DS546 Ageing Management and Maintenance of Packages for the Transport of Radioactive Material

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
WASSC	Czech Republic	CZ-01	General	Provide clear distinction between storage during transport and storage as considered in e. g. GSR Part 5 or IAEA Safety Glossary. For storing during transport of packages loaded with spent fuel or radioactive waste provide clear distinctions between these two terms, or clarify otherwise. In the document provide answers to following questions: Does storage during transport cover long-term storage of packages (e. g. loaded with spent fuel or HLW) lasting up to several centuries? How does this guide consider principles of RAW management (not a single document in Chapter Reference is related to RAW management)? What are the requirements on storage facilities for storing packages during transport and what are the requirements on their AMPs?	The document seems to interfere with other documents related to RAW management. It is vital to identify the links between these two sets of requirements to avoid confusions and overlaps.			X	1. Storage during transport is clearly regulated in SSR-6 under the concept of 'storage in transit', setting out specific requirements for it. Storage during transport (storage in transit) does not include long-term storage of packages. However, most of the entries in this guide do not refer to storage as 'storage in transit' but as 'shipment after storage'. Shipment after storage is a concept also developed in IAEA SSR-6 and itself implies long-term storage. SSR-6 establishes specific requirements for shipment after storage and SSG-26 includes clarifications of these requirements. Thus SSG-26, in its para 106.2 states: shipment after storage is a specific shipment operation that requires consideration of ageing of package components, as well as changes in the Transport Regulations and changes of technical knowledge during the period of storage. This is why this guide (DS546 draft) on ageing and maintenance of transport packages focuses in depth on shipment after storage. 2. Although predisposal management of RAW includes the transport activity (scope of GRS part 5), all requirements related transport activity are defined in SSR-6, to which compliance is addressed in that GRS. The guidance that is being developed focuses specifically on the ageing management and maintenance of transport packages, so the management of RAW itself is completely outside its scope. For this reason, no provisions from other IAEA documents on RAW management have been used in the development of the guide (DS546 draft). Consequently, it is not needed to include any reference to these documents in the references section. 3. As indicated above, the requirements on storage in transit are set out in SSR-6. Regarding the shipment after storage, the storage facilities and their AMPs are completely outside the scope of the transport regulations and are therefore should be outside the scope of this guide, which focuses on ageing management and maintenance of the transport packages themselves. However, since in the case of shipment after storage there are interfaces between the transport activity and the storage facilities, these interfaces are taken into account throughout the DS546 draft (See section 9), but always considering that the scope of the guide is focused on transport.

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TRANSSC	Pakistan	PK-08	General	Appendix Addition	Table cross referencing of each section of this document to specific requirements/recommendations of SSR-6 (Rev.1) and SSG-26 (Rev.1) or any other to ensure comprehensive coverage of regulatory expectations. Furthermore, it will help to connect the guide's recommendations with broader regulatory frameworks.			X	In principle, it is not considered necessary. Specific paragraphs of SSR-6 and SSG-26 are already identified throughout the guidance. In any case, this is an issue that could be considered again after the 120-day commenting process of the Member States.
TRANSSC	USA	US-01	General	Revision of 613A in lieu of this guidance is preferred. 613A. When package is intended for transport after extended period of storage, the package design shall take into account ageing mechanisms.	It is improper to regulate through issuance of guidance material. Use of guidance material to impose requirements that are not found in regulations is improper (example is using guidance to require inspection and maintenance programs when regulations do not require such programs. SSG26 613A.2. removes packages used once for a single transport and not intended for shipment after storage from ageing requirements and states inspection prior to use may be sufficient (excepted packages, Type IP-1, Type IP-2, Type IP-3 and Type A Packages are removed from ageing requirements by applying inspection program that regulations do not require) SSG26 613A.3 removes packages intended for repeated use from aging requirements by applying inspection and maintenance programs that are not required by the regulations. Section 5 and 6 of this document proposes significant maintenance actions for package designs that are not required to have maintenance program other than to comply with ageing program			X	Proposal for new text is not related with DS546 draft.
TRANSSC	Canada	CAD-01	General/ through-out	Add a Definitions section.	There are several footnotes providing definitions of terms: package design safety report, ageing, maintenance, service life, relevant interested parties, ageing mechanism, ageing effects, package component, gap analysis, dual purpose cask. Consider moving these footnoted definitions to a Definitions section.			X	Based on NSOC comments, Definition Section in Safety Guides in not supported in general. Footnotes were acceptable.
TRANSSC	WNTI	WNTI-02	Para 1.1	IAEA Safety Standards Series No. SSR-6 (Rev. 1), Regulations for the Safe Transport of Radioactive Material, 2018 Edition [1] (hereinafter referred to as the 'the Transport Regulations'), introduced important requirements to take into account the ageing of transport packages including, as relevant, their radioactive contents. (…).	Editorial – Consistency with para. 1.1 in SSG-66 "Format and Content of the Package Design Safety Report for the Transport of Radioactive Material".	X			

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TRANSSC	Canada	CAD-02	Para 1.1	The design of such packages is required to be based on evidence that these requirements have been met (see para. 613A of the Transport Regulations). This specifically includes packages used for shipment after storage (see para. 809(f) and 809(k) of the Transport Regulations).	Suggest deleting “specifically” since both 613A and 809(f) have equal importance in the context of ageing management.Suggest referencing SSR-6 para 809(k) as well, which is also about shipment after storage.	X			
TRANSSC	WNTI	WNTI-03	Para 1.2	(…). Recommendations on the incorporation of ageing considerations and ~~the~~ an ageing management programme into the package design safety report1 are provided in IAEA Safety Standards Series No. SSG-66, (…).	The wording "the ageing management programme" sounds very prescriptive about the nature of the ageing management programme to be established, while "an ageing management programme" leaves it to the applicant how to phrase or incorporate it in the PDSR.	X			
TRANSSC	Pakistan	PK-01	Para 1.2	……..considerations and the ageing management programme into the package design safety report (PDSR) are provided in IAEA Safety Standards Series No. SSG-66, …….	The terms “Package Design Safety Report” are used interchangeably in the document. It is better to define the acronym “PDSR” in the beginning and same may be used in the later text.			X	Based on NSOC comments, abbreviations are to be used in 100+ cases of term used.
TRANSSC	WNTI	WNTI-04	Para 1.3	The Transport Regulations also include requirements for maintenance of transport packages~~, which is regarded as one of the operations comprising transport~~. SSG-66 [3] recommends (…).	It is proposed to delete the end of the first sentence. There is no significant value having this information here. And during the current review and revision process, the contents of para. 106 in the Regulations for the Safe Transport of Radioactive Material (2018 Edition) [SSR-6 (Rev. 1)] appeared as needed further discussions and clarifications (see proposal R-01 in the current Review and Revision cycle). Consequently, the simplest solution is to delete this part of the text.	X			
TRANSSC	WNTI	WNTI-05	Para 1.3	(…). SSG-66 [3] recommends that evidence of **a** maintenance **programme** is used when preparing the package design safety report. SSG-26 (Rev.1) [2] also addresses maintenance of transport packages with respect to lifting attachments and ageing management of transport packages.	Clarification. The package design safety provides the specification of the maintenance. It does not provide evidence of the actual maintenance on individual packages.			X	It is rejected on the basis that SSG-66 is giving the recommendation on the maintenance in general, not giving any recommendation on maintenance programme specifically.
TRANSSC	Japan	JPN-01	Para 1.3 Footnote 3	In the context of this Safety Guide, the phrase ‘maintenance’ is intended to mean the organized activity, both administrative and technical, of keeping package components in good operating condition, including both preventive and corrective (or repair) aspects**, including component ageing.**	Clarification The application of this guide should include component ageing.			X	The basis for the footnote is the IAEA Nuclear Safety and Security Glossary 2022 (Interim) Edition, where the term was adapted to the case of transport packages. Additionally, ageing should not be considered as maintenance per se but the analysis of ageing in the components of the package should lead to determination of maintenance of those components.
TRANSSC	USA	US-02	Para 1.5	Change commas to semi-colons at the end of each list item.	Mixed use of semi-colon and comma needs correcting.	X			
TRANSSC	WNTI	WNTI-06	Para 1.5	The recommendations in this Safety Guide are aimed at: designers of packages; manufacturers, owners and the maintenance organizations of the packagings; owners of the radioactive content of the package, users (consignors) of the package, organizations responsible for storage facilities **and** for shipment after storage; technical support organizations, and competent authorities with responsibilities for the safe transport of radioactive material.	Editorial. Correction of a typo. Clarification regarding the responsibilities associated with storage: (i) organization responsible for the storage facilities, and (ii) organization responsible for shipment after storage.		(..); organisations responsible for the storage where the packages are stored before shipping (shipment after storage); (..)		Modification for clarification. It is considered that one organisation was meant, i. e. the one where the packages are stored before shipment after storage. Proposed 'organisation responsible for shipment after storage' is in fact the consignor, that is already included.

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TRANSSC	Canada	CAD-03	Para 1.6	This Safety Guide covers **Type IP, Type A, Type B(U) or B(M), and Type C** ~~all~~ packages containing radioactive material ~~(i.e. Excepted, Type IP, Type A, Type B(U) or B(M), Type C packages~~, including packages containing fissile material or uranium hexafluoride~~)~~, as defined in the Transport Regulations	There is no safety benefit in including excepted packages in this document. Although the graded approach is stated in section 1.8 it is difficult at times to determine if the requirements would apply to an excepted package. As well, consignors of excepted packages will likely be unaware of this document or apply the guidance provided.			X	Paragraph 613A of SSR-6, in relation to the consideration of ageing mechanisms, concerns all types of packages and, as for the provisions related to maintenance, also excepted packages and type IP-1 require maintenance. Therefore the recommendations that have been included may also be useful for the users of these packages. Of course considering a graded approach in their application.
TRANSSC	WNTI	WNTI-07	Para 1.6	This Safety Guide covers all packages containing radioactive material (i.e. Excepted **package**, Type IP-**1, Type IP-2, Type IP-3**, Type A, Type B(U) or B(M), Type C packages, including packages containing fissile material or uranium hexafluoride), as defined in the Transport Regulations.	Correctness. “Type IP” is not a type that is defined in the Transport Regulations.		1.6 This Safety Guide covers all packages containing radioactive material (i.e. Excepted, Type IP-1, Type IP-2, Type IP-3, Type A, Type B(U) or B(M), Type C packages, including packages containing fissile material or uranium hexafluoride), as defined in the Transport Regulations.		Editorial modification to the proposal.
TRANSSC	WNTI	WNTI-08	Para 1.6	This Safety Guide covers all packages containing radioactive material **except excepted packages and Type IP-1** (i.e. ~~Excepted~~, Type IP-**2 and Type IP-3**, Type A, Type B(U) or B(M), Type C packages, including packages containing fissile material or uranium hexafluoride), as defined in the Transport Regulations.	There is no safety benefit in including excepted packages in this document. SSG-66 “Format and Content of the package Design Safety Report for the Transport of Radioactive Material” does not include a chapter “Ageing considerations” for excepted packages, contrary to the other types of packages. Since Type IP-1 are essentially the same as Excepted packages they should also be included. Although the graded approach is stated in section 1.8, it is difficult to determine if the requirement would apply to an excepted package as for any other type of package or industrial package. As well consignor of excepted packages or Type IP-1 will likely be unaware of this document or apply the guidance provided, so really no use.			X	Paragraph 613A of SSR-6, in relation to the consideration of ageing mechanisms, concerns all types of packages and, as for the provisions related to maintenance, also excepted packages and type IP-1 require maintenance. Therefore the recommendations that have been included may also be useful for the users of these packages. Of course considering a graded approach in their application.
TRANSSC	Canada	CAD-04	Para 1.7	This Safety Guide also covers all activities during the service ~~+~~ life [4] of transport packages, in which ageing management and maintenance are to be considered.	Suggest moving the ‘4’ after ‘life’ since the term defined in the foot note is ‘service life’ not just ‘service’.	X			
TRANSSC	USA	US-03	Para 1.7	Move foot note 4 to be after “life”.	Footnote 4 is for “Service life.”	X			
TRANSSC	WNTI	WNTI-09	Para 1.7	This Safety Guide also covers all activities during the service[4] life[4] of transport packages, (…).	Editorial – The foot note number should be placed right after "life" (not after “service”) since the full wording "service life" is explained in the foot note.	X			
TRANSSC	WNTI	WNTI-10	Para 1.7 footnote 4	4 In the context of this Safety Guide, the phrase ‘service life’ is intended to mean the period from ~~initial operation~~ **completion of manufacturing** to final withdrawal of the transport package from its service.	What does "initial operation" mean? What about packages after manufacturing and before loading? Does "initial operation" mean "loading" or "brought into service" before loading? It is proposed to change “initial operation” to “completion of			X	The basis for the footnote is the IAEA Nuclear Safety and Security Glossary 2022 (Interim) Edition, where the term was adapted to the case of transport packages.

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					manufacturing", for consistency with para. 2.2.				
TRANSSC	WNTI	WNTI-11	Para 1.8	*No additional or alternative text is proposed by the reviewer.*	Although a graded approach, commensurate with the type of package, is stated in para. 1.8, it is difficult (and even impossible) to determine if the guidance would apply to a given type of package as for any other type of package. Additional guidance is needed regarding the implementation of the graded approach when applied to the type of package			X	It is considered that this guide does not attempt to identify which provisions apply to one type of package or another, or whether they apply to a package subject to approval or not, as the scope of the guide extends to any type of package. Therefore, the recommendations in the guide apply to all types of packages, unless the provisions clearly specify otherwise.
TRANSSC	Japan	JPN-02	Para 1.9 L1 (P.2) STRUCTURE	1.9. This Safety Guide consists of ~~eleven~~ nine sections	Editorial	X			
TRANSSC	Canada	CAD-05	Para 2.1	Considerations for ageing management are divided into three types of use of packaging; packagings intended to be used for a single transport, repeated use, and shipment after storage (see paras 613A.2–613A.4 of SSG-26 (Rev.1) [2]), as described in paras 2.3–2.9 of this Safety Guide	Suggest listing the three types of use for clarity.	X			
TRANSSC	USA	US-04	Para 2.1	Remove "curing" from Footnote 6.	Curing is not an aging mechanism, it is an expected reaction process that is used to develop specific materials properties.			X	The basis for the footnote is the IAEA Nuclear Safety and Security Glossary 2022 (Interim) Edition, where curing is includid in the definition.
TRANSSC	USA	US-05	Para 2.1	Move first 3 lines of text to previous page.	Page break after section title.	X			editorial issue, to be corrected in final draft.
TRANSSC	USA	US-06	Para 2.1	Comment: Revisions needed to SSG-26, including the following: 1. The guidance in SSG-26 should be corrected. Specifically, the last sentence of paragraph 613.A.3 should be moved to be the last sentence of 613.A.4. Note that the order of the references [12] and [13] in SSG-26 will need to be revised as well. 2. The first sentence of SSG-26 Paragraph 613A.5. should read: With regard to package design, the consideration of the impact of ageing on the package as described in 613A.1 should be supported by an inspection and maintenance program or an ageing management programme.	Consistency with aging management requirements.			X	Proposal for new text is not related with DS546 draft.
TRANSSC	USA	US-07	Para 2.2	Remove "(e.g. corrosion)"	Ageing mechanisms is already defined via Footnote 6 in the preceding paragraph. Listing the single example of "corrosion" here is both incomplete and unnecessary.	X			
TRANSSC	USA	US-08	Para 2.3 2.4 2.5	Remove list of package types in 2.3 and redraft "documentary evidence" text in 2.5	2.3 on single use packages appears to exclude many package types but these same package types reappear in 2.4 for packages intended for multiple use. 2.5 requires documentary evidence on package designs which competent authority does not usually review and rarely, if ever, approves.			X	Para 2.3 is statement from SSG-26 para 613A.2 Para 2.5 is modified in connection with CAD-08
TRANSSC	Canada	CAD-06	Para 2.4	Based on the evaluation, measures should be defined as part of the inspection and maintenance programme on the packaging to monitor and control ageing effects[7] ~~in order~~ to ensure that the safety functions of the packaging do not deteriorate over its service life	Editorial.	X			

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TRANSSC	Canada	CAD-07	Para 2.4	The inspection and maintenance might be conducted when the packaging is empty (i.e. without radioactive contents) between ~~carriages~~ shipments of the loaded package (see Section 5).	Change the term “carriages” for “shipments”.	X			
TRANSSC	Japan	JPN-03	Para 2.4	2.4 Paragraph 613A.3 of SSG-26 (Rev.1) [2] states: “For packaging intended for repeated use, the effects of ageing mechanisms on the ~~packaging components during its service life~~ package should be evaluated during the design phase in the demonstration of compliance with the Transport Regulations.”	Quotation from SSG-26 Rev.1 should be done correctly. (“service life” is not used in the paras.)		“For packagings intended for repeated use, the effects of ageing mechanisms on the package should be evaluated during the design phase in the demonstration of compliance with the Transport Regulations.”		corrected quotation from SSG-26 (Rev.1)
TRANSSC	WNTI	WNTI-12	Para 2.4	(…). The effect of the ageing mechanisms on its radioactive contents should not normally need to be considered because the duration of a single transport is relatively short (i.e. equal to or less than one year). Based on ~~the~~ **an** evaluation, measures should be defined as part of the inspection and maintenance programme on the packaging to monitor and control ageing effects in order that the safety functions of the packaging do not deteriorate over its service life.	Clarification. It is not clear, and in fact it is not defined, what should be “the” evaluation	X			
TRANSSC	Canada	CAD-08	Para 2.5	Change the first sentence: “~~Documentary evidence of the evaluation~~ Considerations of ageing mechanisms, with appropriate justifications, should be included in the package design safety report.”	The proposed text is similar to the wording of SSR-6 para.809(f).	X			
TRANSSC	USA	US-09	Para 2.5 2.8	Remove reference to “[3]” or refer to actual document.	The sentences do not actually refer to Reference #3, and there is no need to link to this reference every time the “package design safety report” is mentioned.	X			
TRANSSC	WNTI	WNTI-13	Para 2.5 6.22 new 6.22 bis new 6.25 bis	2.5. Documentary evidence of the evaluation of ageing mechanisms should be included in the package design safety report [3]. ~~The outcome of the inspection and maintenance programme, including inspection results and maintenance records should be maintained throughout the service life of the packaging by the responsible organization (e.g. the packaging owner or consignor) under its management system to demonstrate the integrity of the safety functions of the packaging. The results of the inspection and maintenance programme should be submitted to the competent authority, if this is required as part of the framework of compliance assurance actions conducted by the competent authority.~~ 6.22. The pre-shipment inspection should be defined in the package design safety report (i.e. the sections dealing with ‘PACKAGE OPERATIONS’ or ‘MAINTENANCE’, as applicable). 6.22bis.The outcome of the pre-shipment inspection, including inspection results, should be maintained throughout the service life of the packaging and retained by the consignor of the package ~~(with copies provided to other responsible parties, as appropriate)~~ in accordance with its management system to demonstrate the integrity of the safety functions of the packaging. The results should be made available to other responsible parties, as necessary. The results of the pre-shipment inspection should be submitted to the competent authority, if this is required as part of the framework of compliance assurance actions conducted by the competent authority. These records should be used as part of the evaluation of ageing effects. 6.25bis.The outcome of the periodic inspection, including inspection results, should be maintained throughout the service life of the	The second part of para. 2.5 is about inspection and maintenance programme, whereas these concepts have not yet been introduced in the Guide. Hence, for pre-shipment inspection, it is more appropriate to have the information moved to and merged in para. 6.22 (where this issue is already considered) and to divide the para. 6.22 into two paragraphs to consider separately the definition of the pre-shipment inspection and the management of the results. And for periodic inspection, the information should be moved to a new para. 6.25bis.		2.5 Considerations of ageing mechanisms, with appropriate justifications, should be included in the package design safety report .		It is considered that the information proposed to be moved from para 2.5 is already covered in para 6.22, except for the indication relating to the competent authority (i.e: *The results of the inspection and maintenance programme should be submitted to the competent authority, if this is required as part of the framework of compliance assurance actions conducted by the competent authority.*) However, that issue (competent authority) is dealt with in a general way in other sections of the guidance such as 6.11, section 7, 9.6, Appendix III. Therefore, the proposed changes in paras 6.22, 6.22bis and 6.25bis are not acceptable. So, only the deletion of the second part of 2.5 is acceptable as indicated in the 'accepted but modified' column.

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				packaging and retained by the consignor of the package by the responsible organization (e.g. the organization in charge of maintenance on behalf of the owner or user of the packaging owner or user, or the packaging owner) in accordance with its management system to demonstrate the integrity of the safety functions of the packaging. The results should be made available to other responsible parties, as necessary. The results of the periodic inspection should be submitted to the competent authority, if this is required as part of the framework of compliance assurance actions conducted by the competent authority. These records should be used as part of the evaluation of ageing effects.					
TRANSSC	WNTI	WNTI-14	Para 2.5 new 2.5 bis	2.5. Documentary evidence of the evaluation of ageing mechanisms should be included in the package design safety report [3]. 2.5bis. The outcome of the inspection and maintenance programme, including inspection results and maintenance records should be maintained throughout the service life of the packaging by the responsible organization (e.g. the packaging owner or consignor) under its management system to demonstrate the integrity of the safety functions of the packaging. The results of the inspection and maintenance programme should be submitted to the competent authority, if this is required as part of the framework of compliance assurance actions conducted by the competent authority.	This comment should only be considered if above comment WNTI-13 is not accepted. The current para. 2.5 covers two different subjects: (i) the evaluation of the ageing mechanisms, and (ii) the outcome of the inspection and maintenance programme. It should be more clear having these two subjects in two different paragraphs.			X	as it was alternative proposal to WNTI-13 which was accepted
TRANSSC	USA	US-10	Para 2.7 (a)	Need clarification or editing 2.7. (a) The transportability of a package intended for use after storage should be maintained during storage. The ageing management programme and the gap analysis programme should ensure that the package complies with the requirements of the Transport Regulations at the time of shipment after storage.	Do not understand how current gap analysis can ensure compliance with future regulations and future regulatory changes.			X	It is considered that gap analysis is a periodic assessment, therefore it should address the changes in transport regulations when they occur.
NUSSC	United Arab Emirates	UAE-01	Para 2.7 (a)	2.7. ~~The consideration of ageing mechanisms should take into account the following issues, as appropriate~~ When considering the ageing mechanisms of radioactive waste packages intended for shipment after storage, several critical factors need to be taken into account: (a) The transportability of a package intended for use after storage should be maintained during storage. This involves ensuring that the ~~The~~ ageing management programme and the gap analysis programme ~~should ensure that the package complies with the requirements of the Transport Regulations at the time of shipment after storage~~ monitor and address any degradation or changes in the package's structural integrity, radiation shielding effectiveness, or other relevant factors that could affect its suitability for transport. Compliance with Transport Regulations must be continuously evaluated to ensure that the package meets regulatory requirements at the time of shipment after storage.	Adding more context while focusing on radiation safety requirements.			X	It is not considered appropriate to introduce 'waste packages' in the Guide, as it is not a term used in transport of radioactive material (SSR-6 and related guidance)
NUSSC	United Arab Emirates	UAE-02	Para 2.7 (b)	It should be recognized that the package configuration for transport and the configuration for storage may differ. For instance, dual purpose casks ~~are~~ may be stored without shock absorbers but must be equipped with these features before transportation to ensure safe handling and transport of radioactive materials. The ageing management program must account for any differences in configuration and address specific requirements for both storage and transportation.	Adding more context while focusing on radiation safety requirements.		(..) For instance, dual purpose casks may be stored without shock absorbers.		Editorial modification to the text accepted. It is not considered necessary to add more context to this point.

