

DS 509 Commissioning of Research Reactors (Revision of NS-G-4.1)

COMMENTS BY REVIEWER					RESOLUTION			
Reviewer: Country/Organization:			Page. Date: 24 October 2019					
Comment No.	Country Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	Korea 1	Contents	Propose to insert the number of relevant paragraph in contents as follows: Background (1.1) Objective (1.2)	Propose the unified format of Contents for the uniformity and consistency with other Safety Guides.	X			
2.	Finland 2	Footnote 3, 4	3 The reactor management comprises the members of the operating organization to whom the responsibility and the authority for directing the operation of the research reactor facility have been assigned (SSR-3 [1]). 4 The reactor manager is the member of the reactor management to whom the direct responsibility and authority for the safe operation of the reactor are assigned by the operating organization and whose primary duties comprise the discharge of this responsibility.	please check the numbering of the foot notes. footnotes 1 and 2 have been deleted.	X			
3.	USA/DOE 1	general	In document, Commissioning of Research Reactors (Revision of NS-G-4.1), DS 509, there is a notable	Because some research reactors use HEU and some research reactors are located in urban areas		X		Interface between safety and security

			<p>absence of the needed interface between safety and security in management systems related to commissioning of research reactors. The document can be significantly improved by reference to nuclear security publications and the inclusion of text from existing safety documents related to the nuclear safety and security interface for research reactors (SSR=3).</p> <p>We recommend that consideration be given to a reference to the nuclear security series and the importance of an adequate interfaces to nuclear security. SSR-3 is a good example of this and contains some text that should be considered. As the document focuses on management systems, text from TECDOC 1801 (Management of the Interface between Nuclear Safety and Security for Research Reactors) should be considered.</p>	<p>(sabotage), this publication has significant implications for nuclear security. However, there is no reference to research reactor security in the main text, other than on page 7: "A documented management system that integrates safety, health, environmental, security, quality and economic objectives for the research reactor project is required to be in place (Requirement 4, SSR-3 [1])".</p>				<p>added in Section 4, para 4.35/4.36.</p>
4.	Vietnam 12	General	<p>Should not delete the GLOSSARY part, and it is better to place right before INTRODUCTION part, by that way the readers will be more easier to understand whole</p>				X	<p>In accordance with editorial guidance for safety standards,</p>

			document.				items in the IAEA safety glossary should not be repeated in safety guides.
Section 1							
5.	Vietnam 1	1.1	The main objective of commissioning of Research Reactor is to assess the safe and orderly handover of the Research Reactor from the constructor to the owner, guaranteeing its operability in terms of performance, reliability, and safety and information traceability.	To clarify the objective of commissioning of the research reactor to another phase of a research reactor.			X The objective is given in para 1.2. This section describes the objective of the safety guide not the commissioning programme.. Objectives of the programme are covered in Sec 3.
6.	Vietnam 8	Page5/Sub clause 1.1	Specific Safety Requirements No. SSR-3, Safety of Research Reactors [1] It also relates to the IAEA Specific Safety Guide No. SSG-24, Safety in the Utilization and Modification of Research Reactors [2] and IAEA Specific Safety Guide No. SSG-20, Safety Assessment of Research Reactors and Preparation of	Comment: SSR-3 isn't "Standards Series", it is just one document in Standards Series; and the similar logics for SSG-24, SSG-20		X	The citation format for references is in accordance with editorial guidance for IAEA safety standards. The format will be

