as follows:

- 10. Background
- 11. Definitions
- 12. Maintenance Generalities
- 13. Maintenance for approved and non-approved packages
- 14. Maintenance program
- 15. Authority control
- 16. Interface Issues
- References

The TTEG PPA appreciates the work of the working group. The TTEG PPA supports the continuation of the development of the maintenance guide. The guide will be an important contribution for the harmonised implementation of the maintenance requirements in the IAEA Transport Regulations SSR-6.

Member states have already invested significant resources in the drafting of the guide. To finalise the guide will need additional resources. The involved member states would like to get assurance, that the final guide will be an official IAEA document to enable the broad international application.

#### **Conclusion**

The TTEG PPA recommends continuing developing this guidance material which should be subject to the IAEA document preparation process to consider comments of the whole transport community and to enable the broad international application of the final guide.

The TTEG PPA recommends classifying the maintenance guide as a TECDOC and to launch the relevant document preparation process.

#### **Classification**

This report is provided for TRANSSC information and feedback. TRANSSC feedback is expected with respect to the recommendation (see conclusion).

#### **Statement** (according to the TTEG ToR)

The official IAEA position is as stated in the IAEA Safety Standards. This is a TTEG Report and as such it represents a preliminary position which may be incorporated into future revisions of the IAEA Safety Standards.

#### **Attachments**

- 2) Maintenance guide draft rev. 3

<b>TTEG PPA Report</b>	<b>No. 006</b>	<b>18 March 2022</b>
<b>Title</b> Ageing and maintenance guides		
<b>Background</b> The IAEA Transport Regulations SSR-6 have introduced by the 2018 edition the new paragraph 613A, which requires the design of the package shall take into account ageing mechanisms. Additionally, requirements for shipment after storage have been incorporated in SSR-6, in particular, the paras 106 (scope) 503 (requirements before first shipment) have been amended. An important issue to be considered in the shipment after storage is the ageing mechanisms that may affect the package design after a long storage. Maintenance is part of the objective (para 104) and the scope (para 106) of the IAEA Transport Regulations SSR-6. Additionally, SSR-6 requires to include maintenance instructions for package design in the application for approvals (para 809), but there is no reference to maintenance requirements for packages not subjected to approval. SSR-6 and SSG-26 do not include many references to this important issue despite it is clearly included in the objective and scope of the IAEA Transport Regulations.		
<b>Justification</b>		



Many members of the TTEG PPA have requested rather comprehensive guidance concerning the new requirements related to ageing and for the existing requirements concerning maintenance for approved and non-approved packages.

In consequence, the TTEG PPA has established two working groups to develop guidance material on this issue. The working groups have developed an ageing guide draft and a maintenance guide draft considering existing guidance material of member states. Drafts of the guides have already been presented to TRANSSEC 43.

The development of the guides was based on preliminary document project profiles usually applied by the IAEA to initiate new guides or update of existing guides. These preliminary document project profiles will be provided in the attachments.

#### **Conclusion**

The TTEG PPA appreciates the work of the working groups. The TTEG PPA supports the continuation of the development of the guides. Both guides will be an important contribution for the harmonised implementation of the requirements of the IAEA Transport Regulations SSR-6.

The TTEG PPA recommends to TRANSSEC:

- TRANSSEC should consider starting two document preparation projects for the ageing and the maintenance guide

The attached preliminary document project profiles can be used to create the necessary DPPs. Some members of the TTEG PPA prefer to combine the two guides into one. The majority of the TTEG PPA members supports the development of two separate guides. In this case, the two guides may cross-refer to each other's contents.

#### **Classification**

This report is provided for TRANSSEC decision.

#### **Statement** (according to the TTEG ToR)

The official IAEA position is as stated in the IAEA Safety Standards. This is a TTEG Report and as such it represents a preliminary position which may be incorporated into future revisions of the IAEA Safety Standards.

#### **Attachments**

Ageing Guide – Preliminary Document Preparation Profile Version 2, 18 March 2022

Maintenance Guide – Preliminary Document Preparation Profile Version 2, 18 March 2022

TRANSSEC 44 Actions Record Sheet			
44.06	Two DPPs for Safety Guides on Ageing Management and Maintenance of Transport Packaging (item 7.1.3).	TRANSSEC 45	Secretariate