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NUSSC	United Arab Emirates	UAE-03	Para 2.7 (c)	The impact of ageing effects on the radioactive contents should be considered in the ageing management programme and the gap analysis programme. This ~~should include a consideration of whether the characteristics of the radioactive contents might change during storage and affect the safety functions of the package~~ includes assessing whether changes in the characteristics of the radioactive contents during storage could affect the safety functions of the package during transportation. Monitoring and analysis of these effects are essential to ensure continued compliance with regulatory requirements and safety standards.	Adding more context while focusing on radiation safety requirements.			X	proposal would change the original meaning (if characteristics might change during storage and therefore affect the safety function versus changes of characteristics). Second part is a true statement, but already mentioned elsewhere, in form of recommendation.
NUSSC	United Arab Emirates	UAE-04	Para 2.7 (d)	Inspection and maintenance during storage should be designed so that they can be conducted on the loaded packages. This involves developing procedures, tools, and equipment that allow for thorough inspections and maintenance activities without compromising the safety or security of the stored radioactive materials. Personnel conducting these activities must receive appropriate training and follow strict safety protocols to minimize the risk of exposure to radiation or other hazards.	Adding more context while focusing on radiation safety requirements.			X	It is considered that proposal would introduce issues not directly related to the ageing managemen of package design but to the operational practices of the facilities, which would be out of the sope of the Guide. See also CAD-09
TRANSSC	Canada	CAD-09	Para 2.7 (d)	Add: “Where it is not possible to directly inspect and maintain the loaded package during storage (e.g., if the primary container of the package is enclosed within a shielded overpack or shielded vault during the storage period) alternative means could be used to assess aging effects. For example, an empty container/packaging of the same design could be placed in the same storage conditions and at the same starting time as the loaded container/package. The empty container/packaging could be periodically retrieved, disassembled, and inspected. The ageing effects due to the storage conditions (e.g., temperature variations and humidity) on the empty container/packaging would be representative of the ageing effects on the loaded container/package.”	It was recognized in para.2.7(b) that the package configuration for transport and the configuration for storage may differ. One reason for storage before transport is “decay storage”. At the time when the “package” (actually the primary container of package) is loaded with the contents, the external dose rates on the package exceed the limits for transportation. Therefore, the package will be stored for a sufficiently long period that radioactive decay will reduce the activity of the contents and thereby reduce the external dose rates to less than the transportation limits. However, during the storage period the package must be stored within a shielded overpack or shielded vault to ensure acceptable dose rates for workers in the storage facility. In this scenario the package will not be accessible for inspection and maintenance during the storage period. An empty packaging could be stored in the same environment, but it would be accessible/retrievable for inspection. The ageing effects of the storage conditions on the empty packaging would be representative of the ageing effects on the loaded package. It is understood that this approach would not be able to capture the effects of ageing mechanisms (e.g., radiation and decay heat) that would only be present in a loaded package.		Where it is not possible to directly inspect and maintain the loaded package during storage (e.g., if the primary container of the package is enclosed within a shielded overpack or shielded vault during the storage period) alternative means could be used to assess aging effects. For example, an empty packaging of the same design could be placed in the same storage conditions and at the same starting time as the loaded package. The empty packaging could be periodically retrieved, disassembled, and inspected. The ageing effects due to the storage conditions (e.g., temperature variations and humidity) on the empty packaging would be representative of the ageing effects on the loaded package.		Agreed, editorial changes and term clarification added.

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TRANSSC	Canada	CAD-10	Para 2.8	Change the first sentence: ~~Documentary evidence of the evaluation~~ Considerations of ageing mechanisms, with appropriate justifications, should be included in the package design safety report."	The proposed text is similar to the wording of SSR-6 para.809(f).	X			
TRANSSC	WNTI	WNTI-15	Para 2.9	Monitoring and inspection results and maintenance records should be maintained throughout the storage period by the responsible organization (e.g. the packaging owner, storage facility operator or consignor) under in accordance with its management system as part of the evidence of the transportability of the package after storage.	Clarification. "in accordance with its management system" is more appropriate than "under its management system".			X	see WNTI-16 para 2.9 was deleted.
TRANSSC	WNTI	WNTI-16	Para 2.9 6.30 6.39	~~2.9. Monitoring and inspection results and maintenance records should be maintained throughout the storage period by the responsible organization (e.g. the packaging owner, storage facility operator or consignor) under its management system as part of the evidence of the transportability of the package after storage. The same should be submitted to the competent authority if this is required as part of the framework of compliance assurance actions conducted by the competent authority.~~ 6.30. The pre-shipment inspection should be performed by the consignor of the package (or by another organization of behalf of the consignor). The pre-shipment inspection should include the items identified in the package design safety report (i.e. in the sections dealing with 'PACKAGE OPERATIONS' and 'MAINTENANCE'). 6.30bis. The outcome of the pre-shipment inspection, including inspection results, should be maintained throughout the service life of the packaging and retained by the responsible organization (e.g. the user or owner of the packaging, or consignor as applicable), in accordance with ~~their~~ relevant management system, ~~and~~. The results should be made available to other relevant interested parties. The results of the pre-shipment inspection should be submitted to the competent authority, if this is required as part of the framework of compliance assurance actions conducted by the competent authority. These records should be used as part of the evaluation of ageing effects. 6.39. The outcome of the monitoring activities, including the results of the ~~receipt inspection~~ monitoring activities, should be retained throughout the storage period by the operating organization of the storage facility, the packaging owner and the owner of the radioactive contents, in accordance with regulatory requirements and the relevant management systems. The results should be made available to other relevant interested parties, as necessary. The same should be submitted to the competent authority if this is required as part of the framework of compliance assurance actions conducted by the competent authority.	Para. 2.9 is about monitoring and inspection results and maintenance records, whereas these concepts have not yet been introduced in the Guide. Hence, for pre-shipment inspection, it is more appropriate to have the information moved to and merged in para. 6.30 (where this issue is already considered) and to divide the para. 6.30 into two paragraphs to consider separately the definition of the pre-shipment inspection and the management of the results. And, for monitoring activities during storage, inspection, the information should be moved to para. 6.39, wheref this issue is already considered.		X Only deletion of 2.9 is accepted ~~2.9 . Monitoring and inspection results and maintenance records should be maintained throughout the storage period by the responsible organization (e.g. the packaging owner, storage facility operator or consignor) under its management system as part of the evidence of the transportability of the package after storage.~~		It is considered that most of the information proposed to be transfered to paras 6.30 and 6.39 is already covered there (in a more specific way), except for the indication relating to the competent authority (i.e: T*he results of the inspection and maintenance programme should be submitted to the competent authority, if this is required as part of the framework of compliance assurance actions conducted by the competent authority).* However, this issue (competent authority) is dealt with in a general way in other sections of the guidance such as 6.11, section 7, 9.6, Appendix III. Therefore, the proposed changes ar not acceptable except for the deletion of the para 2.9, as indicated in the 'Accepted but modified' column.
TRANSSC	WNTI	WNTI-17	Para 3.1	3.1. ~~For some types of packages, the ageing management approach applied to the consideration of ageing mechanisms for transport packages might be similar to that for nuclear power plant components. Recommendations on ageing management for nuclear power plants are provided in IAEA Safety Standards Series No. SSG-48, Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants [4].~~ Information on the approach to ageing management in individual Member States is given in Refs [5–8]. The interim storage of spent nuclear fuel and the use of dual purpose casks has strengthened the focus on the consideration of ageing mechanisms for storage packages (e.g. see Refs [9–12]).	There is no technical reason to link the ageing management of casks with nuclear power plants. These sentences should be deleted to avoid misinterpretation.		3.1. For some types of packages, the ageing management approach applied to the consideration of ageing mechanisms for transport packages might follow the fundamental princples used for nuclear power plant components. Recommendations …		In the development of several sections of the draft of this document, the fundamental principles on ageing used in SSG-48 for nuclear power plant components have been taken into account, but always focusing on the particular case of transport packages.

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TRANSSC	WNTI	WNTI-18	Para 3.1	3.1. (…). Information on the approach to ageing management in **an** individual Member State~~s~~ is given in Refs [5–8]. (…).	There is no technical reason to link the ageing management of casks with nuclear power plants. These sentences should be deleted to avoid misinterpretation.	X			
TRANSSC	Canada	CAD-11	Para 3.2	Delete all of section 3.2.	The definition of service life in para. 3.2 is not consistent with the definition in para. 1.7 and footnote 4. Canadian industry experience is that predicting the service life (sometimes called the “design life”) at the design stage has no value. All predictions have proven to be overly conservative, which would result in transport packages being retired early compared to their historical statistical mean life. Canadian industry experience is that it is not practicable to set a limit on the duration or the maximum number of shipments for a package’s service life. The ageing process depends on the components, contents, and operational conditions. Instead, with a sound integrity management program that leverages the advancements in integrity monitoring technology, transport packages can achieve maximum useful life without safety risks to the public. An automotive tire manufacturer may state tires are good for 80,000 km, however many people have safely enjoyed far greater tire life. And yet most vehicle owners or their vehicle service providers likely have preventatively measured tire wear (i.e. performed inspections) far before 80,000 km, not simply after, because despite a scientifically derived nominal life, it is based on idealistic conditions that can never be repeated. Also, in almost all industries, containment systems of all sorts (pipes, tanks, vessels, totes, etc.) are not subject to prescribed finite service life but are instead monitored for fitness-for-service through mechanical integrity programs. Transport packages should be treated in a similar manner.		see WNTI-21 resolution		see WNTI-21 resolution
TRANSSC	WNTI	WNTI-19	Para 3.2	No alternative text is proposed	It is not clear why subparagraphs (a) and (b) are expressed so differently. For instance, in (a) it is distinguished between in-service and out-of-service, without explicitly naming operations like loading, movement and transport, whereas these details		see WNTI-21 resolution		see WNTI-21 resolution

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					are provided in (b)).The wording in (a)) and (b) should aligned as far as possible.				
TRANSSC	WNTI	WNTI-21	Para 3.2	~~SERVICE LIFE OF TRANSPORT PACKAGES~~ ~~3.2. Ageing is a time-dependent phenomenon; hence, the package designer should determine in the package design safety report the service life of a package as part of the consideration of ageing mechanisms. For packagings other than those intended to be used for a single transport, the service life should be defined as follows:~~ ~~(a) Packagings intended for repeated use:~~ ~~The service life may be expressed in terms of the number of years of use or the total number of shipments. However, to consider ageing mechanisms, both the in-service duration (i.e. with the packaging subjected to the loads caused by the radioactive contents and transport operations) and the out-of-service duration (subjected to the storage environment) should be considered. If it is not practicable to set a limit on the duration or the maximum number of shipments, then the performance of the packaging should be ensured by the package design and periodically through an appropriate maintenance and ageing management programme. If the transport period is short, then there should be no need to consider the effects of ageing mechanisms on the radioactive contents, provided this is adequately justified in the package design safety report.~~ ~~(b) Packagings intended to be used for shipment after storage:~~ ~~The service life for these types of packaging includes the storage period of the package and the phases before and after storage, including operations such as loading, movement and transport. The radioactive contents are stored for a period of time in the package; thus the effect of ageing mechanisms on the radioactive contents should be considered taking into account any changes that might affect the integrity of the contents, loads to which packaging components are subjected to, and the retrievability of the contents. The possible effects of heat generation due to radioactive decay and due to irradiation should also be considered.~~	Para. 3.2 should be deleted. It is unreasonable to establish a service life for a package. It is impossible to determine age limits for transport packages without being excessively conservative, which would result in transport packages being retired far to early compared to their historical statistical mean life. Instead, with a sound ageing management program that leverages the advancements in ageing monitoring technology, transport packages can achieve maximum useful life without safety risks to the public. It is costly and adds no safety benefit to retire a package that is still in good condition because it exceeded its service life. At issue is the ageing of transport packages, and the notion that there is a predictable finite life of transport packages which designers must establish, and owners must adhere to. Ageing of physical assets is definitely real but there are far too many variables that contribute to the ultimate life achieved. An automotive tire manufacturer may state tires are good for 80,000 km, however many people have safely enjoyed far greater tire life. And yet most vehicle owners or their vehicle service providers have likely preventatively measured tire wear (i.e. performed inspections) far before 80,000 km, not simply after, because despite a scientifically derived nominal life, it is based on idealistic conditions that can never be repeated. Furthermore, unlike tire designers, transport package designers do not likely have the data to empirically determine any age limits, and forced to do so based on theory they would make excessively conservative assumptions such that transport packages would be retired far to early compared to their historical statistical mean. And in almost all industries, containment systems of all sorts (pipes, tanks,		3.2. Ageing is a time-dependent phenomenon and therefore may depends on the service life of the package. Although it is usually difficult in practice to establish a priori a specific service life for a package design as it often might depend on some unpredictable factors, the designer should consider the ageing mechanisms that might occur in the course of an expected service life of the package. The expected service life might be expressed in terms of the number of years of use or the number of shipments. To consider ageing mechanisms, both the in-service duration (i.e. with the packaging subjected to the loads caused by the radioactive contents and transport operations) and the out-of-service duration (subjected to the storage environment) should be considered. Nevertheless, If it is not practicable to set a limit on the duration or on the number of shipments, the performance of the packaging should be ensured by an appropriate maintenance. If the transport period is short, then there should be no need to consider the effects of ageing mechanisms on the radioactive contents, provided this is adequately justified in the package design safety report. Additionally, for the packagings intended to be used for shipment after storage, the service life should consider the storage period of the package and the phases before and after storage, including operations such as loading, movement and transport. The radioactive contents may be stored for a period of time in the package, thus the effect of ageing mechanisms on the radioactive contents should be considered		The concerns expressed in this and similar comments are understood. Indeed, it is sometimes very difficult to specify a priori a specific value for the service life of a packaging design. It is therefore not appropriate to state in the guide that this should be reflected in the PDSR. However, the designer should analyse the ageing mechanisms taking into account an expected (estimated) service life. Also, considering this comment and others made on the same paragraph, the separate points for repeated use packaging and shipment after storage packaging are eliminated, so that a series of generic indications are given for all types of packagings in relation to what can be understood as service life and, subsequently, certain particularities are indicated which only affect the case of shipment after storage.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					vessels, totes, etc.) are not subject to prescribed finite service life but are instead monitored for fitness-for-service through mechanical ageing programs. Transport packages should be treated in a similar manner.		taking into account any changes that might affect the integrity of the contents, loads to which packaging components are subjected to, and the retrievability of the contents. The possible effects of heat generation due to radioactive decay and the possible effects of irradiation on package components should also be considered.		
NUSSC	United Arab Emirates	UAE-05	Para 3.2 (a)	Packagings intended for repeated use: The service life may be expressed in terms of the number of years of use or the total number of shipments. However, to consider ageing mechanisms comprehensively, both the in-service duration (i.e. with the packaging subjected to the loads caused by the radioactive contents and transport operations) and the out-of-service duration (subjected to the storage environment) should be considered. This includes assessing ageing mechanism considerations such as material degradation, radiation effects, environmental conditions, mechanical stresses, thermal cycling, and the impact of regulatory compliance. If it is not practicable to set a limit on the duration or the maximum number of shipments, then the performance of the packaging should be ensured by the package design and periodically through an appropriate maintenance and ageing management programme. If the transport period is short, then there should be no need to consider the effects of ageing mechanisms on the radioactive contents, provided this is adequately justified in the package design safety report.	Adding more context while focusing on radiation safety requirements.		X See resolution on WNTI-21		See resolution on WNTI-21
TRANSSC	USA	US-11	Para 3.2 (a)	Delete the words “and ageing management program” in the next to the last sentence.	As written this paragraph is not consistent with Table 1. Ageing Management Considerations for Transport Packages which identifies “Maintenance in accordance with a maintenance programme with periodic and pre-shipment inspections” for Packages intended for repeated use. Per Table 1 of this document, An Aging Management Programme is only identified for Packages intended for shipment after storage.	X See resolution on WNTI-21			See resolution on WNTI-21

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
NUSSC	United Arab Emirates	UAE-06	Para 3.2 (b)	(b) Packagings intended to be used for shipment after storage: The service life for these types of packaging includes the storage period of the package and the phases before and after storage, including operations such as loading, movement and transport. It is crucial to consider the impact of ageing mechanisms on various aspects of the packaging, including material degradation, radiation effects, and environmental conditions, throughout these phases. The radioactive contents are stored for a period of time in the package; thus, the effect of ageing mechanisms on the radioactive contents should be considered. taking into account This involves assessing any changes that might affect the integrity of the contents, such as degradation of containment barriers or deterioration of shielding materials. Additionally, consider the loads to which packaging components are subjected to during storage and transport, including mechanical stresses, thermal cycling, and radiation exposure. Furthermore, it is essential to evaluate and the retrievability of the contents, ensuring that the packaging maintains its integrity and can be safely accessed for retrieval or inspection purposes. Consider the The possible effects of heat generation due to radioactive decay and irradiation, which may impact the thermal performance and structural integrity of the packaging over time and due to irradiation should also be considered.	Adding more context while focusing on radiation safety requirements.			X	It is considered that the proposal is beyond the scope of the para, indicating what should be considered within service life of the packaging in the case of shipment after storage. Identification of ageing mechanisms and degradation effects are considered sufficiently addressed in other sections of the Guide. See also resolution of WNTI-21.
TRANSSC	USA	US-12	Para 3.2 (b)	Add the following as the last sentence to 3.2(b): Ageing mechanisms and effects relevant for packagings intended to be used for shipment after storage should be addressed in an ageing management program.	Consistency with Table 1. This paragraph should identify the need for an Aging Management Programme (Packages intended for shipment after storage) per the information included in Table 1 of this document.			X	It is considered that the proposal is more general and already addressed in other sections of the Guide (for example Appendix I and II). See also resolution of WNTI-21.
TRANSSC	WNTI	WNTI-20	Para 3.2 (b)	(b) (…). The possible effects of heat generation due to radioactive decay and **the possible effects** ~~due to~~ **of** irradiation **on package components** should also be considered.	Clarification to avoid misinterpretation of the sentence.	X See resolution on WNTI-21			See resolution on WNTI-21

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
NUSSC	United Arab Emirates	UAE-09	Para 3.3	e) Chemical Exposure: Packaging materials may come into contact with chemicals or substances during transportation, storage, or handling that could degrade their properties or compromise their integrity. Chemical exposure can lead to material degradation, corrosion, and loss of mechanical strength or sealing effectiveness. f) Biological Factors: Depending on the transportation route and storage location, packages may be exposed to biological factors such as mold, bacteria, fungi, or pests. Biological contamination can compromise packaging integrity and safety. g) Fire and Explosion Hazards: Packages may be exposed to fire or explosion hazards during transportation or storage, especially in high-risk environments such as industrial facilities or areas prone to natural disasters. Fire-resistant and explosion-proof designs may be required to mitigate these risks. h) Operational Constraints: Packaging design should account for operational constraints such as space limitations, handling equipment availability, and regulatory requirements at transportation hubs or storage facilities. Flexibility and adaptability in packaging design can help overcome logistical challenges and ensure compliance with regulations. i) Storage Conditions: Apart from temperature and humidity variations, storage conditions may include factors such as ventilation, lighting, and proximity to other hazardous materials. Designers should assess how these conditions may affect packaging integrity and safety over time. j) Handling and Loading Equipment: The availability and compatibility of handling and loading equipment, such as cranes, forklifts, and lifting attachments, should be considered during packaging design. Compatibility with standard equipment can facilitate efficient loading and unloading operations and minimize the risk of damage to the packaging.	Additional points to consider		3.3. a) ... General conditions during loading, shipment, unloading and specific ambient conditions during storage of empty packaging (e.g. outdoor or indoor, uncovered or covered) should be considered, such as humidity, temperatures or chemical and biological factors.		It is considered that some of the points in proposal (e-g) are covered in general way by 3.3 a) and are added in the draft. As for point g) of the proposal, they are not environmental conditions that may affect ageing mechanisms but accident conditions. As for h) and j), they are not factors affecting ageing either, but transport logistics issues.
TRANSSC	Switzerland	CH-01	Para 3.3	The package designer should define **restrictions of environmental conditions and safety criteria of components including relevant inspections to control them.** ~~the expected environmental and operational conditions to which the packaging might be subjected to.~~ These may include the following:	Please refer to comment CH-02 for para 4.4		The package designer should define **restrictions of environmental and operational conditions to which the packaging might be subjected to, as well as ~~safety criteria of components [?] including relevant inspections to control them.~~** These may include the following:		It is considered that the restrictions on operational conditions should also be estabilised by the designer. To speak here on the safety criteria of components and inspections to control them goes beyond the scope of this paragraph related exclusively to environmental and operating conditions
TRANSSC	WNTI	WNTI-22	Para 3.3 (a)	(…). The internal atmosphere of the package cavity (e.g. air or a ~~cover~~ **filling** gas, such as helium and nitrogen) should be defined to evaluate the ageing effects on the radioactive contents and internal components. (…).	"Cover gas" does not seem the right wording, "filling gas" is more often used.	X			
TRANSSC	WNTI	WNTI-23	Para 3.3 (a)	(…). For packagings intended to be used for shipment after storage, the ~~detailed~~ **expected** ambient conditions during storage, which are defined in the storage facility design specifications, should be considered. (…).	Clarification. It is not clear what is meant by "detailed".	X			
TRANSSC	WNTI	WNTI-24	Para 3.3 (a)	(…). For packagings intended to be used for shipment after storage, the detailed ambient conditions during storage, which ~~are~~ **might be** defined in **or derived from** the storage facility design specifications, should be considered.	The storage facility design specifications are not always explicit regarding the detailed ambient conditions.	X			

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-25	Para 3.3 (a) Appendix I I.6	3.3. The package designer should define the expected environmental and operational conditions to which the packaging might be subjected to. These may include the following: (a) General external and internal conditions: General conditions during loading, shipment, unloading and specific ambient conditions during storage of empty packaging (e.g. outdoor or indoor, uncovered or covered) should be considered. The internal atmosphere of the package cavity (e.g. air or a cover gas, such as helium and nitrogen) should be defined to evaluate the ageing effects on the radioactive contents and internal components. Leaktightness criteria need to be specified. Dry storage needs special specifications for drying. For packagings intended to be used for shipment after storage, the detailed ambient conditions during storage, which are defined in the storage facility design specifications, should be considered. The storage configuration (i.e. vertical or horizontal on a concrete pad or floor, storage frame, outdoors, and in a building) should also be considered, if they affect the ambient conditions. The general external and internal conditions might also be optimized, when possible, to prevent ageing mechanisms causing adverse effects on package performance. I.6. There are four typical design approaches to prevent ageing mechanisms causing adverse effects on package performance, as follows: (a) Selecting component materials that do not exceed thresholds for ageing effects; (b) Replacing or refurbishing components before ageing effect thresholds are exceeded; (c) Designing package performance parameters not to exceed ageing effect threshold, taking into account environmental and operational conditions; (d) Ensuring that the package design is based on the properties of aged component materials. A threshold parameter for preventing adverse ageing effects on each package component should be determined taking into account the properties of aged material.	For packages intended to be used for shipment after storage, the designer often knows, or even designs the storage conditions (constant temperature, humidity, …). When the approach to ageing management is common between the transport and the storage designers (see para. 9.1), favorable storage conditions should be considered and valorized in the package design safety report.		I.6 (..) c) Designing package performance parameters not to exceed ageing effect threshold, taking into account environmental and operational conditions;		The proposed additional sentence to para 3.3 is not clear with subject. It seems that it is proposed that the user should try to optimize the conditions even more, then those (restrictions) given by the designer. If that is the case then it is considered out of the scope of this para, which is focused on the design phase. The proposal for adding text to I.6 was accepted.
TRANSSC	WNTI	WNTI-26	Para 3.3 (b)	(…). For packagings intended to be used for shipment after storage, the mechanical loadings ~~under the expected~~**, as defined by the package designer for the** conditions of storage**,** should also be considered.	Clarification. Not the mechanical loadings under the expected conditions of storage should be considered, but the package designer specifications for allowable loads during storage.	X			
NUSSC	United Arab Emirates	UAE-07	Para 3.3 (c)	For ~~repeated use~~ transport packagings, all thermal loadings that increase the temperature of package components should be considered.	Thermal loading shall also be considered for packaging intended to be used for a single transport.			X	It is not considered that this phenomena is significant for packages inteded to be used for a single transport.
TRANSSC	WNTI	WNTI-27	Para 3.3 (c)	(…). For packagings intended to be used for shipment after storage, the thermal loadings ~~under expected~~**, as defined by the package designer for the** conditions of storage should be considered. These loadings are the decay heat of the radioactive contents and the insolation in the case of outdoor storage.	Clarification. Not the thermal loadings under the expected conditions of storage should be considered, but the package designer specifications for the package.	X			
NUSSC	United Arab Emirates	UAE-08	Para 3.3 (d)	For ~~repeated use~~ transport packagings, the effects of cumulative irradiation (gamma and neutron) during their service life should be considered.	Effects of cumulative irradiation shall also be considered for packaging intended to be used for a single transport.			X	It is not considered that this phenomena is significant for packages inteded to be used for a single transport.