			the Safety Analysis Report [3]. These Safety Guides include guidance on the commissioning reactor modifications and experiments [2] and of the reactor itself [3]				harmonized.
7.	Vietnam 2	1.2	Some or all of the commissioning guide may be relevant when a research reactor is to be restarted after a shutdown period. Where extensive modifications have been made to an existing research reactor, the commissioning of these modifications and their incorporation into the reactor may require comprehensive tests to demonstrate that the reactor meets design requirements. The commissioning of modifications to a research reactor is also covered by this commissioning guide.	The commissioning of upgraded research reactors should be considered.			X Repetition. The commissioning of modifications including upgrades are covered in this guide as well as in SSG-24. This is addressed in paras 1.7, 3.3.and in Section 8
8.	Korea 2	1.3	1.3. The recommendations and guidance provided in this Safety Guide are intended to be applicable to most types of research reactors, critical assemblies and subcritical assemblies, having a limited potential for causing hazard to the public.	If the graded approach is included in this Safety Guide obviously, this sentence is not necessary.			X This conflicts with comments from Germany to use text on having limited potential...
9.	Vietnam 9	Page6/Sub clause 1.4	In formulating the recommendations in this Safety Guide, IAEA Specific Safety Guide No. SSG-28,	IAEA Safety Standards Series No. SSG-28 → IAEA Specific Safety Guide No. SSG-28		X	See resolution above for Vietnam comment1.

10.	Vietnam 10	Page6/Sub clause 1.5	The guidances on Specific Safety Guide No. SSG-28, Commissioning for Nuclear Power Plants [4] may be useful for the commissioning of high power research reactors.	The guidance on commissioning for nuclear power plants SSG-28 [4] → The guidances on Specific Safety Guide No. SSG-28, Commissioning for Nuclear Power Plants [4]	X		See resolution above for Vietnam comment 1.
11.	Korea 3	1.6	Propose insert below sentence in para. 1.6. <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>	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		
12.	Germany 1	1.6	Low risk Research reactors <u>with low hazard potential, including having a power rating of up to several tens of kilowatts</u> and critical and subcritical assemblies may need a less comprehensive commissioning programme than that outlined here. While all recommendations in this Safety Guide should be considered, some may not be applicable to these low power research reactors <u>with low hazard potential</u> and subcritical assemblies.	According to SSR-3 2.17 and SSG-22 2.7 thermal power is only one of the factors to characterize the hazards originating from a research reactor. The more general term “hazard potential” is more suited. E.g. a research reactor using plutonium as fuel has an increased hazard potential as a RR using uranium.	X		
Section 2							

13.	Korea 4	2.1	propose to insert ' <u>GENERAL</u> ' in front of para 2.1	Correction of typo-error	X			
14.	Germany 2	2.1	A documented management system that integrates safety, health, environmental, security, quality, <u>human-and-organizational-factor</u> , <u>societal</u> and economic objectives for the research reactor project is required to be in place (Requirement 4, SSR-3 [1]).	Bringing in accordance with GSR Part.2, Para 1.3.	X			
15.	Germany 3	2.1 Line 7	[...] Approval of the management system (or parts thereof) by the regulatory body may be <u>is</u> required.	Bringing in accordance with Para. 4.33 of this Guide			X	Para 4.33 says the RB should complete the review and assessment. Some states may not require RB approval of the MS.
16.	Vietnam 11	Page8/Sub clause2.1	IAEA <u>General Safety Requirements</u> No. GSR Part 2, Leadership and Management for Safety [7] Further guidance is provided in IAEA <u>Safety Guide</u> No. GS-G-3.5, The Management System for Nuclear Installations [8]	IAEA Safety Standards Series No. GSR Part 2 → IAEA General Safety Requirements No. GSR Part 2. IAEA Safety Standards Series No. GS-G-3.5 → IAEA Safety Guide No. GS-G-3.5		X		See resolution above for Vietnam comment 1.
17.	Finland 1	2.3.	The objective of the management system as applied to commissioning is to ensure that the facility meets the	Editorial, delete reference to footnote 2, footnote 2 has been deleted.	X			

