

DS 509 Ageing Management for Research Reactors (Revision of SSG-10)

COMMENTS BY REVIEWER					RESOLUTION			
Reviewer:			Page.					
Country/Organization:			Date: 12 November 2019					
Com ment No.	Country Comment No.	Para/ Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
General								
1.	Korea 1	ToC	Considering the revision of text, the title and subtitle in the “Contents” are needed to change. (for example: Planning for Decommissioning (4.28), and so on)	Editorial Comments (to align with other Para.)	X			ToC revised. The SPESS editorial review will ensure consistency on issues like this across all 8 safety guides .
Section 1								
2.	Germany 1	1.3	...programme for the <u>prediction</u> , monitoring, prediction , and timely detection and mitigation of degradation of SSCs...	Logical order	X			
3.	Korea 2	1.1	1.1. This Safety Guide is a revision of IAEA Safety Standards Series No. SSG-10, Ageing Management for Research Reactors[†], which it supersedes.	Propose to rewrite for the uniformity and consistency of format with other Safety Guides.			X	The text as written is the standard IAEA format.

			<u>1.1. This publication supersedes the Safety Guide on Ageing Management for Research Reactors that was issued in 2010 as IAEA Safety Standards Series No. SSG-10¹.</u>				
4.	Korea 3	1.11	1.11. ... for the specific research reactor under consideration, SSR-3 [1] paras 2.15-2.17 <u>paras 2.15-2.17 of SSR-3 [1].</u> Hereafter, subcritical assemblies will be mentioned separately only if a specific recommendation is not relevant for, or is applicable only to, subcritical assemblies. <u>Each case in which the application of recommendation is graded shall be identified, with account taken of the nature and possible magnitude of the hazards presented by the given facility and the activities conducted.</u>	Unified format of referring the requirements and/or paragraph of SSR-3 is necessary, for example, <u>Paras 2.6-3.7 in Requirement 1 of SSR-3 and Requirement 3 of SSR-3.</u> In order to clarify the graded approach concepts, safety guide have to address that background and rationale shall be identified and justified when the graded approach is applied to the facility and activities under consideration. (we can find a good example in the revised para 1.4 of SSG-37)	X	For these reasons, the recommendations in this Safety Guide should be <u>applied using a graded approach</u> for the specific research reactor under consideration, <u>SSR-3 [1] paras 2.15-2.17.</u> Each case in which the application of recommendation is graded shall be identified, with account taken of the nature and possible magnitude of the hazards presented by the given facility and the activities conducted.	The standard format is used.

5.	USA 1	1.1	INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management for Research Reactors, IAEA Safety Standards Series No. SSG-10, IAEA, Vienna (2010)	It is unclear what is the purpose of this footnote.			X	This is the new standard format for referring to IAEA superseded publications. Because it is superseded it cannot be added in the references.
6.	USA 2	1.11	several tens of kilowatts, critical assemblies and subcritical assemblies may need	Grammar	X			
Section 2								
7.	Viet Nam 1	2.4	The management system should support the development, implementation and maintenance and enhancement of a strong safety culture in all aspects of the ageing management programme.	The management system of any facility not only supports safety culture but also maintains a strong enough safety culture	X			
8.	Viet Nam 2	2.8	d') Ensuring the availability of appropriate financial resources;	To implement an effective aging management program the facility has responsibility for preparing the appropriate financial resources.			X	The list currently includes items regarding the provision of both equipment and labour which are the two biggest drivers of cost
9.	Viet Nam 3	2.3	2.3. The objective of the management system as applied to ageing management is to ensure that	The operating procedures and Emergency plans are also a			X	The ageing management program will ensure