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TRANSSC	WNTI	WNTI-28	Para 3.3 (d)	(d) Irradiation: For repeated use packagings, the effects of cumulative irradiation (gamma and neutron) during their service life should be considered. For packagings intended to be used for shipment after storage, the effects of cumulative irradiation **(gamma and neutron)** during the intended storage period should be considered. The decay in the radioactive contents during storage should also be considered.	The text in the second paragraph should be aligned to the text in the first paragraph, to avoid any misunderstanding.	X			
NUSSC	Iran	IR-01	Para 3.3 (e) new	For all packaging, the increase in the internal pressure of the package should be considered. The use of pressure measuring equipment as well as pressure reducing equipment or determination of executive activities to reduce pressure of packages and effect on the ageing mechanisms should be considered.	One of the most important concerns in the storage and transportation of packages is the increase of the internal pressure of the packages. For example, placing the transport package under the sun causes the internal pressure to increase.		e) Internal pressure: The increase in the internal pressure of the package should be considered, if applicable in accordance with the package design.		modified to fit the style of the list of items
TRANSSC	Canada	CAD-12	Para 3.4	AGEING MECHANISMS RELEVANT TO COMPETENT AUTHORITY APPROVED TRANSPORT PACKAGES 3.4 The most common ageing mechanisms specific to competent authority approved transport packagings that should be considered are as follows [12]:	Cameco, a Canadian company, proposes that this section should be specific to competent authority approved packages since none of the items listed pertain to excepted or industrial packages.			X	It is considered, that the paragraph should not apply only to packages subject to approval. The guidance is global in scope and many of the mechanisms listed affect packages not subject to approval. See resolution of WNTI-29 and CAD-13.
TRANSSC	Canada	CAD-13	Para 3.4	3.4. ~~The most c~~Common ageing mechanisms that may be relevant ~~specific~~ to transport packagings include ~~that should be considered are as follows~~ [12]:	To clarify that not all the items listed in this section apply to all packages.		3.4 The most common ageing mechanisms specific to transport packagings that should be considered, depending on the package design, are listed below. [12]:		See resolution of WNTI-29

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NUSSC	United Arab Emirates	UAE-11	Para 3.4	(l) Degradation of Polymer Seals: Polymer seals used in packaging may degrade over time due to exposure to radiation, temperature fluctuations, and chemical environments. Degradation can lead to loss of sealing effectiveness, compromising the containment of radioactive materials. (m) Hydrogen Embrittlement: Hydrogen embrittlement occurs when hydrogen atoms diffuse into metal structures, leading to reduced ductility and increased susceptibility to fracture under stress. This phenomenon can occur in metal components of transport packages exposed to radiation and moisture. (n) Environmental Stress Cracking: Environmental stress cracking is the cracking of polymers caused by the combined action of stress and exposure to specific environmental conditions, such as temperature, radiation, or chemical exposure. This mechanism can affect polymer components of transport packages, compromising their structural integrity. (o) Degradation of Neutron Absorbing Materials: Neutron-absorbing materials used in transport packages, such as boron-based materials, may degrade over time due to exposure to neutron fluence. Degradation can result in reduced effectiveness in absorbing neutrons, potentially affecting the safety performance of the packaging. (p) Hydriding of Metal Components: Hydriding is the absorption of hydrogen into metal structures, leading to changes in material properties and potential embrittlement. Metal components of transport packages, such as steel or aluminum alloys, may be susceptible to hydriding in environments where hydrogen is present, such as during exposure to radiolysis or corrosion. (q) Thermal Shock: Thermal shock occurs when rapid temperature changes cause differential expansion and contraction within materials, leading to cracking or deformation. Transport packages may experience thermal shock during operations involving exposure to extreme temperature variations, such as loading and unloading or exposure to direct sunlight. (r) Vibration Fatigue: Vibration fatigue is the progressive weakening of materials due to repeated mechanical vibrations, which can lead to cracking or failure over time. Transport packages are subjected to various sources of vibration during transportation, including road, rail, or air transport, which can induce fatigue damage in packaging components. (s) Creep Rupture: Creep rupture is the failure of materials under constant stress at elevated temperatures over extended periods. Although primarily a concern for materials exposed to high temperatures, transport packages may experience creep rupture in components subjected to elevated temperatures during operations or storage in environments with high ambient temperatures or in proximity to heat sources. (t) Hydrogen Embrittlement of Welded Joints: Welded joints in metal components of transport packages may be susceptible to hydrogen embrittlement, particularly in environments where hydrogen is present, such as during corrosion processes or radiolysis. Hydrogen embrittlement can lead to premature failure of welded joints, compromising the structural integrity of the packaging. (v) Creep Relaxation of Polymeric Materials: Polymeric materials used in transport packages may experience creep relaxation, where the material gradually relaxes and loses its initial shape over time when subjected to constant stress or load. Creep relaxation can affect the dimensional stability and sealing properties of polymeric components in transport packages. (w) UV Degradation: Ultraviolet (UV) degradation occurs when	Additional points to consider			X	It is considered that the list is not intended to be exhaustive, but to indicate the most relevant and common examples of mechanisms. In addition, the reference [12] is given to find more details if needed.

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				materials are exposed to sunlight, leading to chemical changes and degradation of properties such as strength, color, and flexibility. Transport packages may be exposed to UV radiation during outdoor storage or transportation, particularly if packaging materials are not UV-resistant. (x) Oxygen Embrittlement: Oxygen embrittlement is a phenomenon where exposure to oxygen at high temperatures causes embrittlement of metal components, particularly in materials like titanium and certain stainless steels. Transport packages containing metal components may be susceptible to oxygen embrittlement during operations or storage in oxygen-rich environments. (y) Hygroscopic Expansion: Hygroscopic expansion occurs when materials absorb moisture from the surrounding environment, leading to dimensional changes and potential degradation of packaging materials. Transport packages may experience hygroscopic expansion when exposed to high humidity conditions during transportation or storage. (z) Electrostatic Discharge (ESD) Damage: Electrostatic discharge (ESD) can occur when static electricity builds up on the surface of packaging materials, leading to damage or degradation of electronic components or sensitive materials. Transport packages containing electronic components or sensitive materials may be vulnerable to ESD during handling or transportation. (aa) Degradation of Thermal Insulation: Thermal insulation materials used in transport packages may degrade over time due to exposure to temperature variations, moisture, or mechanical stress, leading to reduced thermal performance. Degradation of thermal insulation can affect the temperature control and protection of packaged materials during transportation. (bb) Degradation of Radiation Shielding Materials: Radiation shielding materials, such as lead or boron-based materials, may degrade over time due to exposure to radiation, temperature variations, or mechanical stress, leading to reduced effectiveness in shielding radioactive materials. Degradation of radiation shielding materials can compromise the safety and security of transported materials.					

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-29	Para 3.4	3.4. **For transport packages requiring competent authority approval of the design, the** ~~The~~ most common ageing mechanisms ~~specific to transport packagings~~ that should be considered are ~~as follows~~ **listed hereafter** [12]~~:~~**. In the framework of a graded approach, these ageing mechnaisms should be reviewed when relevant to the package design and its environmental and operational conditions. The depth of the review of these ageing mechanisms should be commensurate to the safety issues of the package design.** a) Boron depletion~~: degradation of the neutron-absorbing capacity of the neutron poison and shielding materials when exposed to neutron fluence.~~ b) Corrosion~~: electrochemical reaction of a metal or a metal alloy in an environment, which results in material oxidation or loss.~~ The following are typical forms of corrosion: (i) Crevice corrosion~~: localized corrosion in joints, connections, and other small, close-fitting regions that develop local aggressive environments.~~ (ii) Galvanic corrosion~~: accelerated corrosion of a metal when is in electrical contact with a more noble metal or a non-metallic conductor in a corrosive electrolyte.~~ (iii) General corrosion~~: uniform loss of material caused by corrosion, which proceeds at approximately the same rate over a metal surface.~~ (iv) Microbiologically influenced corrosion~~: any form of corrosion influenced by the activity of microorganisms, such as bacteria, fungi and algae, and/or the products of their metabolism. For example, anaerobic bacteria can establish an electrochemical galvanic reaction or disrupt a passive protective film, acid-producing bacteria can produce corrosive metabolites. Wood corrosion bacteria might degrade the wood used as a shock absorber.~~ (v) Pitting corrosion~~: a localized form of corrosion confined to a point or small area of a metal surface in the form of cavities ('pits').~~ (vi) Intracrystalline corrosion~~: selective attack to the structure of a metal in the grain boundaries or adjacent. Susceptible for intracrystalline corrosion could be for example stainless steel, copper-zinc alloys and some aluminium alloys.~~ (c) Stress corrosion cracking~~: metal cracking produced by the combined action of corrosion and tensile stress (applied or residual). Stress corrosion cracking is highly chemically specific, in that, certain alloys are likely to undergo this type of corrosion only when exposed to certain chemical environments.~~ (d) Stress relaxation~~: loss of preload in a heavily loaded bolt. Over time, the clamping force provided by a bolt might decrease (analogous to the metallic creep mechanism at elevated temperatures).~~ (e) Wet corrosion and blistering~~: degradation mechanism for neutron poison plates with open porosity as a result of water entering the pores of the material during loading, which leads to internal corrosion. Blisters occur from the trapped hydrogen produced by the corrosion reactions. Wet corrosion and blistering can cause dimensional changes affecting the criticality considerations due to moderator displacement and might hinder the retrieval of fuel assemblies.~~ (f) Creep~~: for a metallic material, time-dependent continuous deformation process under constant stress. It is a thermally activated process and generally a concern at temperatures greater than 40% of the absolute melting temperature of the material. However, a low-temperature creep is a thermal process considered as a potential degradation mechanism for some alloys, including zirconium-based alloys.~~	(i) In line with the graded approach, these mechanisms apply to competent authority approved packages only. Although a graded approach, commensurate with the type of package, is stated in para. 1.8, it is difficult (and even impossible) to determine if the guidance would apply to a given type of package as for any other type of package. Additional guidance is needed regarding the implementation of the graded approach when applied to the type of package. (ii) Para. 3.4 has a very high level of details, but this level of details might not be sufficient for the assessment of the ageing mechanisms. In any case, the user of the Guide will have to refer to more detailed literature. A list of potential ageing mechanism should be enough for this guide.		3.4 The most common ageing mechanisms specific to transport packagings that should be considered, depending on the package design, are listed below. [12]:		It is considered that this paragraph should not be focused only on packages subject to approval, as the scope of the guidance is general. Many of the mechanisms indicated affect packages not requiring approval. Additional information to the listed items is also considered useful for the user of the guide in facilitation understanding the mechanisms. Modifications were made to include graded approach. Connected with CAD-13.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
				(g) Fatigue (also called 'cyclic loading' or 'thermal/mechanical fatigue'): ~~phenomena leading to fracture under repeated or fluctuating stresses with a maximum value less than the tensile strength of the material.~~ (h) Radiation damage: ~~loss of ductility (embrittlement), fracture toughness, and resistance of metal and polymer cracking that might occur under exposure to radiation.~~ (i) Radiolysis: ~~in broad meaning, material change caused by the breaking of chemical bonds by irradiation. For example, when water exists in the package cavity, hydrogen is generated by radiolysis, which causes an internal pressure buildup in the package. Polymers might change in composition, due to decomposing of crosslinks by irradiation.~~ (j) Thermal ageing: ~~continued exposure to elevated temperatures during operation can sometimes result in undesirable properties. For example, at operating temperatures of 300–400°C, austenitic stainless steel welds containing ferrite exhibit a spinodal decomposition of the ferrite phase into ferrite and chromium-rich phases. This could lead to embrittlement (reduction in the fracture toughness) depending on the amount, morphology, and distribution of the ferrite phase and the stainless steel composition. This phenomenon is called 'thermal ageing embrittlement' or 'thermal embrittlement'. For some alloys, where the material strength is increased by adding specific elements and heat treated when needed, a long thermal history might cancel the enhanced mechanisms and reduce the strength.~~ (k) Wear: ~~surface material removal caused by relative motion between two surfaces or under the influence of hard, abrasive particles. Wear occurs in parts that experience intermittent relative motion or frequent manipulation.~~					
TRANSSC	USA	US-13	Para 3.4 (b)(vi)	Consider adjusting the second sentence to state: "Materials susceptible to intracrystalline corrosion could include, for example, stainless steel, copper-zinc alloys and some aluminum alloys."	Editorial – Improve grammar and clarity.	X			
TRANSSC	WNTI	WNTI-30	Para 3.4 (d)	(d) Stress relaxation: loss of preload in a heavily loaded bolt. Over time the clamping force provided by a bolt might decrease ~~(analogous to the metallic creep mechanism at elevated temperatures)~~.	This comment should only be considered if above comment WNTI-29 is not accepted. The example in brackets is too simplistic. Relaxation is the loss of stress at constant total strain due to the transformation of elastic strain into plastic strain. In contrast to creep, relaxation is self-limiting and does not lead to rupture.	X			
TRANSSC	WNTI	WNTI-31	Para 3.4 (f)	Creep: for a metallic material, time-dependent continuous deformation process under constant stress. It is a thermally activated process and generally a concern at temperatures greater than 40% of the absolute melting temperature of the material. ~~However, a low-temperature creep is a thermal process considered as a potential degradation mechanism for some alloys, including zirconium-based alloys.~~	This comment should only be considered if above comment WNTI-29 is not accepted. The third sentence should be deleted. Specific examples at this level of abstraction could give the reader a limiting view.	X			
TRANSSC	USA	US-14	Para 3.4 (g)	Consider adding environmentally assisted fatigue - i.e., long-term fatigue damage of the material due to the synergistic effects of cyclical stress and the electrochemical effects of an aqueous electrolyte on the material. This may potentially warrant evaluation for transport packagings that are designed for repeated use and for transport packagings that are to be used for shipment after storage.	Consideration of potential aging mechanisms for transportation packaging.			X	It is considered that the list is not intended to be exhaustive, but to indicate the most relevant and common examples of mechanisms. In addition, the reference [12] is given to find more details if needed.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
NUSSC	United Arab Emirates	UAE-10	Para 3.4 (i)	Radiolysis: in broad meaning, material change caused by the breaking of chemical bonds by irradiation. For example, when water exists in the package cavity, hydrogen is generated by radiolysis, which causes an internal pressure buildup in the package. Polymers might change in composition, due to decomposing of crosslinks by irradiation. Radiolysis may also produce chemical species impacting corrosion processes.	Radiolysis may produce oxidizing (such as H2O2) or chemical species modifying locally the corrosion environment. These species might increase the kinetics of the general corrosion of the metallic materials and favour the occurrence of localised corrosion.			X	It is considered that the list is not intended to be exhaustive, but to indicate the most relevant and common examples of mechanisms. In addition, the reference [12] is given to find more details if needed.
TRANSSC	WNTI	WNTI-32	Para 3.4 (j)	Thermal ageing: continued exposure to elevated temperatures during operation can sometimes result in undesirable properties. ~~For example, at operating temperatures of 300–400°C, austenitic stainless steel welds containing ferrite exhibit a spinodal decomposition of the ferrite phase into ferrite and chromium-rich phases. This could lead to embrittlement (reduction in the fracture toughness) depending on the amount, morphology, and distribution of the ferrite phase and the stainless-steel composition. This phenomenon is called 'thermal ageing embrittlement' or 'thermal embrittlement'. For some alloys, where the material strength is increased by adding specific elements and heat treated when needed, a long thermal history might cancel the enhanced mechanisms and reduce the strength.~~	This comment should only be considered if above comment WNTI-29 is not accepted. The example and following text should be deleted. Specific examples at this level of abstraction could give the reader a limiting view.	X			
NUSSC	Iran	IR-02	Para 3.4(I) new	Repair activities on packages: Carrying out repair activities such as welding on the packages and not performing heat treatment on the repaired packages.	Welding on the packages and not performing heat treatment on the repaired packages causes the creation of heat-affected zone (HAZ) and these zones cause destruction of the package.			X	It is considered that the proposal does not refer to ageing mechanisms listed in the para.
TRANSSC	USA	US-15	Para 3.4(j)	Consider including more examples of thermal aging for different types of materials. For example, thermal embrittlement of Type 17-4 precipitation hardened martensitic stainless steel components; reduction in yield and tensile strength for precipitation hardened aluminum alloys, etc. These types of thermal aging effects are known to occur during long-term exposure to sufficiently high temperatures, which can occur for structural components located near stored and/or transported spent nuclear fuel. Also, thermal aging of polymers and inorganic compounds could be an aging mechanism that needs evaluation for packagings designed for repeated use and for packagings used for shipping after storage.	Consideration of potential aging mechanisms for transportation packaging.			X	It is considered that the list is not intended to be exhaustive, but to indicate the most relevant and common examples of mechanisms. In addition, the reference [12] is given to find more details if needed.
TRANSSC	USA	US-16	Para 3.5	Consider adding the following to this list: (i) spent nuclear fuel cladding creep and (ii) reduction in cladding yield and tensile strength due to annealing of the cladding at high temperatures during vacuum drying and storage of spent nuclear fuel.	Consideration of potential aging mechanisms for spent nuclear fuel cladding, which may require evaluation for transport after storage.			X	It is not intended to list exhaustively the degradation phenomenon that can occur in spent fuel, but to give some examples of common and important phenomena. In addition, reference [12] is included in the paragraph where more details can be found.
TRANSSC	WNTI	WNTI-33	Para 3.5	Examples of ageing mechanisms specific to nuclear fuel, especially for spent nuclear fuel, include the following [12]: (a) Delayed hydride cracking~~: crack propagation in zirconium-based cladding materials resulting from hydrogen diffusion to a crack tip and embrittlement of the near-tip region due to hydride precipitation. The operability of the delayed hydride cracking mechanism in fuel cladding depends on the stress imposed on the cladding.~~ (b) Hydride reorientation and hydride-induced embrittlement~~: precipitation of radial hydrides resulting in the embrittlement of zirconium-based cladding materials. The hydride reorientation from the circumferential-axial to the radial-axial direction is caused by heating and cooling of the cladding under sufficient cladding hoop tensile stresses and might affect the performance of the cladding under pinch load stress.~~ (c) Mechanical overload: (overload of fuel cladding caused by fuel	Para. 3.5 has a very high level of detail, but this level of detail provides an anticipatory assessment which should be avoided. Multiple factors play a role for an assessment in each individual case by the designer and by the competent authority. Thus, in any case, the user of the Guide will have to refer to more detailed literature. A list of potential ageing mechanism should be enough for this guide.			X	It is considered that a basic description of each of the degradation phenomena shown as examples, rather than an assessment.This may be useful for the users of the guide in facilitating the understanding of these phenomena.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
				pellet swelling). ~~The fuel pellet swelling is the result of the decay gas production in the pellet. Pellet swelling can increase stresses on the cladding.~~					
NUSSC	Iran	IR-03	Para 3.5 (d) new	Fuel assembly bow and twist, Gross deformation, increasing of oxide layer Thickness, Water in the rod, Diameter changes due to local corrosion or hydration, Structural integrity etc. are the defects that cause the destruction of nuclear fuel and should be considered in the ageing program.	It is better to give more examples about the defects of nuclear fuel, especially spent fuel.			X	It is not intended to list exhaustively the degradation phenomenon that can occur in spent fuel, but to give some examples of common and important phenomena. In addition, reference [12] is included in the paragraph where more details can be found.
TRANSSC	WNTI	WNTI-35	Para 3.7 (a)	Level 1: components ~~important to~~ **relied on for** safety and necessary to fulfil one or more safety functions of the package. (…).	Clarification. It is not clear what is the meaning of "important" in th current context (how important is important?).			X	It is considered to keep the consistency of the description of the safety levels of the components and the terminology used in this para with SSG-48 (para 5.16).
TRANSSC	WNTI	WNTI-36	Para 3.7 (a)	(…); and ~~radiation~~ **cooling** fins and thermal paths.	"Cooling fins" is a more appropriate wording (the fins have no significant function regarding radiation).	X			
TRANSSC	Canada	CAD-14	Para 3.7 (a) and figure 1	Propose revised wording: Level 1: components ~~important~~ critical to ~~safety and necessary to~~ fulfil one or more of the safety functions of the package listed in section 3.6. Modify Level 1 text in Figure 1 to match.	To improve clarity that the components are critical, not just important, and to reference where the safety functions to be considered are listed.			X	It is considered to keep the consistency of the description of the safety levels of the components and the terminology used in this para with SSG-48 (para 5.16).
TRANSSC	Canada	CAD-15	Para 3.7 (b) and figure 1	Propose revised wording: Level 2: other components whose failure might prevent the Level 1 components ~~important~~ critical to safety from fulfilling one or more of the~~ir intended~~ safety functions of the package listed in section 3.6. Modify Level 2 text in Figure 1 to match.	To improve clarity that the components are critical, not just important, and to reference where the safety functions to be considered are listed.			X	It is considered to keep the consistency of the description of the safety levels of the components and the terminology used in this para with SSG-48 (para 5.16).
TRANSSC	Canada	CAD-16	Para 3.7 (c)	Examples are ~~thermal~~ barriers to prevent access or persons touching the package (mesh plates), seals…	To clarify what is meant by thermal barriers, which would generally be Level 1 components.	X			
TRANSSC	WNTI	WNTI-37	Para 3.7 fig. 1	3.7. A systematic scope setting process should be used for identifying components subject to the ageing consideration; all package components, including radioactive contents, where relevant, should be listed. The following components should be included by the package designer in the scope of ageing considerations in the package design safety report (See Fig. 1) [4]. (a) ~~Level 1: c~~Components important to safety and necessary to fulfil one or more safety functions of the package. Examples are containment system components such as shell, bottom plate, lid(s), lid bolts, gasket, orifices and valves, gamma and neutron shielding, fuel baskets; and radiation fins and thermal paths. (b) ~~Level 2: o~~Other components whose failure might prevent the components important to safety from fulfilling their intended functions. Examples are shock absorbers, trunnions and lifting lugs. (c) ~~Level 3: o~~Other components credited in the safety analyses as performing the function of coping with certain types of event, consistent with the Transport Regulations and national requirements. Examples are thermal barriers (mesh plates), seals to detect opening of packages and name plates. FIG. 1. Scope setting process for ageing management *The information "Level 1", "Level 2" and "Level 3" should be deleted.*	The definitions of three levels for the components is a new concept. It is understood that this concept might have significant merits in the framework of a graded approach. However, this concept is not used in the Guide. Consequently, for simplification and for avoiding any ambiguity regarding how to use these three levels, it is suggested to remove these three levels from the text of para. 3.7 and from the figure 1.	X			