			<p>requirements for safety as derived from: — The regulatory body’s requirements;</p> <p>— Design requirements and assumptions;</p> <p>— The safety analysis report (SAR);</p> <p>— The operational limits and conditions (OLCs);</p> <p>— Administrative requirements of the reactor management².</p>				
18.	Germany 4	2.17	<p>External personnel (e.g. personnel of external suppliers) who perform commissioning activities should be appropriately trained and qualified for the work they are to perform.</p> <p>Experienced and qualified personnel may be allowed to bypass training by proving proficiency. External personnel should perform activities under the same controls and to the same standards as staff. Research reactor facility supervisors should review the work of external personnel during preparation for the work and during testing.</p>	<p>Bypass of training should not be allowed. In any case adequate training and qualification of external personnel should be demonstrated and documented.</p>	X	<p>Experienced and qualified personnel may be allowed to demonstrate proficiency or adequate prior training and qualification.</p>	
19.	Korea 5	2.27	<p>2.27. In accordance <u>with the para 7.54 of SSR-3</u>[1] the para 7.54, SSR-3 [1], requirements for the preparation ...</p>	<p>Unified format of referring the requirements and/or paragraph of SSR-3 is necessary, for example, <u>paras 2.6-2.7 in Requirement 1 of SSR-3, paras 2.6-2.7 of SSR-3, and Requirement 3 of SSR-3.</u></p>	X		
		3.4	<p>3.4. <u>Para 7.49 in Requirement 73 of</u></p>				

			SSR-3 [1] Requirement 73. Para 7.49 of SSR-3 [1] states that ...				
20.	Germany 5	2.33	<u>The operating organization should evaluate the results of the independent assessments and should take any necessary actions to make improvements.</u> Para 4.20 of SSR-3 [1] (part omitted) states that “The operating organization shall evaluate the results of such assessments and shall determine and take the necessary actions for continuous improvements.”	We suggest to leave the first sentence. Otherwise it is not clear what exactly the phrase “such assessments” means. The independent assessment is also emphasized in GRS Part 4 Req.21 and SSG-2, (Rev.1) Paras. 9.1-9.21	X		
Section 3							
21.	Vietnam 3	3.2’	Responsibilities for implementing and reporting on the various parts of the commissioning programme shall be clearly specified. In planning for commissioning, all activities and all organizations involved shall be taken into consideration.	The commissioning plan of the research reactor consists of various parts, so it is necessary to identify the specific responsibilities of the parties for each part.			X Responsibilities for commissioning are covered in para 3.16. Section 4 provides guidance.
22.	Korea 6	3.5 3.16 3.17	3.5. ... Section 4 of this Safety Guide publication provides further guidance. 3.16. ... Section 4 of this Safety Guide publication provides guidance. 3.17. ... Section 5 of this Safety	‘Publication’ and ‘Safety Guide’ are used simultaneously. It is preferred to use ‘Safety Guide’ rather than ‘publication’ when this is used to address the content of recommendation itself. Publication may be used to compare other IAEA publication	X		

		3.21	Guide publication provides further guidance on commissioning stages.	with Safety Guide.				
		3.21	3.21. ... Section 6 of this Safety Guide publication provides guidance.					
		3.22	3.22. ... Section 6 of this publication provides guidance.					
		3.23	3.23. ... Section 7 of this publication provides guidance.					
23.	Germany 6	3.17 Line 8	[...] Initial criticality tests and low power tests and Stage C tests might not apply to subcritical assemblies, if provided adequate subcriticality has been verified.	Clarification	X			
24.	Korea 7	3.20	3.20. The documentation document describing the commissioning programme should describe ...	Correction of typo-error	X			
25.	Korea 8							No comment provided
26.	Finland 3	3.25	MANAGEMENT SYSTEM . The management system for commissioning should is required to cover <u>among other things</u> verification, review, audit and treatment of non-conformances. Section 2 provides guidance.	Please add, among other things or just make reference to management system section of the safety guide.	X			