			<p>the facility meets the requirements for safety as derived from:</p> <ul style="list-style-type: none"> - The requirement of the regulatory body; - Design requirements and assumptions; - The safety analysis report; - Operational limits and conditions; - The operating procedures; - The administrative requirements established by the management of the research reactor - Emergency plans. 	<p>part of safety documents which be met by the facility.</p>				<p>that SSCs perform as required. Any requirements for safe operation of the research reactor in the operating procedures or emergency plans are themselves derived from the Safety Analysis Report. There is no need to reference these lower level documents here.</p>
Section 3								
10.	Germany 2	3.2	Physical ageing and wear effects eventually leads to degradation of materials subjected to normal...	Wear is part of physical ageing, see also para 3.16(f)	X			
11.	Germany 3	3.16	Further information on the categories of service conditions and the associated ageing <u>degradation</u> mechanisms can be found...	Change from “ageing mechanisms” to “degradation mechanism” inconsistent. Has to be unified in the whole document.		X	16 instances of "ageing mechanism" were corrected throughout the document. The terminology is now consistent.	
12.	USA 3	3.1	Degradation of SSCs (physical ageing and wear effects)	“Wear effects” is introduced in para. 3.2 as a means for degradation, so 3.1 should be			X	Comments from other reviewers inserted “wear

				consistent in its description of what causes degradation of SSCs.				effects” into 3.2 and have since removed that addition. The two paragraphs are now consistent.
13.	USA 4	3.3	The safety and utilization of the facility will may be affected	Consistent with the previous sentence.	X			
14.	USA 5	3.16	(3) Environmental conditions, including conditions during periods when the SSC is not in service, such as when the reactor is shutdown.	Ageing can happen, even at accelerated rates, when SSCs are not in service.	X			
Section 4								
15.	Korea 4	4.5	<p>Insert below at the end of each paragraph as follows:</p> <p>The design for ... a postulated initiating event (para. 6.112 in Requirement 37 of SSR-3. [1]).</p> <p>An ageing management programme that ... at appropriate intervals (para. 6.113 in Requirement 37 of SSR-3. [1]).</p> <p>The design shall ... of spare parts.” (para. 6.114 in Requirement 37 of SSR-3. [1]).</p>	From the 3 rd to the 5 th paragraphs of 4.5 are referred from SSR-3. So it is preferred to refer the relevant paragraphs obviously, in order to distinguish those from the Requirements.		X	Text amended to read, “Requirement 37 from SSR-3 [1], states, “The design life of...”	The three paragraphs are enclosed in quotation marks. Rather than add three statements referencing Req. 37, a single statement has been added to the beginning of the quoted section.
16.	Korea 5	4.9 (d)	(d) ... consideration should may also be given to the combined effects of	It might be hard to consider some ageing mechanisms which can occur			X	The term “should” is the standard language used in

			several ageing mechanisms acting simultaneously.	simultaneously due to technical limitations.				IAEA guides. It denotes best practice, and does not imply that the recommended action is mandatory.
17.	Korea 6	4.19 (1)	4.12 The operating organization should ensure that: ... (1) Follow up of possible degradation trend in SSCs between successive periodic testing; or (1) Follow-up of possible degradation trend in SSCs between successive periodic testing <u>where possible</u> ;	There is high degree of uncertainty in predicting degradation trend because it is impossible to consider all factors and conditions that can give effects on degradation of SSCs. Therefore, it is hard for operating organization to ensure follow up of possible degradation trend, and it is also hard for regulatory body to evaluate accuracy or reliability of the trend which the operating organization suggested. Therefore, deleting the item (1) or adding some comments about these difficulties is needed.	X			
18.	USA 6	4.12	Environmental conditions are appropriate to prevent any degradation of SSCs in storage, or under installation <u>or otherwise not in service.</u>	Ageing can happen, even at accelerated rates, when SSCs are not in service.	X			

19.	USA 7	4.15	the improper execution of testing	Clarity. A poorly designed test that is properly executed could still cause premature ageing.	X			
20.	USA 8	4.18	examples of significant ageing effects due to power uprating include radiation embrittlement of damage to the reactor vessel and core components, flow accelerated	This makes the example broader to cover more types of ageing degradation.	X			
21.	USA 9	4.27	taken into account for SSCs that are out of service or placed in lay-up or safe-storage states during extended shutdown	Remove jargon.	X			
Section 5								
22.	Germany 4	5.1	AGEING MANAGEMENT PROGRAMMES OF FOR RESEARCH REACTORS	Unification, see para 5.1 and 5.2	X			
23.	Germany 5	5.12	MINIMIZATION PREVENTION AND MITIGATION OF AGEING EFFECTS	Further specification			X	The seven elements of the RR ageing management programme are widely used by member states. Renaming one of the seven may lead to misunderstanding. Given that ageing cannot be prevented, retaining the term "minimization" for