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-34	Para 3.7 new 3.9	A systematic scope setting process should be used for identifying components subject to the ageing consideration; all package components, including radioactive contents, where relevant, should be listed. The following components should be included by the package designer in the scope of ageing considerations in the package design safety report ~~(See Fig. 1)~~ [4]. (…). *New para. 3.9 to be created and inserted after para. 3.8.*	One of the purposes of Fig. 1 is to assess whether a component is affected by any ageing mechanism, or not. To answer to this question, it is necessary to consider which material are used to manufacture the components. And the considerations about materials are discussed in para. 3.8. Fig. 1 is a flowchart that provides a synthesis of the considerations that are presented in paras 3.4 to 3.8. Consequently, Fig. 1 deserves to be presented in a specific (short) paragraph at the end of Section 3.			X	It is considered that Figure 1 is directly related to 3.7 and the determination of safety relevant components.
TRANSSC	Canada	CAD-17	Para 3.8	MATERIALS OF SAFETY RELEVANT COMPONENTS IN COMPETENT AUTHORITY APPROVED TRANSPORT PACKAGES The materials of safety relevant components in a competent authority approved transport package should be listed to complete the scope setting process for ageing management described in para. 3.7. Examples of typical materials used for packaging and radioactive contents include the following [12]:	Cameco, a Canadian company, proposes that this section should be specific to competent authority approved packages since most of the materials listed do not pertain to excepted or industrial packages. To maintain a graded approach, this section should be revised to prevent confusion.			X	The paragraph applies to any type of package, as the scope of the guidance is general. Many of the materials mentioned are also used in non approved packages
TRANSSC	USA	US-17	Para 3.8	Change “typical materials used for packaging and radioactive contents” to “typical materials used for components of packaging”.	Clarifying change. “Radioactive contents” does not make sense here.	X			
TRANSSC	USA	US-18	Para 3.8	Consider adding inorganic material such as ceramics. For example, ceramic fiber thermal insulation, inorganic compounds for neutron shielding, etc.	Inorganic materials such as these may be used for transportation packaging.	X			
TRANSSC	WNTI	WNTI-38	Para 3.8		Editorial. It is understood that materials are listed in para. 3.8. in alphabetical order. Consequently, “Borated aluminium” and “Borated stainless steel”, currently in (f) and (g) should be moved up between the current (a) and (b).	X			

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-39	Para 3.8	3.8. For transport packages requiring competent authority approval of the design, the The materials of safety relevant components in a transport package should be listed to complete the scope setting process for ageing management described in para. 3.7. Examples of typical materials used for packaging and radioactive contents include the following [12]: (a) Aluminium or aluminium alloys~~: used as a cladding of metallic gaskets for closure seals, or as a structural component or heat conductor (e.g. baskets for locating spent fuel assemblies or as a cladding material).~~ (a-bis) Concrete (b) Copper or copper alloys~~: used as a rupture disk or a heat conductor.~~ (c) Ductile cast iron~~: used as a structural member or as shielding material.~~ (d) Lead: ~~used as a shielding material.~~ (e) Nickel or nickel alloys: ~~used as a closure lid, plate bolt or trunnion bolt, or as an inner cladding and spring, mainly for the metallic gasket for the lid seal, or as a cladding for corrosion protection purposes.~~ (f) Borated aluminium~~: used as a neutron absorber of a structural or non-structural member of a basket for nuclear fuel.~~ (g) Borated stainless steel~~: used as a neutron absorber of a structural member of a basket for nuclear fuel.~~ (h) Other neutron absorber material~~: high-hydrogen-containing material such as water, polymer or polymer compounds (resin, polyethylene), used as shielding; boron or B4C may be used to absorb neutrons and suppress secondary gamma ray, and also for subcriticality purpose.~~ (i) Paint~~: used as a surface coating material (e.g. protection against corrosion, thermal emissivity).~~ (j) Silicone resin~~: used as a filling or sealing material for gaps, notches or holes to prevent the aggregation or ingress of moisture.~~ (k) Silver~~: used as a cladding of the metallic gasket for lid seals.~~ (l) Stainless steel (austenitic, ferritic, duplex or martensitic)~~: used as a structural member, shielding material, corrosion-resistant lid gasket seating surface and nuclear fuel cladding tube (older designs).~~ (m) Steel (i.e. carbon, alloy, high-strength and low-alloy steels)~~: used as structural member or as shielding material.~~ (n) Synthetic rubber~~: used as an elastomer O-ring for the closure seal.~~ (o) Woods or foamed polymer (e.g. polyurethane)~~: used as a shock absorbing material.~~ (p) Zirconium-based alloys~~: used as a cladding tube of nuclear fuel.~~	(i) In line with the graded approach, listing the materials of safety relevant components should apply only to competent authority approved packages. Although a graded approach, commensurate with the type of package, is stated in para. 1.8, it is difficult (and even impossible) to determine if the guidance would apply to a given type of package as for any other type of package. Additional guidance is needed regarding the implementation of the graded approach when applied to the type of package. (ii) Para. 3.8 has a very high level of details, but is not comprehensive. A list of typical materials should be enough for this guide.		X (a-bis) Concrete, used as structural member and shielding.		The paragraph applies to any type of package, as the scope of the guidance is general. Additional information on each point is considered useful for the user of the guide, It is therefore not considered appropriate to delete it. The inclusion of concrete within the standard materials is considered appropriate. The wording of the new bullet is included in the column 'Accepted, but modified'.
TRANSSC	USA	US-19	Para 3.8(h)	Consider augmenting the introductory words for this item to include the underlined text, specifically: “Other neutron absorber <u>and neutron shielding</u> materials:”	The material safety functions described in 3.8(h) include both neutron shielding and neutron absorber functions.	X			
TRANSSC	Pakistan	PK-02	Para 3.8, 4.10(b)(i), table I-1	(a) Tungston: used as a shielding material. (b) Depleted Uranium: used as a shielding material.	Tungsten and depleted uranium may also be used as shielding material.		3.8 (..) f) Depleted uranium: used as a shielding material; (..) m) Tungsten: used as a shielding material; (..)		Proposed changes in para 3.8 were accepted. In para 4.10 ageing mechanisms are listed, not materials. Table I-1 is example of scope setting, not meant to be exhaustive.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-45	Para 4 Section TABLE 1 Column “packages intended for shipment after storage” Line “Package Operation”	Manufacturing confirmation for packaging conformity with the design, in accordance with para.501 of the Transport Regulations Shipment confirmation for package content and design, in accordance with paras 502 and 503 of the Transport Regulations **If necessary, p**Periodic maintenance during storage, in accordance with a maintenance programme ~~Periodic monitoring of ageing effects in accordance with the ageing management programme.~~ **Periodic monitoring of environmental and operational conditions in accordance with the ageing management programme.** Periodic monitoring of gaps in terms of compliance with new regulations and technologies, in accordance with a gap analysis programme.	Periodic maintenance might not be necessary in some instances. Therefore, “if needed” should be added. “Periodic monitoring of ageing effects…” should be deleted since it is a duplication of the periodic maintenance. In some instances, monitoring certain environmental and operational conditions, or facility parameters (temperature, humidity, etc.) could eliminate the need to monitor each individual package.			X	It is not considered necessary to add 'if necessary', as the maintenance programme itself will indicate whether or not maintenance is required on the package during storage. Nor is it considered adequate to refer only to the monitoring of environmental and operational conditions with the aim of detecting ageing effects, as this will be one more procedure to detect them, but not the only one.
WASSC	Czech Republic	CZ-02	Para 4 Section Table 1 Page 14	Packages intended for shipment after storage Management system of the responsible organization*, in accordance with para. 306 of the Transport Regulations or *organization responsible for the storage*	After several decades or centuries of storage the “*the entity responsible for design, manufacturing or operation of a package*” may not exist anymore.	X			
TRANSSC	WNTI	WNTI-40	Para 4.1	The package design should be documented **in a package design safety report format by the package designer to provide** ~~to maintain~~ evidence of its compliance with the applicable Transport Regulations. ~~Such documentary evidence should be prepared by the package designer in the package design safety report format.~~ For package designs that require approval by a competent authority, the package design safety report should be the basis for the application to the competent authority	Editorial. Clarification. The current wording is difficult to understand.	X			
TRANSSC	Canada	CAD-18	Para 4.1 8.2 Footnote 1	“4.1 The package design…Transport Regulations. Such document~~ed~~ary evidence should…” “8.2 Paragraph 801…, document~~ed~~ary evidence of the compliance…” “[1] In the context… all document~~ed~~ary evidence of compliance…”	The use of documented evidence and not documentary evidence is likely what is meant.			X	see WNTI-40 8.2 is statement from SSR6 'documentary evidence' is term from SSR6
TRANSSC	Canada	CAD-23	Para 4.10	The parameters to be included in the Package Design Safety Report (PDSR) should be justified and evaluated based on the specific package design	Expand the abbreviation at the first-time use. Alternatively, introduce the abbreviation in para 1.2 and then use the abbreviation throughout the document.		(..) in the package design safety report should be..		no abbreviation PDSR
TRANSSC	USA	US-25	Para 4.10	A wide range of packages are designed for repeated use.	Improve grammar and clarity.	X			
TRANSSC	WNTI	WNTI-46	Para 4.10 (a)	Package~~s~~ **designs** not requiring competent authority approval (excepted packages, industrial packages, Type A packages):	Correctness. Competent authority approval is required for package designs, not for (individual) packages.	X			
TRANSSC	WNTI	WNTI-47	Para 4.10 (a)(ii)	Any deformation, rust, corrosion, or other defects in the packaging should be detected by the maintenance programme, including pre-shipment inspections (~~S~~see Section 5). Where such effects are detected, the packaging should be repaired or replaced.	Editorial.	X			
TRANSSC	USA	US-26	Para 4.10 (b)	In the last sentence before item (i), define the acronym “PDSR” (i.e., package design safety report?).	Improve clarity.	X			
TRANSSC	WNTI	WNTI-48	Para 4.10 (b)	(b) (…) The parameters to be included in the ~~PDSR~~ **package design safety report** should be justified and evaluated based on the specific package design.	Editorial. Consistency within the draft publication. In most instances, in the draft publication, the abbreviation PDSR is not used.	X			

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-49	Para 4.10 (b)	(i) Ageing management issues that can be taken into account t~~o be considered~~ include the following: - Embrittlement of stainless steel, carbon steel or low-alloy steel should only be considered for very high neutron irradiation levels [14]. ~~Normally, the embrittlement of these materials need not be considered.~~ - Changes in the mechanical properties of aluminium and copper alloys should only be considered for very high neutron irradiation levels [15, 16]. ~~Normally, these changes need not be considered.~~ - The ageing effects on lead used as shielding need not be considered. ~~because no clear change in the properties of lead due to irradiation has been reported.~~ - The radiation resistance of resins (epoxy, silicone) should only be considered for very high neutron and gamma irradiation levels [17]. ~~Normally, no ageing effects on resin need to be considered.~~ (…) - Corrosion of the external surfaces of packaging made of carbon steel or low alloy steel should be considered. ~~Sea salt particles during transport or storage environment might cause the initiation of stress corrosion cracking on stainless steel surfaces.~~ (…).	Para. 4.10(b) has a very high level of detail. General statements and an anticipatory assessment should be avoided. Multiple factors play an important role for the individual assessment by the package designer and by the competent authorities. Thus, this paragraph should be revised accordingly.		X (i) Ageing management issues that can be taken into account include the following:		Modification to first sentence is accepted. It is considered that with removing the text in bullets the added value in the recommendations is lost.
TRANSSC	USA	US-31	Para 4.10 (b) & 8.3	Replace “PDSR” with “Package Design Safety Report”.	To be consistent since the term is spelled out in all other instances in the document. Or define the acronym at its first use (paragraph 1.2) and use consistently throughout the document.	X			
TRANSSC	USA	US-27	Para 4.10 (b)(i)	Consider adding an item to this list that recommends the evaluation of thermal aging for structural components made of Type 17-4 precipitation hardened martensitic stainless steels and precipitation hardened aluminum alloys if the components are located inside the package containment in close proximity to spent nuclear fuel.	This would improve the technical recommendations of this subparagraph on aging management issues to be considered for Type B(U), Type B(M), and Type C packages since thermal aging mechanisms for these materials should considered if applicable to the package design.			X	Rejected on the base of excessive specificity.
TRANSSC	WNTI	WNTI-50	Para 4.10 (b)(i)	- In structural design and construction codes (e.g. Ref. [18]), the mechanical integrity of carbon steel and low alloy steel is up to 350°C, and up to 425°C for stainless steel. ~~The temperature of these material used for a shell, a bottom plate, a lid, lid bolts, and trunnions during transport is less than 170°C; thus, creep in these components need not be considered. The temperature of the stainless steel basket for spent nuclear fuel is less than 180°C for a wet type package and less than 390°C for a dry type package; thus, creep and dimensional change in the basket need not be considered.~~	The second part of this paragraph should be deleted. It is too specific and unduly precise.			X	It is considered that the second part compares the temperatures reached in some components with that data and without that the first part is only a statement.
TRANSSC	WNTI	WNTI-51	Para 4.10 (b)(i)	~~Irradiation and t~~Thermal degradation of elastomer O-rings (e.g. for lid seals) need to be considered.	Irradiation degradation of elastomer O-rings is not a common phenomenon.			X	It is considered that high irradiation rates can indeed degrade elastomers.
TRANSSC	WNTI	WNTI-52	Para 4.10 (b)(i)	The fatigue of trunnions should be considered and determine~~d~~ **the need** to ~~be~~ replace~~d~~ **the trunnions** when the number of lifting operations exceeds a calculated limit times to avoid a fatigue failure.	Clarification		..considered and the need to replace the trunnions should be determined when ..		editorial modification to give recommendation

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-53	Para 4.10 (b)(i)	Corrosion by bacteria ~~and /or~~ **and/or** humidity on the wood used as a shock absorbing material should be considered. Normally, this need not be considered, providing the wood is sealed tightly in a metallic casing and any O-rings used for the shock absorber casing surface are confirmed to be leaktight during maintenance and/or periodic inspection. The temperature ~~of~~ and irradiation of the wood is low enough such that ageing effects (e.g. a change of mechanical property or decomposition of adhesive to form a plywood) need not be considered.	Editorial	X			
TRANSSC	WNTI	WNTI-55	Para 4.10 (b)(i)	No ageing effects on the radioactive contents need to be considered because the duration of a single transport operation is short (**equal or** less than one year).	Clarification	X			
TRANSSC	Switzerland	CH-03	Para 4.10 (b)(i)	The radiation resistance of resins (epoxy, silicone) should only be considered for very high neutron and gamma irradiation levels [17]. Normally, no ageing effects on resin need to be considered.	According to the list of references, the reference [17] is available in Japanese language. It might be useful to have this reference in an English translation.			X	The English version of this document was not available at the stage of preparation of the draft. In any case, the present IAEA procedures accept references to documents in languages other than English.
TRANSSC	Switzerland	CH-04	Para 4.10 (b)(i)	Corrosion of the external surfaces of packaging made of carbon steel or low alloy steel should be considered. Sea salt particles during transport or storage environment might cause the initiation of stress corrosion cracking on stainless steel surfaces. **In case of internal storage, the monitoring of storage conditions, i. e. humidity and temperatures, to exclude any condensation on the package surfaces (Dew point) can be used to exclude all ageing mechanisms that require an electrolyte to take place.**	In addition to storage in free air, it should also be referred to storage in buildings (internal storage). In this case, the monitoring of temperatures and humidity may provide sufficient information for ageing justification.	X			See in combination with resolution of US-28 and US-29 and CAD-25
TRANSSC	Japan	JPN-04	Para 4.10 (b)(i) 4th bar (P.17, L.4)	The radiation resistance of resins (epoxy, silicone) should only be considered for very high neutron and gamma irradiation levels [17]. Normally, ~~no~~ ageing effects on resin caused by thermal degradation need to be considered.	Thermal degradation of resin for radiation shielding is critical than that by irradiation.		x The radiation resistance of resins (epoxy, silicone) should only be considered for very high neutron and gamma irradiation levels [17].		It is considered, that the second sentence is indeed repetitive to the first one. Resistance to radiation is meant rather than thermal degradation.
TRANSSC	Canada	CAD-26	Para 4.10 (b)(i) bullets 1,2, and 4	"Embrittlement of stainless steel, carbon steel or low-alloy steel should only be considered for very high neutron irradiation levels, such as XXX kGy or greater [14]." "Changes in the mechanical properties of aluminium and copper alloys should only be considered for very high neutron irradiation levels, such as XXX kGy or greater [15, 16]." "The radiation resistance of resins (epoxy, silicone) should only be considered for very high neutron and gamma irradiation levels, such as XXX kGy or greater [17]."	Without adding a reference value (XXX kGy) the statement is ambiguous and could lead to confusion or disagreement. Suggest providing a definition or indicating an arbitrary value in units of kGy or Mrad to provide some frame of reference.			X	Detailed information is to be found the reference documents provided in the text.
TRANSSC	Canada	CAD-25	Para 4.10 (b)(i) second last bullet	Corrosion by bacteria and/or humidity on the wood used as a shock absorbing material should be considered. The concern is that wood corrosion will lead to dry rot or wet rot and result in a loss of strength and/or degradation of mechanical properties. Normally, this need not be considered, providing the wood is sealed tightly in a metallic casing and any O-rings used for the shock absorber casing surface are confirmed to be leaktight during maintenance and/or periodic inspection.	If wood corrosion is not referring to dry rot or wet rot, it is recommended to provide a definition for wood corrosion or additional text describing the phenomenon of wood corrosion.	X			
TRANSSC	USA	US-28	Para 4.10 (b)(i), seventh item on corrosion of external surfaces	Consider augmenting the second sentence by adding the underlined text as follows: "Sea salt particles and road chemicals during transport or storage…'	The environmental chemical species that may lead to corrosion on external surfaces of packaging may be generated by sea salt particles and road chemicals during package transportation and storage.	X			See in combination with CH-04

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TRANSSC	USA	US-29	Para 4.10 (b)(i), seventh item on corrosion of external surfaces of packaging.	Consider augmenting the second sentence by adding underlined text as follows: "…might cause the initiation of pitting, crevice corrosion, and/or stress corrosion cracking on stainless steel surfaces".	These environmental chemical conditions could lead to initiation of one or more of these three corrosion mechanisms for external surfaces of packaging exposed to the outdoor air environment.	X			
TRANSSC	WNTI	WNTI-56	Para 4.10 (b)(ii)	For transport packages containing periodic monitoring, the effects of high temperature should be considered because possible dimensional changes in the fuel basket might affect criticality safety. The depletion of ~~10~~B-**10** used as the neutron absorber in the basket should be considered in terms of the effects on criticality safety.	Editorial			X	According to the Style Manual, the mass number should be written at the top left of the element symbol, with the ionic state at the top right, e.g. ^{238}U, ^{80m}Br, $^{59}Fe^{3+}$. However, in tables the forms U-238 and Br-80m are recommended. At the start of a sentence the element name should be written in full (e.g. Uranium-238).
TRANSSC	Japan	JPN-05	Para 4.10 (b)(ii) 10th bullet	Corrosion by bacteria and /or humidity on the wood used as a shock absorbing material should be considered. Normally, this need not be considered, providing the wood is sealed tightly in a metallic casing and any O-rings used for the shock absorber casing surface are is confirmed to be leaktight during maintenance and/or periodic inspection.	O-rings used for the shock absorber casing are not common structures and it should be deleted. The important point is that the casing is sealed tightly.		X Corrosion by bacteria and /or humidity on the wood used as a shock absorbing material should be considered. Normally, this need not be considered, providing the wood is sealed tightly in a metallic casing and its surface is confirmed to be leaktight during maintenance and/or periodic inspection.....		Agree with the comment. The comment does not make a specific proposal, but a modification of the text is made in line with what is proposed. See also CAD-25 and WNTI-54.
TRANSSC	Canada	CAD-24	Para 4.10 versus 4.11	In Para 4.10 (dedicated for packagings intended for repeated use), it is mentioned that "The ageing effects on lead used as shielding need not be considered because no clear change in the properties of lead due to irradiation has been reported." In para. 4.11 (dedicated for packagings intended to be used for shipment after storage), there is no mention of lead at all. Consider mentioning lead in para 4.11.	Not mentioning lead in para. 4.11 could be construed as lead not needing to be considered at all, which is contrary to the example provided in Table I.1.			X	It is consider not necessary to include reference to lead in 4.11. In the part relating to 'Packagings intended to be used for shipment after storage' only the particular issues are noted in relation to the case of repeated use packages, but this does not mean that most of the points noted for repeated use packages need not be considered in shipment after storage.
TRANSSC	WNTI	WNTI-54	Para 4.10(b)(i)	Corrosion by bacteria and /or humidity on the wood used as a shock absorbing material should be considered. Normally, this need not be considered, providing the wood is sealed tightly in a metallic casing and ~~any O-rings used for~~ the shock absorber casing ~~surface are~~ **is** confirmed to be ~~leaktight~~ **sealed** during maintenance and/or periodic inspection	O-rings used for the shock absorber casing are not common structures and it should be deleted. The important point is that the casing is sealed tightly.		X Corrosion by bacteria and /or humidity on the wood used as a shock absorbing material should be considered. Normally, this need not be considered, providing the wood is sealed tightly in a metallic casing and its surface is confirmed to be leaktight during maintenance and/or periodic inspection		Agree with the comment. The comment does not make a specific proposal, but a modification of the text is made in line with what is proposed. See also CAD-25 and JPN-05.
WASSC	Czech Republic	CZ-03	Para 4.11 (b) Page 18	Packages should maintain their safety functions *during routine, normal and accident conditions of storage and transport* and withstand the conditions of extended storage as well as transport (i.e. for shipment after storage).	There is a need to emphasise the need to maintain all safety functions of the package not only during routine storage and transport conditions, but also in normal and accident conditions.			X	The term 'safety functions' implicitly includes the response of the package to all conditions that may be encountered in the transport operation, in accordance with para. 106 of SSR-6. It is therefore not considered necessary to specify it.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-57	Para 4.11(b) 4.12(a) Footnote 11 (para. 5.8) 8.7	(…) ~~extended~~ storage (…)	Editorial. There is no definition of “extended storage”. Thus, it should be replaced by “storage”.		X To delete 'extended' in paras 4.11(b) and 4.12(a)		The proposal is considered acceptable for paras 4.11(b) and 4.12(a) because they are included within a section that refers to 'Packagings intended to be used for shipment after storage', the concept of which implicitly includes the idea of prolonged storage (although not defined in SSR-6). However, the proposal is not acceptable for Footnote 11 (para. 5.8) and para 8.7, where the term 'extended' is used in a general approach, in order to emphasise that the provision is referring to a prolonged storage.
TRANSSC	USA	US-30	Para 4.12(a)	In the second sentence change “with” to “within”.	The metal gasket must maintain its leak rate <u>within</u> the design limits.	X			
TRANSSC	WNTI	WNTI-58	Para 4.12(a)	~~The containment function of the package during storage needs to be maintained.~~ The metal gasket should be demonstrated (through testing and analysis) to be able to maintain its leak rate with the design limits over an extended storage period. The deterioration of the leaktightness during storage should be monitored, for example by inter-lid pressure monitoring for double-lid systems. Corrective actions should be taken in the case of leakage.	The first sentence should be deleted since the proof of suitability for storage is provided separately from the transport approval. The tightness requirements during storage and transportation may differ or different barriers may be effective.			X	The first sentence indicates in general terms that the containment function of the package must be maintained during storage, which is true, irrespective of whether the cointainment reference criterion is defined by the transport or storage requirements.
TRANSSC	WNTI	WNTI-59	Para 4.12(b)	For fuel baskets, the ageing effects of an elevated temperature environment for long term storage should be considered. ~~For example, age-hardening aluminium alloy with a higher mechanical strength is used as the basket material; however, this alloy can eventually lose its enhanced strength in an elevated temperature environment.~~	The last sentence should be deleted since there is no additional value for the reader.			X	As the document is a guide, the inclusion of specific examples may be helpful to its users.
TRANSSC	Japan	JPN-06	Para 4.13	The following paragraph should be added after the section 4.12. 4.13 Specifically, if the following points are confirmed, it can be judged that no abnormal change in the condition of spent fuel occurs: (a) Moisture is removed and inert gas is filled in a way that satisfies the design condition during preparation of the DPC packages in the power plant. (b) DPC packages pass the inspection of contents for transportation from the power plant to the storage facility, and there are no abnormal external forces added during transportation. (c) There have been no incidents that may damage the integrity of the spent fuel during storage. (d) The inert atmosphere of the DPC has been maintained during storage. Consequently, when the DPC packages are shipped from the storage facilities, especially if there is no fuel reloading equipment, the inspection of the contents during the pre-shipment inspection can be substituted by the documents that confirm the listed items.	As the spent fuel in DPC cannot be visually checked, the supplementary information that has been discussed and published in IAEA-TECDOC-1938 will be beneficial for member states. Ref. IAEA-TECDOC-1938, Methodology for a Safety Case of a Dual Purpose Cask for Storage and Transport of Spent Fuel (2020)		X 6.41bis. Specifically, if the following points are confirmed, it can be judged that no abnormal change in the condition of spent fuel occurs [9]: (a) Moisture is removed and inert gas is filled in a way that satisfies the design condition during preparation of the dual purpose cask packages in the power plant. (b) Dual purpose cask packages pass the inspection of contents for transportation from the power plant to the storage facility, and there are no abnormal external forces added during transportation. (c) There have been no incidents that may damage the integrity of the spent fuel during storage. (d) The inert atmosphere of the dual purpose cask has been maintained during storage. Consequently, when the dual purpose cask packages are shipped from the storage facilities, especially if there is no fuel reloading equipment,		The proposal is considered adequate, however paragraphs 4.11-4.12 follow a general approach to ageing management for the case of 'Packagings intended to be used for shipment after storage'. Therefore, as the proposal specifically concerns the 'Pre-shipment inspection of package intended for shipment after storage', which is considered in detail in paras 6.41-6.43, it is considered that the proposed text may be included as a new para. 6.41bis. Furthermore, in this new paragraph, reference should be made to reference [9], which in the guide is: IAEA-TECDOC-1938, Methodology for a Safety Case of a Dual Purpose Cask for Storage and Transport of Spent Fuel (2020)