27.	USA 1	Para. 3.23	commissioning records together with notes on discussion of any design changes made and or concessions given observed deviations and non-conformances	Clarity.			X	Notes are normally added on drawings to reflect the as-built condition. Concessions is consistent with SSG-28.
Section 4								
28.	Vietnam 4	4.2	(d) Those stakeholders associated with the operation and maintenance of the research reactor.	To cover all stakeholders who have the responsibility in research reactor operation.			X	Redundant. Sub para (c) also covers this group.
29.	USA 2	Para. 4.15	accordance with specifications as well as dealing with any deficiencies non-conformances and modification identified during the commissioning programme	Use standard terminology.			X	Deficiencies is consistent with SSG-28.
30.	USA 3	Para. 4.20	The purpose of regulatory oversight should be to ensure that the research reactor facility is constructed in accordance with the approved design intent and its licensing basis base.	Clarity and grammar.			X	“Design intent and its licensing base” is accepted text and consistent with SSG-28.
31.	Finland 4	4.20.	The role of the regulatory body in the commissioning process for a research reactor facility is specified by the responsibilities and functions established by its legal framework	Please add: The regulatory body should also ensure itself of the readiness of the operating organization to start the operation of the research			X	The focus is on commissioning and the guidance on the role of the RB is consistent

			and national regulations. The main role of the regulatory body in the commissioning process (including the preparations for commissioning) is the oversight of commissioning activities, including, where appropriate, issuing (or not) relevant authorizations. The purpose of regulatory oversight should be to ensure that the research reactor facility is constructed in accordance with the design intent and its licensing base. <u>The regulatory body should also ensure itself of the readiness of the operating organization to start the operation of the research reactor.</u>	reactor.				with SSG-28.
32.	Korea 9	4.21	4.21. <u>The para 7.3 in Requirement 67 of SSR-3 [1] states that</u> “The operating organization for a research reactor facility shall have the prime responsibility for the safety in the operation of the facility” (SSR-3 [1] Requirement 67).	Propose the unified format of paragraph for the uniformity and consistency with other Safety Guides.		X		The format is in accordance with guidance from standards specialists. Format will be harmonized.
33.	Germany 7	4.24	If an issue having major safety significance is discovered during commissioning (e.g. in the regulatory body’s review and assessment of submissions from the operating organization or as a result of	The paragraph is hardly to understand. We propose a new formulation requiring that the reasons / causes for deviations from established acceptance criteria have to be determined by			X	The original text was previously accepted and has not been modified

			<p>deviations discovered during commissioning), the operating organization should ensure that the issue is subjected to safety analyses and to procedures for design, construction and commissioning that are equivalent to those for the reactor itself (see SSR 3 [1]). After satisfactory assessment, the operating organization and, if necessary, the regulatory body should approve the resumption of commissioning activities.</p> <p><u>If during commissioning of the research reactor deviations from established acceptance criteria will be discovered, the operating organization should initiate a thoroughly analysis of the causes. The analysis, findings and proposed corrective actions should be submitted to the regulatory body for approval. The next commissioning stage must not be started before compliance with the established acceptance criteria have been achieved by solving the issue and approval by the regulatory body.</u></p>	<p>the operating organization and carefully analysed. The findings as well as corrective actions to be taken should be submitted to the regulatory body for approval. It is important, that the next stage in the commissioning programme must not be started before those issues have been solved and compliance with the established acceptance criteria has been demonstrated.</p>				<p>except for updating of references, in accordance with the DPP and revision by amendment.</p>
34.	Vietnam 5	4.28	<p>- Ensuring that the documentation of the reactor is kept up to date during the commissioning process (configuration control) and that all</p>				X	<p>Repetition. Updating of documentation and</p>