								<p>this element is preferred. (comment 6 has been incorporated to use the term "preventive and mitigative actions" in the text, without altering the title of the element)</p>
24.	Germany 6	5.12	<p>In order to limit the effects of ageing, preventive <u>and mitigative</u> actions should be taken. Ideally, preventive actions should be determined during the design stage of the research reactor. Preventive <u>The</u> actions should be...</p>	Further specification	X			
25.	Germany 7	5.12	<p>Possible changes in design, materials or environmental conditions, where applicable, to minimize <u>prevent or mitigate</u> ageing...</p>	Further specification			X	<p>The seven elements of the RR ageing management programme are widely used by member states. Renaming one of the seven may lead to misunderstanding. Given that ageing cannot be prevented, retaining the term "minimization" for this element is preferred. (comment 6 has been</p>

								incorporated to use the term "preventive and mitigative actions" in the text, without altering the title of the element)
26.	Germany 8	5.13	...practices for <u>preventing or mitigating</u> minimizing ageing effects of SSCs. Information obtained in periodic...	Further specification			X	The seven elements of the RR ageing management programme are widely used by member states. Renaming one of the seven may lead to misunderstanding. Given that ageing cannot be prevented, retaining the term "minimization" for this element is preferred. (comment 6 has been incorporated to use the term "preventive and mitigative actions" in the text, without altering the title of the element)
27.	Korea 7	5.5	(3) Third level screening: From the list of structural elements and components important to safety, those for which ageing degradation	Editorial Comments In align with the revision of the Para 5.2, the "ageing degradation" in the (3) of	X			also corrected other instances of "ageing degradation" in the document

			<u>degradation mechanisms</u> has the potential to cause component failure should be identified, and a justification should be provided for the components that are excluded.	Para 5.3 may be needed to change into “degradation mechanisms”.				
28.	Korea 8	5.23	MITIGATION OF AGEING DEGRADATION <u>Effects</u>	Editorial Comments In align with the revision of the Para 5.2, the “Mitigation of Ageing Degradation” in the (3) of Subtitle of the Para 5.23-5.25 may be needed to change into ‘Mitigation of Ageing Effects’.	X			
29.	Korea 9	5.26	5.26 Appropriate acceptance criteria ... should be based on the design basis, including response to design extension conditions, or ...	There is doubt that it is possible to make reliable acceptance criteria for design extension conditions.	X			This change is consistent with guidance for NPPs
30.	Korea 10	5.27	5.27. Corrective action, for example to replace or refurbish a SSC, should be implemented when ageing effects are identified which meet the acceptance criteria. <u>A corrective action programme should be put in place to ensure that conditions adverse to quality, such as ageing effects, are identified and that corrective actions, for example to replace or refurbish a SSC, commensurate with the significance of the issue are specified and implemented to meet the acceptance criteria.</u>	New revision may be considered to address the well-defined corrective action programme and its implementation (reference to the IAEA Safety Standard Seties SSG-48 Para 4.49~4.53)	X			

31.	Korea 11	5.29	<p>(a) At least once a year^X, a review should be carried out of the performance of SSCs, indicating the effectiveness of the ageing management programme in monitoring ageing trends and identifying any weaknesses and opportunities for improvement;</p> <p><u>^XThe period for reviewing the performance can be adjusted through the consultation between licensee and regulatory body.</u></p>	<p>If degradation rate is not fast or degradation trend can be predicted accurately, it may be unnecessary to conduct performance review every year.</p> <p>Therefore, it is recommended to add some comment that the period for reviewing performance can be adjusted.</p>		<p>X</p> <p>Agreed that the frequency of review may be adjusted.</p> <p>Text now reads, “(a) At an appropriate frequency, a review should be carried out...”</p>		
32.	Korea 12	5.31	<p>5.31. The result of reviews of the ageing management programme and of assessments of the SSCs, ... should be submitted to the reactor safety committee (or another competent body) for review and, if required, to the regulatory body for review and assessment.</p>	<p>Editorial Comments (to align with other Para and IAEA Safety Glossary)</p> <p>The “reactor safety committee” may be needed to change into “safety committee” in align with other Para 2.18, 4.4 and 6.4</p>	X			
33.	USA 10	5.2	<p>Minimization of ageing effects;</p> <p>—Detection, monitoring and trending of ageing effects;</p> <p>—Mitigation of Procedures for limiting ageing effects to acceptable levels;</p>	<p>Ageing degradation does not need to be minimized or even controlled in some cases, but instead should be limited to an acceptable level to ensure SSCs remain operable and can perform their intended safety functions. For example, it might be more practical to monitor ageing degradation and then replace</p>			X	<p>The verbs to “mitigate” and “limit” are very close in meaning and the seven elements of an AM programme described in this guide are widely understood and applied.</p>