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							the inspection of the contents during the pre-shipment inspection can be substituted by the documents that confirm the listed items.		
TRANSSC	USA	US-20	Para 4.2	Consider augmenting the words in the second sentence of this paragraph to include the underlined text: “The ageing effects on packaging and radioactive contents should…”	This is for improved language accuracy since this paragraph addresses consideration of aging effects for both packaging and radioactive contents.	X			
TRANSSC	USA	US-21	Para 4.2 (b)	Consider augmenting the first sentence to include the underlined words: “Identification of potential ageing mechanisms that are relevant to the package design, taking into account the environmental and loading conditions during the service life of the package:".	This is to ensure more clear and consistent wording for this item.	X			
TRANSSC	USA	US-22	Para 4.2 (b)	Change “be then” to “then be”	Editorial.	X			
TRANSSC	WNTI	WNTI-41	Para 4.2 (b) "4.1(b)"	b) (…) The components to be considered and their materials should be listed (see paras 3.7-3.8). The potential ageing mechanisms, based on the conditions during the service life, should be then listed. Then the ~~materials~~ **components** that may be subject to ageing effects together with the ageing mechanisms involved should be identified and tabulated. (…). .	Clarification. The components, not the material, are subject to ageing effects in the current context, as ageing depends of the conditions during the service life. This is well established in the first sentence.	X			
TRANSSC	WNTI	WNTI-42	Para 4.2 (c)	The materials and ageing mechanisms identified in (b) should be evaluated. If such effects have the potential to adversely affect the safety functions of the package (i.e. as assumed in the package design), preventive measures should be incorporated in the design and/or in operation. **Another option is the use of reasoned argument to demonstrate that ageing effects may be minor and certain levels of safety are not undercut during the service life.** Appendix I includes typical methods to evaluate ageing effects and measures considered in the design of packages to prevent adverse effects due to ageing.	It is currently missing that reasoned argument can be used to allow these ageing effects during the estimated service life of the package when the effects are minor and certain levels of safety are not undercut.			X	It is considered that what is proposed in the comment is already considered in Appendix I, in its section on 'Evaluation of ageing effects'. The last paragraph of 4.2 (c) refers to that Appendix I.
TRANSSC	WNTI	WNTI-43	Para 4.2 (d)	(…) (e.g. maintenance, inspections, monitoring and restrictions on conditions of use) should be stated (~~S~~see Section**s** 5 and 6).	Editorial. Correction of typos.	X			
TRANSSC	Canada	CAD-19	Para 4.4	Change the first sentence: ~~Documentary evidence of the evaluation~~ Considerations of ageing mechanisms, with appropriate justifications, should be included in the package design safety report.”	The proposed text is similar to the wording of SSR-6 para.809(f).		X See resolution of CH-02		See resolution of CH-02. The text proposed to be changed is not existing in original wording of para 4.4.
TRANSSC	Canada	CAD-20	Para 4.4	Delete the last sentence: ~~The quantitative change in material composition or properties or the possibility to initiate material degradation, and the rate of propagation of degradation, if applicable, should be evaluated based on the package design and its operational conditions and service life.~~	The objections to this requirement are similar to those for “service life” in comment CAD-11. Predictions of quantitative changes in composition and properties and rates of degradation are likely to be unrealistic because many variable and unmeasurable factors act on the package during operations.		X The evaluation of ageing should be based on the package design and its operational conditions and service life.		Agree with the comment that for some mechanisms it will be difficult in practice to quantify the effects of ageing. It is considered sufficient to note that the assessment should be based on the specific characteristics of the package design and the expected operating conditions over its service life.
TRANSSC	USA	US-23	Para 4.4	Consider revising the last sentence of this paragraph to more clearly allow for non-quantitative evaluation of potential changes in material composition, material properties, and/or material degradation.	For many credible aging mechanisms, it may not be feasible or practical to really quantify a projected change in material composition or material properties, or the rate of propagation of degradation. Some aging mechanisms like general uniform corrosion and fatigue can be quantified in principle, but many others like pitting, crevice corrosion,		X The evaluation of ageing should be based on the package design and its operational conditions and service life.		Agree with the comment that for some mechanisms it will be difficult in practice to quantify the effects of ageing. It is considered sufficient to note that the assessment should be based on the specific characteristics of the package design and the expected operating conditions over its service life.

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					thermal embrittlement, etc. are heavily governed by stochastic processes & random variables and cannot be reliably quantified or projected for a given package design and service period.				
TRANSSC	Switzerland	CH-02	Para 4.4	The considerations of ageing mechanisms and their effects on the package should be included in the package design safety report [3]. For each combination of packaging component material and ageing mechanism (see para. 4.2(c)), the package designer should evaluate the effects of ageing on the functions of components and the safety functions of the package, and should **define restrictions of environmental conditions and safety criteria of components including relevant inspections to control them. The owner or user of the package should perform the relevant inspections, record, and evaluate the findings.** ~~record the findings in the package design safety report (i.e. in the section on 'AGEING CONSIDERATIONS').~~ The quantitative change in material composition or properties or the possibility to initiate material degradation, and the rate of propagation of degradation, if applicable, should be evaluated based on the package design and its operational conditions and service life.	Usually, the package designer has not got the full information of the environmental conditions and loadings of the package. Therefore, significant parts of the ageing surveillance and evaluation should be done by the owner or user of the package. This may also include the consideration of lower stresses or temperatures in reality because of contents, which do not fully exhaust the licensed content. This also covers the eventuality that the package designer no longer exists, which is an already existing problem for Typ A packages.		X 4.4. The considerations of ageing mechanisms and their effects on the package should be included in the package design safety report (i.e. in the section on 'AGEING CONSIDERATIONS')[3]. For each combination of packaging component material and ageing mechanism (see para. 4.2(c)), the package designer should evaluate the effects of ageing on the functions of components and the safety functions of the package, and should define restrictions of environmental conditions and safety criteria of components including relevant inspections to control them.The quantitive		It is considered important to maintain the indication of the section of the PDSR where the ageing analysis should be included. The reference to the surveillance to be performed by the owner or user of the package is not considered necessary because this is sufficiently addressed in other sections of the document, specifically in paragraphs 6.17-6.43.
TRANSSC	WNTI	WNTI-44	Para 4.5 bis new	**4.5 bis Based on the results obtained from the first step of evaluation (e.g. quantitative changes in material properties, material strength), the consequences on the safety functions of the package due to ageing mechanisms should be assessed by the package designer in the package design safety report (i.e. in the section on 'AGEING CONSIDERATIONS'). If the consequences are negligible (or within an allowable range), no measures to control the ageing mechanism need to be taken.**	This text is copied from Appendix I, para. I.5. The last sentence is fundamental for the entire ageing management and, thus, should be implemented as a new para. 4.5bis in the text of the guide, and not only in the appendix			X	It is considered that part of the proposal in the comment is already covered by paragraph 4.4. In addition, it is not considered necessary to repeat exactly what is already said in Appendix I, to which reference is made in paragraph 4.5.
TRANSSC	USA	US-24	Para 4.7	In the second sentence, where it states "…based on the information included in those sections…", revise to identify the specific sections and document to which these words refer.	Improve clarity.		X ... An ageing management programme might also be defined for a package containing radioactive material other than spent nuclear fuel based on the information included in Refs [9, 13] and in Appendix I and Appendix II.		The sections are from references [9, 13]. The error is corrected by referring directly to those references.
TRANSSC	Canada	CAD-21	Para 4.9	A wide range of packagings ~~is~~ are designed to be used for a single transport	Editorial	X			
TRANSSC	Canada	CAD-22	Para 4.9	For packagings stored for a prolonged period of time (typically more than a year) before transport…	More than one year is suggested as the time period defining a prolonged period of time since most maintenance schedules are on an annual basis. Should "prolonged period of time" be defined? Or is it purposely left open?	X			
WASSC	Czech Republic	CZ-04	Para 5 Section	The chapter (and the whole document) does not consider the expected lifetime of the package (especially for packages designed for long-term storage) and the need to perform additional maintenance once this period is extended.				X	This issue is addressed several times throughout the document and specifically in paragraph 3.2.

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NUSSC	United Arab Emirates	UAE-12	Para 5 Section	5.9 An appropriate waste management programme should be implemented for waste arising from maintenance operations in accordance with the national waste management routes.	An article should be added for waste management. Indeed, maintenance of transport casks will produce radioactive and non-radioactive waste. This waste shall be safely managed according to the national waste programme.			X	The management of radioactive waste arising from maintenance operations on the packaging, if any (most package designs would not generate this type of waste). is outside the scope of the requirements specifically related to transport. This is a topic that falls within the general scope of radioactive waste management at the facilities using the packagings.
TRANSSC	WNTI	WNTI-64	Para 5.11	During the service life of the packaging, the owner and user should maintain sufficient records to demonstrate that the requirements ~~of the Transport Regulations~~ **set by the maintenance guidance** have been met. (…).	Demonstration of compliance with the Transport Regulations is demonstrated in the Package Design Safety Report. The records which are established during the service life of the packaging demonstrates compliance with the maintenance requirements and subsequently with the design as specified in the Package Design Safety Report.		X 5.11. During the service life of the packaging, the owner and user should maintain sufficient records on the maintenance to demonstrate that the requirements of the package design safety report and Transport Regulations have been met.		In view of the comment, it is considered necessary to clarify the wording of the paragraph, but retaining the reference that maintenance records should confirm compliance with the requirements of the PDSR and the Transport Regulations. It is considered inappropriate to refer to compliance with the requirements set by the 'maintenance guide'.
TRANSSC	WNTI	WNTI-65	Para 5.12	Corrective maintenance on packaging could lead to modifications of safety relevant components. These modifications could affect the safety analyses of the package design and/or its operating instructions. A package with such modifications might not be covered by the original package design safety report; therefore, potential design modifications should be analysed by the package designer to verify that the design will continue to comply with the Transport Regulations. **If the result of the verification is that the modifications are not covered by the original package design safety report, an application for revision of the approval of the package design should be considered.**	Clarification	X			
TRANSSC	Canada	CAD-32	Para 5.13	Delete the entire requirement.	It is not apparent how a modification would use original spare parts and materials. Wouldn't the use of a spare part be a simple replacement? Use of original materials sounds like a repair. In the second sentence it is not apparent what the distinction between a change and modification would be.		X 5.13. Where possible, maintenance should be performed using original spare parts and materials. If original components are not available, the use of other components should be analysed as a potential modification of the package design.		In view of the comment, it is considered that para 5.13 needs to be clarified in its wording. A redrafting is made.
TRANSSC	Switzerland	CH-05	Para 5.14	The process of analysing potential design modifications following corrective maintenance should be adequately documented [21]. The owner and user of the packaging should keep records of the modifications made, including the analyses performed. This documentation should be controlled and maintained in accordance with the management system and be made available to the competent authority on request.	According to the list of references, the reference [21] is available in Spanish language. It might be useful to have this reference in an English translation.			X	The English version of this document was not yet available at the stage of preparation of the draft guidance. In any case, the present IAEA procedures accept references to documents in languages other than English.
TRANSSC	Canada	CAD-33	Para 5.15	Change the second sentence: "In this case, the inspection results should be recorded and may be used as reference for periodic maintenance."	In Canadian industry experience, pre- or post-shipment inspection results would only be used a reference for periodic maintenance if unusual or adverse conditions were found.	X			
TRANSSC	USA	US-34	Para 5.16	The components to be inspected may include the cavity, basket, O-rings and gaskets, seals, nuts and bolts, fasteners and their locking devices, padlocks or other securing devices, trunnions, lifting lugs, shock absorbers, welding seams, paintwork, and labels [21].	If shock absorbers have a specific safety function, they should be included here.	X			

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	USA	US-35	Para 5.16	Consider augmenting this sentence by adding underlined text as follows: "The components to be inspected may include the packaging exterior surface, the cavity, basket, O-rings and gaskets, seals…"	It is important that the scope of inspection also include the packaging exterior surface since this may well be the most susceptible to aging due to direct exposure to the outdoor air environment.	X			
TRANSSC	WNTI	WNTI-66	Para 5.16	~~5.16. The components to be inspected may include the cavity, basket, O-rings and gaskets, seals, nuts and bolts, fasteners and their locking devices, padlocks or other securing devices, trunnions, lifting lugs, welding seams, paintwork, and labels [21].~~	This list does not add significant value to the reader.			X	The paragraph gives some examples of common components that are relevant to the safety of the package and should therefore be considered in maintenance inspections.
TRANSSC	WNTI	WNTI-67	Para 5.16	The components to be inspected may include the cavity, basket, O-rings and gaskets, seals, nuts and bolts, fasteners and their locking devices, padlocks or other securing devices, trunnions, lifting lugs, welding seams, paintwork, and ~~labels~~ **permanent markings** [21].	This comment should only be considered if above comment WNTI-66 is not accepted. Clarification. Labels are specific to each shipment. The permanent markings should be inspected to confirm that they still comply with the requirements (see also para. 5.23(b)).	X			
NUSSC	Iran	IR-04	Para 5.16 new	In the case of the delivery of a package by the owner or user of the package to another user, its maintenance records should also be delivered to the new user or owner.	Some package users complain about not knowing the previous maintenance records of the packages.			X	This point has been dealt with in appendix III, exactly III.12 to III.14. The user of the packaging should be responsible for ensuring that the packaging is in a serviceable condition prior to shipment. When the user of the packaging is not the owner of the packaging and the owner is responsible for the implementation of the maintenance programme, the user should request from the owner of the packaging all relevant records from the ageing management and maintenance programmes.
TRANSSC	Pakistan	PK-03	Para 5.16/3	……lifting lugs, welding seams, **coating**, paintwork, and labels.	Coating is normally used and not paint on metallic elements.	X			
NUSSC	Iran	IR-05	Para 5.17 new	5.17. The components to be inspected may include the cavity, basket, O-rings and gaskets, seals, nuts and bolts, fasteners and their locking devices, padlocks or other securing devices, trunnions, lifting lugs, valves, welding seams, paintwork, and labels [21].	Inspection of the valve condition and control of closing based on the manufacturing standards is mandatory.		X The paragraph to be amended to introduce "valves" is 5.16. There is no need to introduce an additional paragraph.		The paragraph to be amended to introduce "valves" is 5.16. There is no need to introduce an additional paragraph.
TRANSSC	USA	US-33	Para 5.17-5.20	Move section (Maintenance Considerations in Transport Package Design) to after paragraph 5.8.	Enhance clarity to have the section "Maintenance Considerations in Transport Package Design" come prior to the section "Maintenance Activities on Transport Packages."	X			
TRANSSC	USA	US-36	Para 5.19	In the second to last sentence, consider changing "usually" to "often".	Recommended to improve accuracy.	X			
TRANSSC	Canada	CAD-27	Para 5.2	Delete the 2nd sentence: ~~"It should be indicated on the packagings when maintenance was previously undertaken or (preferably) when the next maintenance is due."~~ Change the third sentence to: "~~The aim of this, in conjunction with appropriate maintenance records, should be~~ Appropriate maintenance records shall be kept to demonstrate that the packaging continues to comply with the Transport Regulations."	The requirement for maintenance-related markings is unnecessary if appropriate maintenance records are kept. The indicating of maintenance and maintenance due on the physical packagings can lead to problems - Tags/labels can fall off or go missing. It is also undesirable to introduce a marking requirement in addition to those already specified in paragraphs 531-537 of SSR-6.			X	This is a recommendation, which is followed in many cases in practice and is valuable information for the competent authorities when carrying out inspections of packages during transport operations.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-60	Para 5.2	Maintenance of packaging should be performed before and/or after each shipment or at planned intervals. ~~It should be indicated on the packagings when maintenance was previously undertaken or (preferably) when the next maintenance is due.~~ The aim of this, in conjunction with appropriate maintenance records, should be to demonstrate that the packaging continues to comply with the Transport Regulations.	It is not a general practice to indicate on the packagings the dates of the maintenance operations.			X	This is a recommendation, which is followed in many cases in practice and is valuable information for the competent authorities when carrying out inspections of packages during transport operations.
NUSSC	Iran	IR-06	Para 5.23	(f) The condition and operation of closures, valves, ventilation patches and devices;	It is very important to inspect the valves and the number of threads on the package according to the relevant standards.	X			
TRANSSC	Japan	JPN-08	Para 5.23 (e)	Wooden parts for drying, shrinkage, crushing if applicable, or cracks, dents, damages on the casing of shock absorbers;	As wood of shock absorbers is sealed by metallic casing generally and only the casing surface can be observed.		X See resolution of WNTI-68		See resolution of WNTI-68
TRANSSC	USA	US-37	Para 5.23(e)	Comment: For shock absorbers the wood is usually contained in a stainless steel casing and not visually inspectable.	Explained in comment		X See resolution of WNTI-68		See resolution of WNTI-68
TRANSSC	WNTI	WNTI-68	Para 5.23(e)	Wooden parts for drying, shrinkage, crushing **when possible, or cracks and damages on the casing of shock absorbers;**	As wood in shock absorbers is sealed by metallic casing generally, only the casing surface can be observed.	X			
TRANSSC	WNTI	WNTI-69	Para 5.23(i)	~~t~~The condition and operation of other parts or components, as necessary.	Typo.	X			
TRANSSC	Pakistan	PK-04	Para 5.24/2	Examinations of welds (e.g. on seams of lifting lugs) may be conducted as per manufacturer's requirements.	NDT techniques may be defined by the manufacturer for in service examination, as some of the welds are inaccessible or some NDT may not be performed on the welds.		X 5.24. Examinations of welds (e.g. on seams of lifting lugs) may be conducted by non-destructive testing according to the information given by the designer in the maintenance instructions		Maintenance information will come from the designer through the PDSR not from the manufacturer.
NUSSC	Iran	IR-07	Para 5.25	5.25. Components important to criticality safety, such as neutron absorption materials, should be inspected for deformation or displacement. Considering that neutron absorption materials lose their properties over time, it is necessary to specify the time and periods of replacement of these materials in the maintenance instructions by the designer.	Neutron absorption materials lose their properties over time.			X	This recommendation is not only applicable to the particular case of these components and is addressed in a general manner throughout the maintenance sections of the document.
TRANSSC	WNTI	WNTI-70	Para 5.25	Components important to criticality safety, such as neutron absorption materials, should be inspected for deformation or displacement**, if the geometry of those components is relied on for criticality safety**.	Clarification. It is needed to be more specific.	X			
NUSSC	Iran	IR-08	Para 5.26	5.26. Trunnions and lifting lugs should be visually inspected prior to each shipment for permanent deformation, galling, or cracking.	In addition to inspecting welding condition of lifting lugs, all their conditions should be visually inspected.	X			See in combination with WNTI-72
TRANSSC	Canada	CAD-34	Para 5.26	"…and all components ~~shell~~ shall be checked…"	Editorial.	X			See in combination with WNTI-72
TRANSSC	USA	US-38	Para 5.26	In the second to last sentence, change "shell" to "shall".	Fix typo.	X			See in combination with WNTI-72
TRANSSC	WNTI	WNTI-71	Para 5.26	Trunnions should be visually inspected prior to each shipment for permanent deformation, galling, or cracking. (…).	"galling" is not a common word and might be difficult to understand for those who English is not the mother tongue. It is suggested to use another word. No proposal is made, and the Secretariat should propose such a more appropriate word.			X	Is is considered to keep the term 'galling' in the draft for comments from Member States (STEP 8) and resolve it in next step in the process of the development of the guide.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-72	Para 5.26	Trunnions should be visually inspected prior to each shipment for permanent deformation, galling, or cracking. Inspection results should be recorded and evaluated against established acceptance criteria. Trunnions should also be subjected to periodic tests. ~~After loading with test load during a certain time, c~~**C**ritical areas, including basic bearing welded joints, ~~are~~ **should be** subject to inspection for defects~~, and~~ **When a loading test is performed, these inspections should be carried out after loading during a certain time and** all components ~~shell~~ **should** be checked for residual deformation. (…).	Clarification. It is necessary to consider the case when a loading test is not performed	X			
TRANSSC	WNTI	WNTI-73	Para 5.27	For some **transport** package designs **requiring competent authority approval**, such as ~~spent fuel casks~~ **packagings intended for repeated use**, the cask body should be subject to periodic pressure test. The test media may be gas or liquid. The pressure should be slowly increased and maintained at a fixed value for specific time in accordance with the design requirements.	(i) In line with the graded approach, the periodic pressure test should apply only to competent authority approved packages. Although a graded approach, commensurate with the type of package, is stated in para. 1.8, it is difficult (and even impossible) to determine if the guidance would apply to a given type of package as for any other type of package. Additional guidance is needed regarding the implementation of the graded approach when applied to the type of package. (ii) It is not clear why spent fuel casks are especially mentioned here. It depends on the assessment of a package design to foresee such test. It seems more useful for packages intended for repeated use, in general. It should be also noted that a pressure test might be difficult to be performed on a spent fuel cask, due to residual internal contamination.		X 5.27. For some package designs, normaly intended for repeated use and requiring competent authority approval, the cask body should be subject to periodic pressure test. The test media may be gas or liquid. The pressure should be slowly increased and maintained at a fixed value for specific time in accordance with the design requirements.		Considering the general scope of the guidance it is not considered appropriate to specify the provision on packages subject to approval, although this will usually be the case. On the other hand, there may be package designs not subject to approval where such periodic test may be necessary. Additionally, the word 'transport' was not entered, to keep the style of paras 5.27-5.29.
TRANSSC	USA	US-39	Para 5.28	Replace “leakage test” with “leaktightness test”.	For consistency of terms since the rest of the document uses “leaktightness”	X			
NUSSC	Iran	IR-09	Para 5.28 new	Spent fuel casks should be pressure tested when they are empty and without the presence of fuel. Design requirements should be available and defined in instructions for use and maintenance, and also set out in the package design safety report [3].	Emphasis on this sentence can provide safety for operators with little experience. For packages without package design safety report design requirements should be available and defined in instructions for use and maintenance.			X	It is considered that this point is covered by para 5.27. All packages should have a PDSR (SSG-66)
TRANSSC	WNTI	WNTI-74	Para 5.28 REFERENCES	For some package designs, a leakage tests should be conducted periodically and/or after seal parts replacement, prior to loading and after loading of the content. Gas leakage is monitored by several methods, helium leakage test can give more high sensitivity. **Additional information is available in Ref. [NN].** REFERENCES **[NN] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, Safe Transport of Radioactive Material — Leakage Testing on Packages, ISO 12807:2018, ISO, Geneva (2018)**	Clarification. To provide additional useful information.	X			