			<p>parties involved in the commissioning process have access to the current documentation and information.</p> <p>- Respond to and manage an emergency in the commissioning stage and to implement appropriate emergency arrangements as given in greater detail in the section on emergency arrangements</p>				<p>configuration control are addressed in paras (e) and (f). Emergency preparedness is covered in paras 4.43 to 4.45</p>
35.	Korea 10	4.31	<p>4.31. The responsibilities of any other groups, <u>such as groups for quality management, radiation protection and design</u>, that may be involved in the commissioning process should be established by the management group.</p>	<p>It is clear to specify the other group definitely.</p>	X	<p>...any other groups that may be involved in the commissioning process, such as designers, manufacturers and supporting technical organizations, should be established ...</p>	<p>Consistency with SSG-28</p>
36.	USA 4	Para. 4.31	<p>The responsibilities of any other groups that may be involved in the commissioning process should be established by the management group <u>and documented in the management system for commissioning.</u></p>	<p>All responsibilities should be documented.</p>	X		

37.	Turkey 1	4.32	The bullet (f) can be rewritten as “The on-site emergency plan and its compliance with the off-site emergency plans.”	The interphase between the on-site and off-site plans are also very important in terms of prompt and effective emergency response and this point should also be reviewed by regulatory body.		X ..and procedures for on-site emergency preparedness and response, and coordination with off-site response organizations, as appropriate;		Para 4.33 not 4.32. Not all research reactors need off-site plans.
38.	Vietnam 6	4.32	The main role of the Regulatory body in the commissioning process (including the preparations for commissioning) is the oversight of commissioning activities, including, where appropriate, issuing (or not) relevant authorizations. The purpose of regulatory oversight is to ensure that the plant is constructed in accordance with the design intents and its licensing base, and that the systems and equipment are installed as designed, and to ensure that their functionality, as well as the behavior of the plant as a whole, demonstrates compliance with the design intents and the safety requirements, and demonstrates that the research reactor can be operated safely.	To specify the role and purpose of regulatory oversight of the regulatory body in the commissioning stage.			X	Redundant. The role of the regulatory body is covered in para 4.20

39.	Finland 5	4.33	<p>. Before authorizing the loading of fuel, the regulatory body should complete the review and assessment of:</p> <ul style="list-style-type: none"> (a) The SAR; (b) The OLCs; (c) The specific OLCs for the commissioning of the facility; (d) The management system; (e) The arrangements for handling fuel; (f) The emergency plan (g) other documents defined in national regulation <p>Also, the regulatory body should ensure that qualification procedures for the personnel needed to perform specified functions (such as reactor operation) are completed and that appropriate authorizations have been issued before authorizing fuel loading.</p>	<p>Please add:</p> <p>(g) other documents defined in national regulation</p> <p>Depending on the national approach there may be other documents RB needs to be reviewed and assessed before fuel loading.</p>	X			
40.	Iran 1	Page 23/Subclause 4.33/Bullet (f)	<p>"The emergency plan and procedures"</p>	<p>Considering SSR-3, especially the following subclause it is suggested to change the Bullet (f):</p> <p>SSR-3: "7.90.<u>Emergency plans and procedures</u> shall be subject</p>	X			

				to approval by the regulatory body, as appropriate".				
41.	Iran 2	Page 23/ Subclause 4.33/ Last paragraph	"Also, the regulatory body should ensure that the requirements for qualification and competence of personnel performing safety related functions qualification procedures for the personnel needed to perform specified functions (such as reactor operation) are completed defined clearly by the operating organization and that appropriate authorizations have been issued before authorizing fuel loading."	It is not so clear what qualification procedures are. Also There is nothing about qualification procedures in SSR-3. It is mentioned in Requirement 70: "7.28. The operation organization shall clearly define the requirements for qualification and competence to ensure that personnel performing safety related functions are capable of safety performing their duties. Certain operating positions may require formal authorization or a licence."	X			
42.	Vietnam 7	4.33	(g) The hold points for inspections, reviews and assessments of the testing results in accordance with the acceptance criteria. A formal approval shall be obtained before advancing beyond these hold points.	The good practice to conduct the inspection activities in the operational stage of the research reactor.			X	Repetition: Para 3.11 provides guidance on hold points, including "that the requirements of the operating organization and the regulatory