				a component than to try to prevent the ageing degradation.				
34.	USA 11	5.12	In cases where minimization of ageing is necessary or the most practical means of ageing management, preventive actions should be taken to minimize or limit the effects of ageing degradation. In order to limit the effects of ageing degradation, preventive actions should be taken.	Ageing degradation does not need to be minimized or even controlled in some cases, but instead should be limited to an acceptable level to ensure SSCs remain operable and can perform their intended safety functions. For example, it might be more practical to monitor ageing degradation and then replace a component than to try to prevent the ageing degradation.	X	In cases where minimization of ageing is necessary or the most practical means of ageing management, preventive and mitigative actions should be taken to minimize or limit the effects of ageing degradation.		A comment from another committee member noted that preventive and mitigative actions may be applied – one reduces the severity of ageing effects, the other reduces the probability
35.	USA 12	5.13	Periodic reviews should be undertaken at appropriate intervals to monitor the effects of ageing and determine the effectiveness of actions and practices for preventing minimizing ageing degradation effects of SSCs	See comment for 5.12 and to make consistent with examinations in 5.15	X			
36.	USA 13	5.22	For removable SSCs, destructive tests may be envisaged if the results of non- destructive tests have indicated abnormal values	Recommend deleting sentence. Whether an SSC is removeable is irrelevant to the aging mitigation. Plus, “envisage” is an archaic term.	X			
37.	USA 14	5.23	Methods and practices to be evaluated should include maintenance, refurbishment and	Undo deletion. There are levels of mitigation that are only fully included by full	X			

			periodic replacement of components, modification of SSCs, and altering of operating conditions and practices that may affect the rate of ageing degradation of components.	sentence; i.e., preventive maintenance (such as greasing a valve stem); refurbishment (as in removing and rebuilding a valve to replace packing or seat), and replacement (with a new component). These are not otherwise captured without words marked for deletion				
38.	USA 15	5.25	Once ageing degradation effects has been detected or predicted, methods for mitigation of ageing effects should be evaluated and mitigatory mitigating actions should be taken.	The correct English word is “mitigating”	X			
Section 6								
Section 7								
39.	Korea 13	7.23 (6)	<i>The definition of “code of record” may be needed to clearly address as an annotation.</i>	Clarification the word, “Code of Record” to Member States		X Text updated to read, “If a code or standard of record is referenced in the safety analysis report...”		
40.	Pakistan 1	7.9	Please include the list of SSCs important to safety or provide the reference if SSCs important to safety	Para 7.9 describe that an equipment qualification programme should be in place	X			The reference has been added to SSR-3 Annex I which lists

			are enlisted in some other IAEA safety standard.	in order to meet Requirement 29 of SSR-3 [1] to achieve and maintain the qualified status of SSCs important to safety however, neither the list of SSCs nor the reference of any other safety standard is provided. For example, items important to safety are given in DS 509; Instrumentation and Control Systems and Software Important to Safety for Research Reactors (Rev. of SSG-37).			typical SSCs important to safety
41.	USA 16	7.33	The ageing management programme should consider the effects of aging from the established operational limits and conditions and the effect of any violations of such conditions and their effects.	Expand to include the normal operating environment...aging is a normal condition that typically happens within the normal established parameters, thus that effect should be considered with special attention to any violations to those conditions that would accelerate that aging.	X		