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	Japan	JPN-09	Para 5.29	For some package designs, a thermal performance tests should be conducted, if applicable, during periodic maintenance used to verify the heat transfer capability over the service life of the packaging. ~~Thermal performance can be evaluated by using the temperature measurement data obtained during transport.~~ It may be conducted by using simulated heating sources, such as electrical heating devices after manufacturing the packaging. Test should be performed in a homogeneous and stable thermal environment, allowing enough time to establish a constant temperature. Thermal performance may ~~can~~ be alternatively evaluated by using the temperature measurement data obtained during transport or storage.	Once the packaging is used, the packaging may be contaminated and it is difficult to conduct the tests by using simulated heating sources. Therefore, alternative evaluation may be made for DPC. The 2nd sentence should be moved to the end of the para. for clarification.		X See resolution of WNTI-75		See resolution of WNTI-75
TRANSSC	WNTI	WNTI-75	Para 5.29	For some package designs, a thermal performance tests should be conducted, if applicable, during periodic maintenance used to verify the heat transfer capability over the service life of the packaging. Thermal performance can be evaluated by using the temperature measurement data obtained during transport. ~~It may be conducted by using simulated heating sources, such as electrical heating devices~~ Test should be performed in a homogeneous and stable thermal environment, allowing enough time to establish a constant temperature.	Once the packaging is used, the packaging may be contaminated, and it is difficult to conduct the tests by using simulated heating sources. Such tests can be done only prior to the first shipment.		X … If possible, It may be conducted by using simulated heating sources, such as electrical heating devices, a system commonly used in thermal tests prior to the first shipment.....		Although the above method is certainly common for thermal tests performed before the first shipment, it may be an option for periodic maintenance whenever possible.
TRANSSC	Canada	CAD-28	Para 5.3	Consignors should plan to complete any transport operations prior to the next maintenance period so that each packaging will be available for maintenance on schedule.	Wording changed for clarity.		5.3.Consignors should plan transport operations in order to ensure that each packaging will be available for maintenance on schedule.		Wording modified in connection with US-32
TRANSSC	USA	US-32	Para 5.3	This states: “Consignors should plan to complete any transport operations prior to the next maintenance period.” Consider expounding further on this recommendation sinch the technical basis for this is not clear.	Improve technical clarity as this wording implies consignor should rush shipment prior to next maintenance.		See resolution of CAD-28		Although no specific text is proposed in the comment, it is understood that there may be a lack of clarity in para 5.3. Alternative text is proposed in order to resolve this, in connection with CAD-28.
TRANSSC	Japan	JPN-10	Para 5.30	Shielding performance tests should include tests for neutron and gamma radiation shielding, as applicable. Shielding performance can be evaluated by using the dose rate measurement data obtained during transport or storage, or the test may be conducted during periodic maintenance.	These tests can be done during transport as well as during storage for DPC. So, storage should be added for clarification.	X			
TRANSSC	Canada	CAD-29	Para 5.4	Planned (periodic) maintenance ~~includes~~ may include the following approaches:	The current text could be interpreted as requiring all of the approaches to be included in a maintenance programme.		See resolution of WNTI-61		See resolution of WNTI-61
TRANSSC	WNTI	WNTI-61	Para 5.4	**Typically, p**~~P~~Planned (periodic) maintenance **might** include~~s~~ the following:	Different periods and inspection scopes might be specified for the storage period, depending on the specific storage conditions. It is not always necessary to define maintenance operations for each of the mentioned steps.	X			
TRANSSC	Japan	JPN-07	Para 5.7	A non-compliant package cannot be transported to another location if it is not in compliance with the Transport Regulations.	Editorial	X			
TRANSSC	WNTI	WNTI-62	Para 5.7	A non-compliant package cannot be transported to another location if is not in compliance with the Transport Regulations**, except under special arrangement**. In addition, depending on the degree of non-compliance, it might not be advisable to even move the package at all until it has been repaired.	The general statement that “transports are not possible” is too strong, since a special arrangement might be considered.		X A non-compliant package cannot be transported to another location if is not in compliance with the Transport Regulations, except under special arrangement according to para 238 of these Regulations [1]....		It is considered necessary to clarify that those special arrangements are regulated in SSR-6.
TRANSSC	Canada	CAD-30	Para 5.8 footnote 11	“See Appendix ~~III~~ IV…”	Editorial.		X “See Appendix III…”		There is no appendix IV, it is appendix III.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	Canada	CAD-31	Para 5.9	"Maintenance activities should be defined in operating and maintenance instructions ~~for use and maintenance~~, and also set out in the package design safety report [3], which should be made available to all relevant parties."	Wording changed for clarity.	X			
TRANSSC	WNTI	WNTI-63	Para 5.9	Maintenance activities should be defined in instructions for use and maintenance, and also set out in the package design safety report [3]~~,~~ ~~which~~**. Maintenance instructions** should be made available to all relevant parties. These instructions should include all activities relevant to operation, inspection and repair of the packaging.	Demonstration of compliance with the Transport Regulations is demonstrated in the Package Design Safety Report. The records which are established during the service life of the packaging demonstrates compliance with the maintenance requirements and subsequently with the design as specified in the Package Design Safety Report.			X	The owner or user of the package, e.g. as relevant parties, should have access to the full PDSR, not only to the maintenance instructions.
NUSSC	Iran	IR-10	Para 6.1	(a) The components of the package that are subject to a maintenance programme; (b) Type and description of maintenance operations including inspection methods and tools; (c) The frequency of maintenance operations; (d) The personnel who will perform maintenance operations. (e) The tests and required inspections instructions of the package	Testing and inspection instructions should be provided along with maintenance and repair instructions.			X	The tests and required inspections instructions are included in (b): description of maintenance operations including inspection methods and tools
TRANSSC	Canada	CAD-35	Para 6.1	Replace the first sentence with: "The package design safety report should include a description of the maintenance programme and maintenance instructions provided by the package designer."	Wording changed for clarity.		X 6.1. The package design safety report [3] should include a description of the maintenance programme for transport packages as part of the maintenance instructions provided by the package designer. ...		The maintenance instructions are addressed in the guide with a more general view than the maintenance programme, which would be part of them.
TRANSSC	WNTI	WNTI-76	Para 6.1	(…). The maintenance programme should address the following elements: (a) (…); (b) Type and description of maintenance operations including inspection methods and tools **and also reasoned argument for spot check**s; (c) (…); (d) (…).	The consideration of spot checks should be implemented as an option for maintenance operations.	X			
TRANSSC	USA	US-40	Para 6.1(d)	The qualifications for personnel who will perform maintenance operations and quality control checks.	Provide additional clarity that the maintenance program should include the qualifications required for personnel performing the maintenance. Expanding scope to include personnel responsible for quality control creates alignment with paragraph 6.7(g).	X			
TRANSSC	WNTI	WNTI-85	Para 6.10 (b)	The individual packaging records should contain the following information, as appropriate: (a) Package design reference and unique serial number; ~~(b) A list of safety relevant components;~~ (c) A list of applicable references to the operating quality plans; (…).	The "list of safety relevant components" is not needed in the individual packaging record. It is only needed in the maintenance programme	X			
TRANSSC	USA	US-43	Para 6.10 (e)	This states "Records of inspections and tests performed before first use" Delete the words "before first use".	Individual packaging records should contain records of all required inspections and tests performed, not just the ones performed before first use.			X	The records of all inspections and tests performed on the package would be cover by 6.10.(f) . Bullet (e) is intended to highlight the importance that inspections before the first use of the packaging may have on some designs.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-86	Para 6.12	~~6.12. The maintenance programme should establish procedures for the management of tools, equipment and spare parts used for maintenance, and appropriate records to be kept.~~	The management of tools does not need to be included in the maintenance programme. It should be sufficiently covered by the management system. Calibration is already covered in para. 6.8.		X 6.12. The maintenance programme, accordingly with the management system, may establish procedures for the management of tools, equipment and spare parts used for maintenance, and appropriate records to be kept.		Regardless of whether the management system defines these points in a general way, it may be advisable for the maintenance programme to specify them in a compiled form.
TRANSSC	USA	US-44	Para 6.14	Add the word “documentation” as follows: “…the programme documentation should be revised and approved accordingly…”	Improve accuracy and clarity of text since its maintenance program documentation that would need to be re-issued to cognizant personnel.	X			
TRANSSC	Switzerland	CH-06	Para 6.17	For packages intended for repeated use or intended to be used for shipment after storage, ageing effects ~~relevant to the safety of~~ **identified for** the package **design** should be monitored by periodic inspection and pre-shipment inspection.	The monitoring should be necessary only for proven ageing effects.			X	It is considered important to maintain that the primary objective of inspections is to detect safety-relevant ageing effects, not others.
TRANSSC	USA	US-45	Para 6.17 and 6.18	Comment: Recommend separating the packages intended for repeated use from the packaged for transportation after storage as the requirements for these are different but this version, and the previous version of DS546, have confused the requirements for these packages.	Explained in comment.			X	In fact this section clearly separates the two packages (repeated use and shipment after storage), as noted below. Paragraphs 6.17 and 6.18 act as an introduction to the section.
WASSC	Bangladesh	BD-01	Para 6.2 (b)	(Line 1, Page 23) In new text example of ‘periodic intervals’ may be included	To have an idea regarding minimum time frame for maintenance activities.			X	It is not possible to give a recommendation on the periodicity of inspections, as these may depend to a large extent on the package designs and environmental conditions of the storage facility. Such periodicity should be defined by the storage facility based on the information in the package design.
TRANSSC	USA	US-46	Para 6.20	Delete paragraph.	It is duplicative to the information already contained in paragraph 6.17.			X	Paragraph 6.20 acts as an introduction to the following paragraphs affecting repeated-use packages
TRANSSC	WNTI	WNTI-87	Para 6.21	This inspection should verify that the package is prepared in compliance with the applicable requirements of the Transport Regulations. The pre-shipment inspection should be performed by the consignor of the packag~~ing~~**e** (or by another organization on behalf of the consignor).	Typo.	X			
TRANSSC	WNTI	WNTI-88	Para 6.22	6.22. The pre-shipment inspection should be defined in the package design safety report (i.e. the sections dealing with ‘PACKAGE OPERATIONS’ or ‘MAINTENANCE’, as applicable). The pre-shipment inspection results should be retained by the consignor of the package (with copies provided to other responsible parties, as appropriate) in accordance with its management system. ~~The results should be made available to other parties, as necessary.~~ These records should be used as part of the evaluation of ageing effects.	The sentence that it is proposed to be deleted is redundant with the text between brackets in the sentence just before.	X			
WASSC	Bangladesh	BD-02	Para 6.23 (a)	(Line 2, page 27) In new text for visual inspection ‘deformation’ of package be included	For visual inspection deformation of package may be included as an example.	X			
TRANSSC	WNTI	WNTI-89	Para 6.23 (d)	~~Checks for subcriticality: For spent fuel packages, ageing effects on the basket structure (deformation, occurrence of a crack, corrosion, peeling off of neutron absorber) can be detected through a visual check before loading of the radioactive contents.~~	It seems difficult to reach such objectives by a visual inspection to be performed on a spent fuel cask before loading.		X (d) Checks for subcriticality: For fresh fuel packages, ageing effects on the components to remain the subcriticality (deformation, occurrence of a crack, corrosion, peeling off of neutron absorber) can be detected through a visual check before loading of the radioactive contents.		Agree with the comment. Visual inspection of the basket does not make practical sense in the case of spent fuel packages. However, in order to keep the example of inspection related to subcriticality, it can be focused on the case of packages for fresh fuel, where such visual inspections are possible and indeed common.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
NUSSC	Iran	IR-12	Para 6.23 (g) new	internal pressure Ensuring no internal pressure above atmospheric for hexafluoride transport cylinders	According to Paragraph 420 C of the Transport Regulation (SSR-6)			X	The list of possible inspections is not intended to be exhaustive. It considers the most common inspections for many package designs. It is not considered necessary to focus on the specific case of UF6 cylinders.
TRANSSC	WNTI	WNTI-90	Para 6.25 (d)	Checks for subcriticality: For spent fuel packages, ageing effects on the basket structure can be detected by dimensional measurements **or through gauges**. The neutron absorber depletion can be calculated based on the records of transport operations, and the general condition of neutron absorbers may be monitored by visual inspection;	"Gauges" can be sufficient to confirm that the adequate dimensions and structures of baskets are maintained.		X d) Checks for subcriticality for spent fuel packages, to detect ageing effects on the basket structure by dimensional measurements or calibre test (through gauges) and inspections for cracks and other defects.		See resolution of JPN-12, US-48 The proposal indicates in error para 6.25(d). It is understood to refer to 6.26(d).
TRANSSC	Japan	JPN-12	Para 6.25 (d)	Checks for subcriticality: For spent fuel packages, ageing effects on the basket structure can be detected by dimensional measurements or calibre test (through gauges). The neutron absorber depletion can be calculated based on the records of transport operations, and the general condition of neutron absorbers may be monitored by visual inspection;	"calibre test (through gauge)" can be used to confirm that the adequate dimensions and structures of baskets are maintained.		X d) Checks for subcriticality for spent fuel packages, to detect ageing effects on the basket structure by dimensional measurements or calibre test (through gauges) and inspections for cracks and other defects.		See resolution of US-48, WNTI-90 The proposal indicates in error para 6.25(d). It is understood to refer to 6.26(d).
TRANSSC	WNTI	WNTI-91	Para 6.26	6.26. **For transport packages requiring competent authority approval of the design, p**Periodic inspections for detecting ageing effects may include the following: (a) Visual inspection:, tTo detect ageing effects on accessible packaging component surfaces (e.g. corrosion, coating defects). ~~Defects found should be repaired in accordance with the maintenance programme.~~ (b) Non-destructive testing:, Tto detect the existence, initiation and/or propagation of cracks in packaging components, or a reduction in the thickness of components due to ageing. ~~The consequences of such defects on the safety of the package should be evaluated, and if needed, the defects should be repaired in accordance with the maintenance programme.~~ (c) Leaktightness checks:, Wwhere appropriate, to detect ageing effects on the lid seals and O-rings. ~~Seals and O-rings should be replaced, if necessary. These may also be replaced after a given number of transport operations (i.e. preventive maintenance), including transport as an empty package, depending on the temperature conditions, to avoid ageing effects on the leaktightness of the package.~~ (d) Checks for subcriticality:; Ffor spent fuel packages, ageing effects on the basket structure can be detected by dimensional measurements. T~~he neutron absorber depletion can be calculated based on the records of transport operations, and the general condition of neutron absorbers may be monitored by visual inspection;~~ (e) ~~Operational checks:~~ Ageing effects can be detected based on the scheduled replacement of movable components such as valves. (f) Lifting attachment inspection ~~(e.g. visual inspection, loading test):~~, ~~Non-destructive testing may~~ **to** be performed on the **lifting** attachments **(e.g. visual inspection, loading test)** when necessary. (g) ~~Thermal performance inspection:~~ Ageing effects on components related to heat dissipation can be detected from the tendency of the temperature measurement inspections for each transport, or by periodic thermal tests.	(i) In line with the graded approach, this list of potential periodic inspection items should apply to competent authority approved packages only. Although a graded approach, commensurate with the type of package, is stated in para. 1.8, it is difficult (and even impossible) to determine if the guidance would apply to a given type of package as for any other type of package. Additional guidance is needed regarding the implementation of the graded approach when applied to the type of package. (ii) Para. 6.26 provides a list of possible items during periodic inspection. But more than that, it already provides information how to deal with observations. This should not be part of this guide since evaluation and results are depending on more factors. An anticipatory assessment should be avoided.		x 6.26. Depending on the package design, periodic inspections for detecting ageing effects may include the following: (a) Visual inspection, to detect ageing effects on accessible packaging component surfaces (e.g. corrosion, coating defects). (b) Non-destructive testing (other than visual testing), to detect the existence, initiation and/or propagation of cracks in packaging components, or a reduction in the thickness of components due to ageing. (c) Leaktightness checks, to detect ageing effects on the lid seals and O-rings, where appropriate. Seals and O-rings should be replaced, if necessary, after a given duration or given number of transport operations (i.e. preventive maintenance), including transport as an empty package, depending on the temperature conditions, to avoid ageing effects on the leaktightness of the package. (d) Checks for subcriticality for spent fuel packages, to detect ageing effects on the basket structure by dimensional measurements or calibre test (through gauges), and inspections for cracks and other		Considering the general scope of the guidance it is not considered appropriate to specify the provision on packages subject to approval, although this will usually be the case. On the other hand, there may be package designs not subject to approval where such periodic test may be necessary. It is considered that in addition to the list of possible inspections, information on possible (not all) actions following observations may also be useful for the user of the guide. See in combination with resolution of CAD-39, CAD-40, WNTI-92, US-47, US-49, US-50

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				(h) ~~Shielding performance inspection:~~ The ageing effects on shielding components can be detected from the tendency of the dose rate inspections for each transport, or direct measurements by using radioactive contents in a periodic test. (i) Pressure test:**, to detect a**~~A~~geing effects on pressure retaining components ~~can be detected.~~			defects The neutron absorber depletion can be calculated based on the records of transport operations, and the general condition of neutron absorbers may be monitored by visual inspection; (e) Operational checks, to detect ageing effects based on the scheduled replacement of movable components such as valves. (f) Lifting attachment inspection (e.g. visual inspection, loading test), non-destructive testing may be performed on the attachments, including weld joints, when necessary. (g) Thermal performance inspection, to detect ageing effects on components related to heat dissipation from the tendency of the temperature measurement inspections for each transport, or by periodic thermal tests. (h) Shielding performance measurement, to detect ageing effects on shielding components from the tendency of the dose rate inspections for each transport, or direct measurements by using radioactive contents in a periodic test. (i) Pressure test, to detect ageing effects on pressure retaining components. (j) Inspection and/or destructive testing of analogues, where it is undesirable or impractical to examine a package component it may be possible to use an analogue (an equivalent or representative component) for periodic inspection and/or non-destructive and/or destructive testing. The condition of the analogue should be representative of the condition of the package component because the analogue should be subjected to the same transport conditions (e.g., impacts, vibrations, and temperature variations) as the package component during shipments. For example, an impact limiter that consists of polyurethane		

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							foam fully enclosed within a steel shell could be represented by a separate component of a similar design, made of the same foam and steel, that is carried on the same conveyance as the package. The representative component could be inspected and tested in place of the actual impact limiter.		
TRANSSC	Canada	CAD-39	Para 6.26	Periodic inspections of competent authority approved packages for detecting ageing effects may include the following:	Cameco, a Canadian company, proposes that this section does not consider the graded approach and should therefore be specific to competent authority approved packages, since none of the items listed pertain to excepted or industrial packages.		X 6.26. Depending on the package design, periodic inspections for detecting ageing effects may include the following:		Some of the inspections listed may apply to packages not subject to approval (depending on their complexity and component materials), therefore it is not considered appropriate to focus only on packages subject to approval. However, it is considered appropriate to introduce a clarification at the beginning of the point
TRANSSC	Canada	CAD-40	Para 6.26	Add: (j) Inspection and/or destructive testing of analogues: Where it is undesirable or impractical to examine a package component it may be possible to use an analogue (an equivalent or representative component) for periodic inspection and/or non-destructive and/or destructive testing. The condition of the analogue should be representative of the condition of the package component because the analogue should be subjected to the same transport conditions (e.g., impacts, vibrations, and temperature variations) as the package component during shipments. For example, an impact limiter that consists of polyurethane foam fully enclosed within a steel shell could be represented by a separate component of a similar design, made of the same foam and steel, that is carried on the same conveyance as the package. The representative component could be inspected and tested in place of the actual impact limiter.	The addition is intended to provide a means of detecting ageing effects in inaccessible components or where destructive sampling of the component would otherwise be required.	X			
TRANSSC	WNTI	WNTI-92	Para 6.26 (c)	Leaktightness checks: Where appropriate, to detect ageing effects on the lid seals and O-rings. Seals and O-rings should be replaced, if necessary~~. These may also be replaced~~ after **a given duration or** a given number of transport operations (i.e. preventive maintenance), including transport as an empty package, depending on the temperature conditions, to avoid ageing effects on the leaktightness of the package.	Clarification	X			
TRANSSC	USA	US-47	Para 6.26(b)	Comment: Visual testing/inspection is a type of NDE. Consider adding examples here such as Ultrasonic testing, eddy current testing, or other examples that better define the guidance here.	Explained in comment.		X (b) Non-destructive testing (other than visual inspection):...		Non-destructive testing (NDT) are well known techniques in the field of engineering and manufacturing of components and systems, so it is not necessary to give examples in order to simplify the content of the document as much as possible. However, to avoid any confusion with regard to the first point, the clarification in brackets is included.
TRANSSC	USA	US-48	Para 6.26(d)	Add the words “and inspections for cracks and other defects” as follows: “For spent fuel packages, ageing effects on the basket structure can be detected by dimensional measurements and inspections for cracks and other defects.”	Comprehensive inspections of the basket structure should look out for these aging effects. In addition to dimensional changes due to creep, significant thermal aging could potentially lead to fractures in basket components.		X d) Checks for subcriticality for spent fuel packages, to detect ageing effects on the basket structure by dimensional measurements or calibre test (through gauges) and inspections for cracks and other defects.		Accepted in combination with WNTI-90 and JPN-12

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TRANSSC	USA	US-49	Para 6.26(f)	Add the words “including weld joints” as follows: “Non-destructive testing may be performed on the attachments, including weld joints, when necessary.”	Lifting attachment inspections should generally include the weld joints since the welds and heat affected zones are generally the areas that are the most susceptible to formation of service-induced flaws.	X			
TRANSSC	USA	US-50	Para 6.26(h)	Replace the word “inspections” with “measurements”.	Shielding performance is addressed through dose rate measurements rather than inspections.	X			
TRANSSC	Japan	JPN-13	Para 6.27	..These inspections should not be limited to the detection of the ageing effects but should also confirm transportability after storage (i.e. conformance to these inspections during storage demonstrates the compliance with the Transport Regulations to ensure that the safety functions of the package have been maintained (i.e. without any adverse ageing effects) and the package is ready for transport).	Editorial One bracket “)” is missing.	X			
TRANSSC	WNTI	WNTI-94	Para 6.27	These inspections should not be limited to the detection of the ageing effects but should also confirm transportability after storage (i.e. conformance to these inspections during storage demonstrates the compliance with the Transport Regulations to ensure that the safety functions of the package have been maintained (i.e. without any adverse ageing effects) and the package is ready**, or can be made ready,** for transport.	For shipment after extended storage it should be possible to refurbish the package and make it ready for transport.			X	By saying that inspections will confirm that the package is ready for transport, it is implicit that in the event that the inspection detects a problem, it must be resolved in order for the package to be transported.
TRANSSC	Switzerland	CH-07	Para 6.27	~~These inspections should not be limited to the detection of the ageing effects but should also confirm transportability after storage (i.e. conformance to these inspections during storage demonstrates the compliance with the Transport Regulations to ensure that the safety functions of the package have been maintained (i.e. without any adverse ageing effects) and the package is ready for transport.~~	Possible inspections for ageing effects are listed in 6.26. It is not clear to which inspections conformance should be demonstrated during storage, e.g. pre-shipment inspection?			X	Inspections during prolonged storage that fall under the concept of 'shipment after storage' (paras 6.27 - 6.43) have particularities compared to those to be carried out on packagings intended for repeated use (paras. 6.20 - 6.26)
TRANSSC	WNTI	WNTI-93	Para 6.27 (a)	6.27. The ageing management programme for packages intended to be used for shipment after storage should be used to determine the associated maintenance programme, and the operating and maintenance instructions, which should include the following: a) Pre-shipment inspection before the first loading**s, and particularly the loading before storage**;	Clarification, to cover those packages that perform several shipments before being used for storage.		X (a) Pre-shipment inspection of package before the first shipment (or first loading) before storage		The proposal is accepted, but the drafting is adapted to the heading covering paragraphs 6.29-6-31.
NUSSC	Iran	IR-13	Para 6.27 (e) new	Inspection after manufacturing of packages should be done before anything else.	There may be a long gap between the time of manufacturing of packages and the first use of packages, so the aging considerations should be considered during this period.			X	This issue affects all types of packaging, not only those used in a shipment after storage and is considered sufficiently in par. 2.2. In any case, the pre-shipment inspection would cover the proposed inspection when transport is carried out with packaging that has been stored for a long time after manufacture before being used.
TRANSSC	USA	US-51	Para 6.27, last paragraph	This sentence needs a lot of work to improve clarity on the scope of the inspections. Recommend using fewer words.	Improve clarity.			X	No specific wording is proposed to address the presumed lack of clarity.
TRANSSC	USA	US-41	Para 6.3	This sentence requires some work to fix grammar and to more clearly state the specific recommendation for the maintenance program.	Improve grammar and clarity of the text.	X			See resolution on WNTI-77
TRANSSC	WNTI	WNTI-77	Para 6.3	6.4 The maintenance programme should include a scope with basic information on the type, model, and other **general** information of the packaging.~~, such as t~~The identification of its safety relevant components to be maintained~~,~~ should **also** be included in this section of the maintenance programme.	Clarification. The current sentence does not seem to be grammatically correct	X			

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TRANSSC	Japan	JPN-14	Para 6.30	The contents of this para. should be consistent to para. 6.21/6.22 and they should be deleted by referring for simplification.	Pre-shipment inspection is same for repeated use packages and DPC.		X 6.29. This pre-shipment inspection should be in accordance with the same provisions as described in paras 6.21 and 6.22. 6.30 (deleted) 6.21. This inspection should verify that the package is prepared as designed and ready for shipment in compliance with the applicable requirements of the Transport Regulations. The pre-shipment inspection should be performed by the consignor of the package (or by another organization on behalf of the consignor).		Paragraphs 6.29 and 6.30 are merged into a single paragraph which refers to paragraphs 6.21 and 6.22. Additionaly, para. 6.21 has been modified to incorporate some of the information included in 6.29 and 6.30, which is considered to be appropriate.
TRANSSC	WNTI	WNTI-95	Para 6.32	6.32. The primary purpose~~s~~ of this inspection ~~are (i)~~ **is** to verify that the package has been transported without being subject to any event that would affect its safety functions ~~and (ii) that it complies with the storage specifications~~. This inspection should **also** provide a record of the initial conditions of the package to be stored. The results should be compared with the results of the pre-shipment inspections.	The second item regarding storage specifications is not part of the transport requirements and should be therefore deleted.			X	There is an obvious interface between transport and storage in this process and it is very difficult to consider one field and the other separately. It is considered more correct to consider the process as a whole.
TRANSSC	WNTI	WNTI-96	Para 6.32	(…). This inspection should provide a record of the initial conditions of the package to be stored. The results should be compared with the results of the pre-shipment inspections **and evaluated**.	An explanation about what to do with the comparison is needed.			X	It is considered that the comparison exercise already implicitly includes an assessment of differences
TRANSSC	Japan	JPN-15	Para 6.33	The receipt inspection at the storage facility should be performed by the operating organization of the storage facility, in liaison with the consignor of the shipment before storage, the packaging owner and the owner of the radioactive contents if necessary.	It's not practical that all inspections are performed in liaison with consignor or packaging owner, and all necessary information should be provided by the transport documents, PDSR and so on. It is same to 6.37.		X See resolution of WNTI-97		See resolution of WNTI-97
TRANSSC	WNTI	WNTI-97	Para 6.33	6.33. The receipt inspection at the storage facility should be performed by the operating organization of the storage facility, ~~in liaison with~~ **based on the information from** the consignor of the shipment before storage, the packaging owner and the owner of the radioactive contents **as appropriate**.	It is not practical that all inspections are performed in liaison with the consignor or the packaging owner. All necessary information should be provided in the transport documents, PDSR, etc. See also below comment WNTI-102 on para. 6.37.	X			
TRANSSC	WNTI	WNTI-98	Para 6.34	6.34. **As the primary purpose of the receipt inspection is to verify that the package has been transported without being subject to any event that would affect its safety functions (see para. 6.32), t**~~T~~he receipt inspection should be ~~included~~ **specified** in the ~~-~~relevant parts of the package design safety report (i.e. the sections dealing with 'PACKAGE OPERATIONS' or 'MAINTENANCE', as applicable).	Clarification			X	It is not considered necessary to repeat the provisions of paragraph 6.32. No added value is seen in substituting specified by included
TRANSSC	WNTI	WNTI-99	Para 6.35	6.35. The receipt inspection results should be retained by the operating organization of the storage facility and the packaging owner and the owner of the radioactive contents, in accordance with regulatory requirements and the management systems. The results should be made available to other relevant interested parties~~, on request~~.	Clarification. For the "other relevant interested parties", it should not be needed to request the results.	X			

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
WASSC	Bangladesh	BD-03	Para 6.36	(Line 2, page 30) In new text example of minimum time frame for 'periodic monitoring' during storage of packages may be included	To have an idea regarding minimum monitoring time frame during storage of packages.			X	It is not possible to give a recommendation on the periodicity of inspections, as these may depend to a large extent on the package designs and environmental conditions of the storage facility. Such periodicity should be defined by the storage facility based on the information in the package design.
TRANSSC	USA	US-52	Para 6.36	Comment: As written, paragraph 6.36 does not make sense. Paragraphs 6.32 to 6.35 describe receipt inspection at the storage facility and do not describe monitoring while in storage. The results of the receipt inspection may be a baseline for parameters that are included in the monitoring program. The description for the monitoring program in SSG-15 which is limited to paragraphs 4.10. 5.21(n) and 6.143 does not contain sufficient information to actually establish a Monitoring program that meets the intent of the guidance. It is unclear why the SSR-4 Requirement 60 Aging management, is also not included in this document. For packages that are subjected to storage prior to transportation, a user should be able to credit the aging management program conducted in storage to verify that the package remains transportable Similarly, SSG-26 paragraphs 613.A.5 and 809.3 could also reference the SSR-4 Requirement 60 on aging management.	Explained in comment.			X	Paragraphs 6.32 - 6.35 refer to inspections performed at reception of the package at the storage facility (if the case). What is indicated is that the monitoring program during storage may already integrate those inspections; in other words, they do not have to be two completely independent processes. See WNTI-100.
TRANSSC	WNTI	WNTI-100	Para 6.36	6.36. ~~Monitoring activities of the package during storage might cover activities described in paras 6.32-6.35.~~ Monitoring during storage may be conducted continuously, or periodically at intervals that are commensurate with the importance to safety. (…).	It is not clear which activities described in paras. 6.32-6.35 might be covered by the monitoring activities during storage.		6.36. Monitoring activities of the package during storage might cover activities described in paras 6.32-6.35 for the receipt inspection of package at the storage facility and it is not neccessary for them to be two completely independent processes.		Paragraphs 6.32 - 6.35 refer to inspections performed at reception of the package at the storage facility (if the case). What is indicated is that the monitoring program during storage may already integrate those inspections; in other words, they do not have to be two completely independent processes.
TRANSSC	WNTI	WNTI-101	Para 6.36	6.36. (…). Monitoring during storage may be conducted continuously, or periodically at intervals that are commensurate with the importance to safety. **Monitoring may be conducted on a representative sample of packages of the same design, stored at the same location or in different locations.** The practicability of monitoring (e.g. in high dose rate areas or areas that are otherwise difficult to access) should also be considered.	It should be noted that casks of the same design might be stored at different locations and the sample size can also be determined across several storage facility sites.		6.36. (…). Monitoring during storage may be conducted continuously, or periodically at intervals that are commensurate with the importance to safety. On the basis of an appropriate justification, monitoring may be conducted on a representative sample of packages of the same design, stored at the same location. The practicability of monitoring (e.g. in high dose rate areas or areas that are otherwise difficult to access) should also be considered.		The packages, even if of the same design, may be affected differently depending on the different environmental conditions at different locations. Monitoring only a sample of packages of the same design in the same location is acceptable if adequately justified previously.
TRANSSC	Switzerland	CH-08	Para 6.36	Monitoring activities of the package during storage might cover activities described in paras 6.32-6.35. Monitoring during storage may be conducted continuously, or periodically at intervals that are commensurate with the importance to safety. ~~The practicability of monitoring (e.g. in high dose rate areas or areas that are otherwise difficult to access) should also be considered.~~ **The dose rate levels in storage areas should be considered with respect to the periodicity of necessary justifications.**	For storage halls, once they become more than half full, access to all packages becomes progressively more difficult. In such cases a program to periodically inspect representative packages could, with the necessary justifications, be considered.			X	It is considered that the initial wording sufficiently covers the idea that radiation protection evaluations and justifications will be needed to carry out the monitoring on the basis of the dose rates in the storage area.

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WASSC	Czech Republic	CZ-05	Para 6.36-6.43	Was the text compared with requirements on monitoring and inspections for RAW predisposal facilities as published in SSG-40, SSG-41 and SSG-45? These documents are not listed in References.				X	All guides referred to are related to predisposal management of radioactive waste from different practices. They have no application to the provisions in paragraphs 6.36-6.43 related to the interim storage of packages of radioactive material.
TRANSSC	WNTI	WNTI-102	Para 6.37	6.37. The programme of monitoring during storage should be implemented by the operating organization of the storage facility (or by another organization of behalf of the operating organization), ~~in liaison with~~ **based on the information from** the packaging owner and the owner of the radioactive contents **as appropriate**.	It is not practical that all inspections are performed in liaison with the packaging owner and the owner of the radioactive contents. All necessary information should be provided in the transport documents, PDSR, etc. See also above comment WNTI-97 on para. 6.33.	X			
TRANSSC	Japan	JPN-16	Para 6.39	The results of the ~~receipt inspection~~ monitoring should be retained by the operating organization of the storage facility, …	The para. is related to monitoring.			X	The paragraph is indeed referring to an receipt inspection, if such inspection has been carried out. See resolution of comment WNTI-104
TRANSSC	WNTI	WNTI-103	Para 6.39	6.39. The results of the ~~receipt inspection~~ **monitoring activities** should be retained by the operating organization of the storage facility, the packaging owner and the owner of the radioactive contents, in accordance with regulatory requirements and the relevant management systems. The results should be made available to other relevant interested parties.	Correction of typo. Para. 6.39 is related to monitoring activities, not to receipt inspection.			X	The paragraph is indeed referring to a receipt inspection, if such inspection has been carried out. See resolution of comment WNTI-104
TRANSSC	WNTI	WNTI-104	Para 6.39	6.39. ~~The~~ **If** results of ~~the~~ **a** receipt inspection **are available, they** should be retained by the operating organization of the storage facility, the packaging owner ~~and~~ **or** the owner of the radioactive contents, in accordance with regulatory requirements and the relevant management systems. The results should be made available to other relevant interested parties.	When there is no public transport after loading, receipt inspection results are probably not available.		X 6.39. The results of the receipt inspection, if applicable, should be retained by the operating organization of the storage facility, the packaging owner and the owner of the radioactive contents, in accordance with regulatory requirements and the relevant management systems. The results should be made available to other relevant interested parties		The substance of the proposal is agreed. A change is made for a simpler alternative wording. It is considered that both the owner of the packaging and the owner of the radioactive material should maintain this information, as the receipt inspection will affect both the packaging and the contents.
TRANSSC	Canada	CAD-36	Para 6.4	Correct the reference: "The maintenance programme should include a scheme that systematically address the content of para ~~6.2~~ 6.1 (b), (c) and (d) for each component considered in the scope, including a description of planned inspections and the procedures for implementing unplanned inspections, and instructions for the maintenance of the packaging."	It appears the reference should be to para. 6.1, rather than para. 6.2. There is no para. 6.2(d).	X			
TRANSSC	Canada	CAD-37	Para 6.4	Delete the text regarding unplanned inspections: "The maintenance programme should include a scheme that systematically address the content of para 6.1 (b), (c) and (d) for each component considered in the scope, including a description of planned inspections ~~and the procedures for implementing unplanned inspections,~~ and instructions for the maintenance of the packaging."	It is not apparent when and why an unplanned inspection would occur. Per para. 6.2 (a), (b), (c) the maintenance programme will address inspections before and after shipments, periodically, and during times of non-use. Para. 5.6 already addresses unplanned maintenance. What other circumstance or event would prompt an unplanned inspection, and why/how would someone write a procedure for the		X See resolution of WNTI-79		See resolution of WNTI-79

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					implementation of a random inspection?				
TRANSSC	USA	US-42	Para 6.4	This sentence requires some work to improved clarity and fix the citation of Paragraph 6.2 lettered subparagraphs.	Improve clarity of the text.	x			See in combination with the resolution of WNTI-79, US-42, CAD-36 and CAD-37.
TRANSSC	WNTI	WNTI-78	Para 6.4	6.4 The maintenance programme should include a scheme that systematically address the content of paras 6.2 **(a),** (b)~~,~~ **and** (c) ~~and (d)~~ for each component considered in the scope, including a description of planned inspections and the procedures for implementing unplanned inspections, and instructions for the maintenance of the packaging.	Editorial. Correction of typos		X 6.4. The maintenance programme should include a scheme that systematically address the content of para 6.1 (b), (c) and (d) for each component considered in the scope, including a description of planned inspections and the organisational procedures for implementing unplanned inspections, and instructions for the maintenance of the packaging		There is indeed an mistake, but it is different from the one indicated in the proposal. The reference should be to para 6.1. not 6.2. See in combination with the resolution of WNTI-79, US-42, CAD-36 and CAD-37.
TRANSSC	WNTI	WNTI-79	Para 6.4	6.4. The maintenance programme should include a scheme that systematically address the content of para 6.2 (b), (c) and (d) for each component considered in the scope, including a description of planned inspections and the **organisational** procedures for implementing unplanned inspections, and instructions for the maintenance of the packaging.	This paragraph might be misunderstood. In case of unexpected events, a specific maintenance plan has to be evaluated. Such events cannot be covered by procedures in advance. However, organisational procedures should be established to describe the process to deal with such unexpected events.	X See also the resolution of WNTI-78			
NUSSC	Iran	IR-11	Para 6.4 new	Maintenance records should include a short description of maintenance, tests and inspections performed. Important challenges during maintenance should also be described.	A short description of the maintenance, tests and inspections performed and the major challenges can be great help to those new persons to the maintenance department.			X	It is considered that the fundamental idea of the proposal is sufficiently covered throughout the other sections of the guide, in particular in sections 5 and 6.
TRANSSC	WNTI	WNTI-105	Para 6.40	6.40. The programme of monitoring during storage may include the following: (a) Visual inspection**:, T**to detect ageing effects on the accessible packaging component surfaces. ~~Defects found should be repaired in accordance with the maintenance programme. The absence of visual anomalies on the package may also demonstrate that no excessive mechanical loadings or excessive thermal loadings have occurred on the package.~~ (b) Non-destructive testing:, to detect the existence, initiation or propagation of cracks in package component, or reduction in thickness of component due to ageing. ~~The consequences of such defects on the package during storage should be evaluated, and if needed, the defects should be managed in accordance with the maintenance programme.~~ (c) Inter-lid pressure monitoring~~: This monitoring,~~ which is conducted continuously or intermittently, **and may** substitutes the leaktightness inspection of lid seals. ~~The decrease of the inter-lid pressure indicates a degradation of the metallic seal of the primary or the secondary lid. When an abnormal pressure decrease is detected, corrective actions should be taken in accordance with the maintenance programme (e.g. investigation of the leak, replacement of the seal, addition of a ternary lid).~~ If no anomaly is detected, this	Para. 6.40 provides a list of possible inspections during storage. But more than that, it already provides information how to deal with observations. This should not be part of this guide since evaluation and results are depending on more factors. An anticipatory assessment should be avoided.		X The proposal is accepted but taking into account the resolution of WNTI-108, WNTI-106, CH-10 for bullets e) Checks for subcriticality and g) Checks on radioactive contents		The proposal is accepted but taking into account the resolution of WNTI-108, WNTI-106, CH-10 for bullets e) Checks for subcriticality and g) Checks on radioactive contents.

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				demonstrates that the leaktightness of lid seals has been maintained, and consequently the atmosphere of the cavity has been maintained. Pressure transducers or pressure switches are used for monitoring the pressure between the lids or the metal seals. Transducers should be periodically calibrated. (d) Dose rate measurements: ~~The dose rate~~ on the surface of the package or around the package, ~~is~~ **which may be performed** continuously or intermittently ~~measured. Ageing effects on the shielding components can be confirmed based on changes in the dose rate and the radioactive decay of the contents.~~ (e) Checks for subcriticality:, ~~This is~~ **which are** normally undertaken through a combination of visual inspections, inter-lid pressure monitoring and temperature measurements. The absence of an anomaly indicates that any ageing effects on the spent fuel basket structure and the neutron absorber are within the designed range. If there is no evidence of excessive mechanical impact to the package, there should be no change of the packaging configuration, including the fuel basket. If there is no abnormal change of inter-lid pressure, this indicates that the cavity atmosphere (inert, thermal conductivity) is maintained as designed. If there is no abnormal change in package temperature, this indicates that the heat dissipation performance of the package is maintained as designed. Consequently, if the parameters to evaluate ageing effects on the criticality related components are within the designed range, the effects of ageing mechanism on the subcriticality are expected to also be within those expected in the design. (f) Temperature measurement~~, inspection: The temperature at the package surface is measured~~ which may be performed continuously or intermittently. Ageing effects on components related to heat dissipation can be detected based on a history of the temperature change and the decay heat generated by the radioactive contents. (g) ~~Checks on radioactive contents:~~ Depending on the type of radioactive content stored, the monitoring programme could rely on the inspection prior to storage, use of test or research results and safety analyses to demonstrate that the radioactive content is maintained during storage. In addition, indirect monitoring from other inspections may be used for early detection of a potential problem with radioactive contents such as dose rate, inter-lid pressure, and temperature measurements.					
TRANSSC	WNTI	WNTI-106	Para 6.40 (b)	Non-destructive testing: ~~t~~**T**o detect the existence, initiation or propagation of cracks in packag~~e~~**ing** component**s**, or reduction in thickness of component**s** due to ageing. The consequences of such defects on **the safety of** the package during storage should be evaluated, and if needed, the defects should be managed in accordance with the maintenance programme.	Consistency with the wording in para. 6.26(b).	X			see also resolution of WNTI-105
TRANSSC	WNTI	WNTI-107	Para 6.40 (d)	Dose rate measurements: The dose rate on the surface of the package or around the package is continuously or intermittently measured. Ageing effects on the shielding components can be ~~confirmed~~ **detected** based on changes in the dose rate and the radioactive decay of the contents	Clarification. Ageing effects on the shielding components are not sure to happen!			x	based on resolution of WNTI-105

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-108	Para 6.40 (e)	(e) Checks for subcriticality: This is normally undertaken through a combination of visual inspections~~, inter-lid pressure monitoring~~ and temperature measurements. ~~The absence of an anomaly indicates that any ageing effects on the spent fuel basket structure and the neutron absorber are within the designed range.~~ If there is no evidence of excessive mechanical impact to the package **identified during the visual inspection**, there should be no change of the packaging configuration, including the fuel basket. ~~If there is no abnormal change of inter-lid pressure, this indicates that the cavity atmosphere (inert, thermal conductivity) is maintained as designed.~~ If there is no abnormal change in package temperature, this indicates that the heat dissipation performance of the package is maintained as designed **and there should be no change of the packaging configuration, including the fuel basket.** ~~Consequently, if the parameters to evaluate ageing effects on the criticality related components are within the designed range, the effects of ageing mechanism on the subcriticality are expected to also be within those expected in the design.~~ (…)	It is proposed to modify para. 6.40(e) to keep only the inspections that can really be useful to check subcriticality. There is no clear connection between inter-lid pressure and the integrity of the fuel basket or fuel assemblies.	X			
TRANSSC	Switzerland	CH-09	Para 6.40 (e)	~~Checks for subcriticality: This is normally undertaken through a combination of visual inspections, inter-lid pressure monitoring and temperature measurements. The absence of an anomaly indicates that any ageing effects on the spent fuel basket structure and the neutron absorber are within the designed range. If there is no evidence of excessive mechanical impact to the package, there should be no change of the packaging configuration, including the fuel basket. If there is no abnormal change of inter-lid pressure, this indicates that the cavity atmosphere (inert, thermal conductivity) is maintained as designed. If there is no abnormal change in package temperature, this indicates that the heat dissipation performance of the package is maintained as designed. Consequently, if the parameters to evaluate ageing effects on the criticality related components are within the designed range, the effects of ageing mechanism on the subcriticality are expected to also be within those expected in the design.~~ **Neutron dose rate measurements: Any significant increase of the neutron dose rate on the surface of the package or around the package from those measured before storage can indicate a degradation of shielding material or an increase in criticality. Further investigations and possible measurements should be considered.**	For casks undergoing long term storage (> 1year) the basket is not accessible and inter-lid pressure/temperature increases are not something that would be reliable indicators of any change in sub criticality. If this is of potential concern during storage of a particular package type then, any significant increase in n-dose rates from those measured before storage would be more relevant as an early indication that something unexpected is occurring (degradation of shielding material, increase in criticality).		X See resolution of WNTI-108		See resolution of WNTI-108
TRANSSC	Switzerland	CH-10	Para 6.40 (g)	Checks on radioactive contents: Depending on the type of radioactive content stored, the monitoring programme could rely on the inspection prior to storage, use of test or research results and safety analyses to demonstrate that the radioactive content is maintained during storage. In addition, indirect monitoring from other inspections may be used for early detection of a potential problem with radioactive contents**.** ~~such as dose rate, inter-lid pressure, and temperature measurements.~~	Under normal conditions of storage even with complete failure of all fuel pins this should not lead to an increase of pressure higher than the design pressure. Therefore, inter-lid pressure is not a suitable indicator for early detection of fuel failure. Indirect monitoring methods that can be used for early detection of potential problems with RA content are currently not reliable or easy to implement.		X g) Checks on radioactive contents: Depending on the type of radioactive content stored, the monitoring programme could rely on the inspection prior to storage, use of test or research results and safety analyses to demonstrate that the radioactive content is maintained during storage. In addition, indirect monitoring from other inspections may be used for early detection of a potential problem with radioactive contents, whenever possible. If no significant event affecting the package occurs or is detected during storage, changes in the condition of the		The comment is accepted and it is assumed that indirect monitoring methods that may be used for early detection of potential problems with the contents are not easy to implement. Additionally it is considered necessary to point out that if during storage no significant event affecting the package occurs or is detected, no changes in the contents that could affect the safety of the package are to be expected.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							contents that could affect the safety of the package are not to be expected.		
TRANSSC	USA	US-53	Para 6.40(b)	Comment: Same comment as 6.26(b). Consider adding examples here such as ultrasonic testing, eddy current testing, or other examples that better define the guidance here.	Explained in comment.		X (b) Non-destructive testing (other than visual inspection):...		Non-destructive testing (NDT) are well known techniques in the field of engineering and manufacturing of components and systems, so it is not necessary to give examples in order to simplify the content of the document as much as possible. However, to avoid any confusion with regard to the first point, the clarification in brackets is included.
TRANSSC	WNTI	WNTI-109	Para 6.42	6.42. The pre-shipment inspection of packages for shipment after storage should also refer to the results from all the inspections and monitoring listed in paras 6.29–6.~~41~~**40**.	Correction of typo. There is no para. 6.41.	X			
TRANSSC	Japan	JPN-17	Para 6.43	If packages are loaded and stored in the same facility (or in separate facilities on the same site, i.e. no off-site transport is conducted before storage), items included in paras 6.29–6.35 will not be necessary. However, in such cases, inspections to confirm the safety of the packages (e.g. after loading, before movement) should be conducted. The content of these inspections is similar to those described in paras 6.29–6.31 and (as appropriate) 6.36–6.40	For clear understanding to apply paras 6.29 - 6.31 for such cases.	X			
TRANSSC	WNTI	WNTI-80	Para 6.5(b)	To record the completion of inspection or test**, and their results** (and any corrective actions taken). The aim is to provide an audit trail regarding satisfactory performance of the past maintenance.	Clarification.		.. or test and their results (including any ..)		accepted comment with editorial change
TRANSSC	Japan	JPN-11	Para 6.7 (e)	Compliance with the acceptance criteria. In some cases, this may be a simple pass/fail indication for the verification of each component of packaging. In other cases, ~~qualitative~~ practical acceptance criteria should be established. The acceptance criteria should be as defined in the relevant procedure.	"qualitative acceptance criteria" may be difficult to judge.	X			
TRANSSC	WNTI	WNTI-81	Para 6.8	6.8. The maintenance procedure should be supported by the training and qualification records of the persons performing the work, and records of calibration, procurement and**, if applicable,** shelf life (for replacement parts). These records need also to be available for audit.	Clarification. There are different approaches for spare part management. Not every component has a shelf life.	X			

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	Canada	CAD-38	Para 6.9	Delete the entire requirement.	The requirements are not appropriate for maintenance records. In regard to 6.9(a): maintenance records for each packaging do not and should not provide information on the inventory of packagings of the same design available for use. The latter is a fleet management issue since the availability or unavailability of packagings is dependent on many factors besides maintenance outages. In regard to 6.9(b): maintenance records should capture the observations and results of each maintenance event. They should not be used to speculate on future problems or propose programme modifications. Negative discoveries found during maintenance should be reported, assessed, and addressed through a management system that includes a corrective action programme. This programme will include trending of low level recurrent events that would prompt consideration of maintenance programme improvements. In regard to 6.9(c): maintenance records should not be used to capture operating experience (often there are separate package operations and package maintenance organizations) or to propose design improvements. Negative discoveries about the condition of a package found during operations should be reported, assessed, and addressed through a management system that includes a corrective action programme. This programme will include trending of low level recurrent events that would prompt consideration of design improvements/modifications.		6.9 Additionally to the maintenance records, it is recommended also to provide an individual record (in the form of an electronic log or logbook) compiled for each packaging, in the case of complex designs (e. g. type B, fissile), or for each package design in use for other cases, which will provide the following [21]:		The individual record is indeed independent from the maintenance records in themselves, but it is considered an appropriate recommendation as it captures the history of the packaging in relation to maintenance and operational performance. Agreed to delete point (a), as it is an issue of available packaging fleet management, which depends on many factors apart from maintenance. On the other hand it is considered that bullets (b) and (c) should be retained. Although these are indeed issues that will be dealt with through the implementation of the management systems, it is considered a positive recommendation to have these individual records that capture the history of packaging (the management systems themselves may define their existence).
TRANSSC	WNTI	WNTI-82	Para 6.9	6.9 The maintenance records should also provide an individual record (in the form of an electronic log or logbook) compiled for each packaging, in the case of complex designs (e. g. ~~t~~Type B**(U)**, **Type B(M) and Type C package designs, packages containing** fissile **material**), or for each package design in use for other cases, which will provide the following [21]: (…).	Editorial. Consistency with the wording used in the Transport Regulations.	X			
TRANSSC	WNTI	WNTI-83	Para 6.9 (b)	Information on possible ~~problems~~ **findings** encountered in the execution of maintenance activities that could necessitate modifications of the maintenance programme, e.g. by increasing the frequency of the inspections or by setting stricter test criteria	Instead of “problems”, the word “findings” seems more appropriate.			X	See WNTI-84. The proposal is more complete and is accepted

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TRANSSC	WNTI	WNTI-84	Para 6.9 (b)	Information on possible ~~problems~~ **findings** encountered in the execution of maintenance activities that could necessitate modifications of the maintenance programme, e.g. by increasing **or decreasing** the frequency of the inspections or by setting stricter **or lower** test criteria.	The result of findings could also be, that the packages are in better condition than expected which could lead to a decreasing frequency / lower test criteria.	X			
TRANSSC	WNTI	WNTI-110	Para 7.2	~~Specific examples of inspection checklists can be found in IAEA Safety Standards Series No. SSG-78, Compliance Assurance for the Safe Transport of Radioactive Material [23].~~	No specific examples of checklists regarding compliance inspection by the competent authority of the ageing management and maintenance programmes has been identified in SSG-78.		7.1 (...) Specific inspection checklists can be found in IAEA Safety Standards Series No. SSG-78, Compliance Assurance for the Safe Transport of Radioactive Material [23]. These can be used as examples to develop specific ageing and maintenance management checklists.		SSG-78 includes several annexes with examples of checklists for performing different types of inspections. Although none of them are specifically focused on ageing management or maintenance, they can be used as examples for the development of checklists specific to those items.
TRANSSC	WNTI	WNTI-111	Para 8.1	8.1. Paragraph 802 of the Transport Regulations states that competent authority approval is required for the designs of certain types of package (i.e. Type B(U), Type B(M), Type C packages and packages containing fissile material or 0.1 kg or more **of** uranium hexafluoride), regardless of their intende~~nt~~**d** use.	Editorial. Correction of typos.	X			
TRANSSC	WNTI	WNTI-112	Para 8.3	8.3. (…). These considerations should be included in the ~~PDSR~~ **package design safety report** as stated in SSG-66 [3].	Editorial. Consistency within the draft publication. In most instances, in the draft publication, the abbreviation PDSR is not used.	X			
WASSC	Bangladesh	BD-04	Para 8.4	(Line 1, page 33) In new text unilateral and multilateral approval requirement for B(U), B(M) type packages may be included	To understand approval requirement for different types of packages			X	It is not considered necessary to make explicit the need for unilateral approval for a B(U) or multilateral approval for a B(M), as this is clearly stated in SSR-6.
TRANSSC	WNTI	WNTI-113	Para 8.6 new 8.6 bis	8.6. To fulfil para. 502 and para. 503 of the Transport Regulations, a pre-shipment inspection (see Section 6 of this Safety Guide) is required to be conducted to demonstrate compliance with the applicable requirements. **8.6bis.** Results of manufacturing inspections, pre-shipment inspections and inspections during maintenance should be kept by the designer, owner or user of the package, and the packaging manufacturer, as applicable, to demonstrate that the safety functions are maintained.	Para. 8.6 covers two different subjects. The publication would be more clear is the information included in the current para. 8.6 be split into two sperate paragraphs.	X			
TRANSSC	USA	US-54	Para 9 section	Comment: This section would be an ideal opportunity to explain the interfaces and relationships with SSG-15 and the SSR-4 Requirement 60 Aging management and SSR-6 and the aging management guidance in SSG-26. Unfortunately, this section does not specifically address these interfaces.	Explained in comment.			X	The nature of the interfaces referred to in the commentary is not specified, nor is any specific text proposed.
TRANSSC	Canada	CAD-41	Para 9.2	"…in the development of its own ageing management programme."	Editorial.	X			
TRANSSC	WNTI	WNTI-114	Para 9.2	9.2. The operating organization of the storage facility should take into account the ageing management and maintenance programme included in the package design safety report (i.e. in the sections on 'AGEING CONSIDERATIONS' and 'MAINTENANCE'), in the development **of** its own ageing management programme.	Editorial	X			
TRANSSC	WNTI	WNTI-115	Para 9.4	9.4. The applicant for package design approval in the country of storage should obtain as much **of the relevant** information as possible from the package designer and/or the competent authority of the country of origin to fully understand the contents and background of the original application. ~~In addition to information on the package design, the applicant should request~~ **This should include** information on ageing considerations, maintenance (e.g. monitoring during storage), requirements for shipment after storage and the gap analysis programme.	Clarifications. The information on ageing considerations, maintenance, requirements for shipment after storage and the gap analysis programme are part of the original application, and are not additional information	X			

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TRANSSC	WNTI	WNTI-116	Para 9.7	9.7. For shipment of a package subjected to unilateral approval**,** other than shipment after storage, a**n** ~~similar~~ approach ~~should be used as~~ **similar to the one** described in paras. 9.3–9.6, as applicable**, should be used**.	The current wording is not very clear.	X			
TRANSSC	Canada	CAD-44	Para Appendix I I.10	"…avoid serious~~ly~~ deterioration of safety functions."	Editorial.	X			
TRANSSC	Canada	CAD-45	Para Appendix I I.12	"…to ensure that the heat dissipation rate is in accordance with the maximum value…"	Editorial.	X but the change affects to para I.11 c) nor I.12			
TRANSSC	WNTI	WNTI-117	Para Appendix I I.4 (i) I.5 (c) I.12 (e)	(…) ~~10~~B-**10** (…).	Editorial.			x	According to the Style Manual, the mass number should be written at the top left of the element symbol, with the ionic state at the top right, e.g. ^{238}U, ^{80m}Br, $^{59}Fe^{3+}$. However, in tables the forms U-238 and Br-80m are recommended. At the start of a sentence the element name should be written in full (e.g. Uranium-238).
TRANSSC	Canada	CAD-43	Para Appendix I I.9 (a)	"(e.g leak ~~late~~ rate measured at…"	Editorial.	X			
TRANSSC	Japan	JPN-18	Para Appendix I I.9 (a)	Replacing a component (e.g. an elastomer O-ring for the lid seal) before the acceptance criterion (e.g. leak ~~late~~ rate measured at the leaktightness test) or…	Typo	X			
TRANSSC	WNTI	WNTI-118	Para Appendix I I.9 (a)	(a) Replacing a component (e.g. an elastomer O-ring for the lid seal) before the acceptance criterion (e.g. leak ~~late~~ **rate** measured at the leaktightness test) or the allowable number of transport operations, as determined by the evaluation of ageing effects, is exceeded;	Correction of a typo.	X			
TRANSSC	Canada	CAD-42	Para Appendix I Table I.1	Type of package Type A Material "Urethane ~~form~~ foam"	Editorial.	X			
TRANSSC	USA	US-59	Para Appendix I Table I.1	Repeat header rows across pages.	Enhance table readability.	X			
TRANSSC	Pakistan	PK-05	Para Appendix I TABLE I.1	EXAMPLE SCOPE SETTING TABLE FOR AGEING MECHANISMS	This tables mentions the ageing mechanisms for different type of packages. In the table packages including Type B(U)F, CF are stated. It may be mentioned, that as per para 231 (definition of package) of SSR-6 Packages containing fissile material are subject to additional requirements. Accordingly, the table may be segregate ageing mechanisms for Type B(U) and Fissile. The same approach has been used in SSG-66.			X	Table I.1 is not exhaustive, it only shows examples of a variety of packages and possible ageing mechanisms. In all cases, an evaluation of the specific package design should be performed by the package designer, taking into account the environmental and operational conditions (See I.2)
TRANSSC	Pakistan	PK-06	Para Appendix I TABLE I.1	**lifting lugs**	Trunnion and lifting lugs both are used addressed in the document at various places. Therefore, **lifting lugs** may also be included in the table.			X	Table I.1 is not exhaustive, it only shows examples of a variety of packages and possible ageing mechanisms. In all cases, an evaluation of the specific package design should be performed by the package designer, taking into account the environmental and operational conditions (See I.2)

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TRANSSC	Pakistan	PK-07	Para Appendix I TABLE I.1	EXAMPLE SCOPE SETTING TABLE FOR AGEING MECHANISMS	Some checkboxes regarding ageing mechanisms has been left empty in the table, e.g. for elastomer polymer seals no ageing degradation mechanism is mentioned in the table. Furthermore, the applicable ageing degradation mechanism for elastomer polymers are also not discussed the text of the document (similar case is for foams and neutron absorbers). Such entries may be deleted or corresponding ageing degradation mechanisms may be defined.			X	Table I.1 is not exhaustive, it only shows examples of a variety of packages and possible ageing mechanisms. In all cases, an evaluation of the specific package design should be performed by the package designer, taking into account the environmental and operational conditions (See I.2) Any mechanisms excluded for the material can be left blank or marked as “N” (no) (See explanation in I.3. a)
TRANSSC	USA	US-55	Para Appendix I Table I.1	Comment: Delete general corrosion of stainless steel from all package entries.	General corrosion as defined in Section 3.4(b)(iii) of this document would not be an aging mechanism of consequence for stainless steels. Consider revising this table.	X			
TRANSSC	USA	US-56	Para Appendix I Table I.1	Comment: All packages with Carbon steel components: add pitting corrosion of carbon steel as a credible aging mechanism.	Pitting corrosion of carbon and low alloy steels exposed to external environments could be a credible aging mechanism. Consider revising this table.	X			
TRANSSC	USA	US-58	Para Appendix II MITIGATING OF AGEING EFFECTS	Comment: Unclear why mitigation measures are separate from corrective actions. Mitigation measures should be considered as a subset of either CORRECTIVE ACTIONS or PREVENTATIVE ACTIONS TO MINIMIZE AND CONTROL AGEING EFFECTS	Explained in comment.			X	The elements recommended to be included in the Ageing Management Programme are exactly the same as those recommended in SSG-48 (See para. II.3). Consistency between the two IAEA guidelines has been sought.
TRANSSC	WNTI	WNTI-123	Para Appendix II Acceptance Criteria II.11	II.11. The acceptance criteria, against which the need for corrective action is evaluated, should ensure that the component safety functions are maintained. The acceptance criteria should be appropriately justified **and can be subject to adjustment based on new technical knowledge.** ~~and~~ **The acceptance criteria** should be based on the information included in the package design safety report.	Acceptance criteria might change over time.	X			

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TRANSSC	Japan	JPN-19	Para Appendix II II.	Include general principle of ageing management that has been discussed and published by IAEA, as attached-1. APPENDIX II II. The general principle of the management of ageing is a so-called PDCA cycle as illustrated in Fig. 1 and can be applied to any process where the safety functionality of SSCs could be compromised due to ageing. The core of any AMP is an understanding of the ageing related degradation mechanisms that have the potential to affect the SSCs of the spent fuel storage system. It allows for the implementation of solutions against ageing, corrective actions, repairs and eventual replacement of components. It is also important to review wider operating experiences as part of the development of further scientific and engineering knowledge to ensure that planned activities are optimal to achieving the required level of surveillance and reassurance. Further information for managing the ageing of nuclear fuel and dry storage facilities, etc. is provided in Refs [1, 2]. [1] INTERNATIONAL ATOMIC ENERGY AGENCY, Guidebook on Spent Fuel Storage Options and Systems, Technical Report Series No. 240 (3rd edn), IAEA, Vienna (2024). [2] INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management for Nuclear Power Plants: International Generic Ageing Lessons Learned (IGALL), Safety Reports Series No. 82 (Rev. 1), IAEA, Vienna (2020).	The general principle of ageing management will be beneficial for member states to consider structure of an ageing management programme for transport pacjages.		3.1 … Recommendations on ageing management for nuclear power plants are provided in IAEA Safety Standards Series No. SSG-48, Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants [4] and further information in Refs [5new, 6new]. Information on...		It is not considered appropriate to introduce general principles that are already considered in other IAEA documents. The content of Appendix II is consistent with the indicated principles but specifically focused on the case of packages of radioactive material. References were introduced in more general section on ageing management in para 3.1.
TRANSSC	WNTI	WNTI-124	Para Appendix II II.14(a)	a) Technical knowledge and corrective action reports, from inside the organization and from similar organizations**, e.g. the receipt protocol of a storage facility**;	Example for additional clarification			X	It is considered that the example given is not the most representative of the point. It is not considered essential to give specific examples, as the concepts of 'technical knowledge and corrective action reports' are sufficiently well known and clear.
TRANSSC	USA	US-57	Para Appendix II II.2(b)	Comment: Explain why cathodic protection is included here. Cathodic protection is commonly used in tanks, pipelines and other civil engineering structures. Are there any dual purpose systems that use cathodic protection?	Explained in comment.	X			
TRANSSC	WNTI	WNTI-119	Para Appendix II II.3	II.3 Each individual ageing management programme developed to support the ageing considerations may contain the elements listed in paras II.4–II.~~18~~**16** (adapted from Table 2 of SSG-48 [4]). Examples of ageing management programmes and the information needed to develop such programmes are provided in Refs [5–8, 10].	Editorial. Paras II.17 and II.18 do not exist.	X			
TRANSSC	WNTI	WNTI-120	Para Appendix II II.6 (a)	II.6. To detect ageing effects before there is a loss of safety function for any packaging component within the scope of the ageing management programme, inspection and monitoring should include the following: (a) Specification of parameters to be monitored or inspected **, taking into account the environmental and operational conditions.** (…).	In some cases, monitoring certain facility parameters (temperature, humidity, …) could eliminate the need to monitor each package.		(a)Specification of parameters to be monitored or inspected , taking into account the environmental and operational conditions. The need of monitoring each package may be eliminated by monitoring certain facility parameters (i. e. temperature, humidity).		It is considered necessary to clarify why such reference is made to environmental and operating conditions.

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-121	Para Appendix II II.6 (d) II.6 (e)	II.6. To detect ageing effects before there is a loss of safety function for any packaging component within the scope of the ageing management programme, inspection and monitoring should include the following: (a) Specification of parameters to be monitored or inspected. (b) A method (e.g. visual, volumetric, surface inspection) capable of evaluating the conditions of the component for the specific ageing mechanism or effect. (c) An adequate frequency of inspections to ensure that safety functions will be maintained. (d) **An identification and a justification of t**The number of components to be evaluated in each inspection, the extent of the inspection of each component and the criteria for selection of the component for inspection~~, should be identified and justified~~. For inaccessible components, alternative measures to assess their condition should be provided. (e) **A documentation of t**The results ~~should~~ includ**eing the** descriptions of observed ageing effects, and supporting diagrams, photographs or videos ~~should be documented~~. Any specific methods to be used for data acquisition and documentation, including any applicable codes and standards should be referenced. The documentation should be archived in an adequate manner in order to be retrievable.	Editorial. Consistency of style with the introductory sentence and the paras II.6(a) and II.6(b).	X			
TRANSSC	WNTI	WNTI-122	Para Appendix II II.9 II.10	MITIGAT~~ING~~ON OF AGEING EFFECTS II.9**5bis.** Mitigating measures, including design or manufacture procedures, should be used to mitigate the rates of ageing of package components. These measures should be supported by data and an analysis that demonstrate that the measures are effective. II.10**5ter**. Examples of mitigating measures include, maintenance, repair and replacement actions to mitigate detected ageing effects and/or degradation of the components.	Paras. II.9 and II.10 would be better located after para. II.5, in order to follow the same order as described in para. II.2. Editorial. Correction of typos.		X MITIGATION OF AGEING EFFECTS		Typo in title corrected. Proposes change in location was rejected as the elements (terminology and order) recommended to be included in the Ageing Management Programme are exactly the same as those recommended in SSG-48 (See para. II.3). Consistency between the two IAEA guidelines has been sought.
TRANSSC	WNTI	WNTI-125	Para Appendix III III.1	III.1 The package designer is the person or organization ~~responsible~~ **that takes responsibility** for the complete package design. For each package design there should be only one package designer, who should issue the package design safety report ~~[3]~~ as described in SSG-66 [3].	Consistency with para. 2.1 in SSG-66.	X			
TRANSSC	WNTI	WNTI-128	Para Appendix III III.11	III.11 If the owner of the packaging is not the same as the user of the packaging, the owner should be responsible for supplying the **relevant information (e.g. the maintenance instructions) of the** package design safety report to the user.	It is not necessary to provide the whole package design safety report to the user.			X	The owner should supply the complete PDSR to the user not only the relevant information
TRANSSC	WNTI	WNTI-129	Para Appendix III III.12	III.12 The user of the packaging is usually the consignor of the package. The ~~user~~ **consignor** of the packaging prepares the shipment of the package in accordance with the requirements of the Transport Regulations. Therefore, the user of the packaging should be responsible for ensuring that the packaging is in a serviceable condition prior to shipment.	Clarification. The statement in the last sentence about the responsibility of the user for ensuring serviceability of the packaging yields from the fact that the user is assumed to be the consignor, and it is the responsibility of the consignor to prepare the shipment in accordance with the requirements of the Transport Regulations.		X III.12. The user of the packaging is usually the consignor of the package. The consignor prepares the shipment of the package in accordance with the requirements of the Transport Regulations. Therefore, the user of the packaging should be responsible for ensuring that the packaging is in a serviceable condition prior to shipment.		Consignor should relate to the term package not packaging, therefore it is considered appropriate to accept the proposal but to delete the term packaging after consignor: ... The consignor prepares the shipment of the package in accordance with the requirements of the Transport Regulations...

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	Canada	CAD-46	Para Appendix III III.2	Before the first use of the package, the package design must be certified. The package designer is usually the applicant for the approval of the package design.	Clarify text.		X III.2. Before the first use of the packages that require competent authority approval, their package design must be approved. The package designer is usually the applicant for the approval of the package design.		It is accepted that a clarification is needed, but the term 'certified' is not correct according to SSR-6. The correct term is 'approved'. However this only applies to the case of packages subject to approval. Therefore the paragraph can be reworded as follows: III.2. For packages subjected to approval, before the first use of the package the design shall be approved. The package designer is usually the applicant for the approval of the package design.
TRANSSC	WNTI	WNTI-126	Para Appendix III III.3	III.3 In issuing the package design safety report [3], ~~the package designer should particularly focus on~~ the sections on 'AGEING CONSIDERATIONS' and 'GAP ANALYSIS PROGRAMME'~~. This~~ should be based on the specification of the package (i.e. as defined in the sections on 'SPECIFICATION OF THE CONTENTS', 'SPECIFICATION OF THE PACKAGING', and on the maintenance programme defined in the sections on 'PACKAGE OPERATIONS' and 'MAINTENANCE').	Clarification. All the sections of the package design safety report have an equivalent importance. Th package designer should not focus on some sections, more than on others.	X			
TRANSSC	WNTI	WNTI-127	Para Appendix III New para. III.3bis	**III.3bis. For transport packages containing spent fuel, the package designer should interact with the relevant interested parties, including the fuel vendors, to gather the relevant information regarding the changes in the behavior of the spent fuel assemblies.**	The packaging designer has limited ability to assess the spent fuel behavior. The fuel vendor has a broader knowledge of the changes in the behavior of the spent fuel assemblies due to ageing.		X III.4.The package designer should interact with the relevant interested parties regarding manufacturing, use and maintenance and the operator of the storage facility, if applicable, in order to gather feedback. For transport packages containing spent fuel, the package designer should interact also with the fuel vendors to gather the relevant information regarding the changes in the behavior of the spent fuel assemblies.		The idea proposed may already be covered by the current para III.4. However, such specificity may be appropriate for the particular case of spent fuel packages. It is proposed to amend III.4 as follows: III.4.The package designer should interact with the relevant interested parties regarding manufacturing, use and maintenance and the operator of the storage facility, if applicable, in order to gather feedback. For transport packages containing spent fuel, the package designer should interact with the fuel vendors to gather the relevant information regarding the changes in the behavior of the spent fuel assemblies.
TRANSSC	Japan	JPN-20	Para Appendix IV	To add an example of each periodic inspections and intervals (Short term, Medium term and Long term) in Annex. 6.24….. Depending on the type of the package, the inspection activities and inspection intervals may be determined through a systematic analysis, such as failure modes and effects analysis (An example is provided in Appendix IV). Appendix IV Periodic inspections and intervals for package intended for repeated use	Typical intervals of periodic inspections are shown in para. 5.4, but they are not linked to each inspection. So, an example of the relation between each inspection and intervals can be helpful for readers.			X	No specific example proposal for a new Appendix IV is included.
TRANSSC	WNTI	WNTI-130	Para Contributors	Kom~~m~~ann, S.	Editorial. Correction of typo	X			
TRANSSC	Japan	JPN-21	Reference [17] (P.50)	[17] Japan Nuclear Energy Safety Organization (JNES), "Metal Cask Storage Technology Confirmation Test Final Report", JNES (2004). [in Japanese]. https://warp.da.ndl.go.jp/info:ndljp/pid/10207746/www.nsr.go.jp/archive/jnes/atom-pdf/seika/000005481.pdf	The web reference source of Reference [17] should be added.	X			
TRANSSC	Japan	JPN-22	Reference [20] (P.50)	ANSI N14.1-~~2012~~ 2023	Update to the latest edition.	X			

RC	MS	Comment Nr.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
TRANSSC	WNTI	WNTI-01	Title of the Guide Titles of: 1.7 1.10 Section 7 7.1 7.2 (g) 7.4 Section 8, 9 9.2 9.6 (a) (b) Appendix III III.5 III.14	(…) ageing management ~~and maintenance~~ (…)	This Guide does not consider “maintenance” in general, but a limited scope of maintenance, i.e. maintaining integrity of the package for compliance with the Transport Regulations and with the specification included in the package design safety report. Consequently, including “and maintenance” to the words “ageing management” is superfluous. That act of managing ageing includes maintenance, inspection, and testing.			X	The guidance does have a general focus on maintenance, not only that arising from the effects of ageing. Therefore, the deletion of the term maintenance in the titles is not considered appropriate. See last part of the paragraph 6.1: *The scope of maintenance operations includes actions to detect and correct ageing effects and other actions necessary to prevent or repair damages occurring from the use of the packaging*