							body have been met." Paras A.12 and A.18 also states that regulatory approval may be required.
43.	Iran 3	Page 25/ Subclause 4.43/ Two last lines	" Non-nuclear Non-radiation-related hazards should be considered in the arrangements."	According to Requirement 80 of SSR-3, GSR Part 7 and IAEA Saftey glossary, "non-radiation-related hazard" or "non-radiological hazard" are suggested.	X		
44.	Iran 4	Page 25/ Subclause 4.43/ Two last lines	" Non-nuclear hazards Non-radiation-related hazards that may impair the effectiveness of the response actions should be considered identified in the arrangements hazard assessment. "	The text is not so clear. Requirement 81 of SSR-3, is about Emergency arrangements for preparedness for, and response to, a nuclear or radiological emergency. It is mentioned in subclause 4.24 of GSR Part 7: "The government shall ensure that the hazard assessment also identifies non-radiation-related hazards to people on the site and off the site that are associated with the facility or activity and that may impair the effectiveness of the response actions to be taken. " In IAEA Safety Glossary (so IAEA Safety Standards) the		X	Revised as per Iran comment 3 above

				definition of "emergency response actions" is: "An action to be taken in response to a nuclear or radiological emergency to mitigate the consequences of an emergency for human life, health, property and the environment."				
45.	Iran 5	Page 25/ Subclauses 4.43 and 4.45	"4.43. Requirements for emergency preparedness and response are established in IAEA Safety Standards Series No. GSR Part 7, Preparedness and Response for a Nuclear or Radiological Emergency." "4.45. Requirement 81 of SSR-3 states "Appropriate emergency arrangements shall be established from the time that ..."	It is suggested that subclause 4.45 comes before subclause 4.43, because it helps to understand better that the general requirements of GSR Part 7 should be considered too.		X		Order changed. Revised as per Canada comment 1.
46.	USA 5	Para. 4.44	should be trained to respond appropriately to cope with emergencies			X		
47.	Canada 1	Para 4.45	Suggest to move existing 4.45 after 4.43 and revise as follows: <u>These arrangements should be in accordance with the requirements for emergency preparedness and response as established in IAEA Safety Standards Series No. GSR</u>	Provides clarity on the basis for the arrangements described in para 4.43		X		

			Part 7, Preparedness and Response for a Nuclear or Radiological Emergency [9].				
Section 5							
48.	Germany 8	5.1	In accordance with requirement 73 of SSR-3 [1], the commissioning programme shall be divided into stages (see paras 3.10 and 3.16 of <u>this Guide</u>).	Clarification	X		
49.	Iran 6	Page 28 and 29/ Subclause 5.17	"Radiation protection procedures programme and emergency procedures should be in place and personnel should be appropriately trained in them to cope with any accident that may occur during the commissioning process."	What is the content of Radiation Protection Procedures ? It is not clear. Considering the Requirement 84 of SSR-3, it is suggested to change the text.	X		Procedures for radiation protection.
50.	Germany 9	5.22	<u>Additionally</u> , fFor subcritical assemblies, adequate subcriticality should be verified (e.g. through 1/M calculations, where M is the subcritical neutron multiplication factor).	Verification of subcriticality should be carried out additionally to subcriticality verification test, which is required in Para 5.21 of current Guide	X		
Section 6							
51.	Germany 10	6.11	The management group should review the commissioning reports to ensure that the programme objectives have been achieved. In particular, the	Bringing in accordance with the rest of the text of current document	X		

			management group should ensure that the OLCs have been verified and that assumptions and predictions made in the SAR about the performance of the <u>research</u> reactor facility have been confirmed.				
52.	Germany 11	New Chapter 6A	<u>REVIEW, EVALUATION AND REPORTING OF TEST RESULTS</u>	We suggest to add a new chapter, dealing with review, evaluation and reporting of test results (taking the example from SSG-28)			X This is covered in the text, e.g. see 6.9, 7.2, A.11 etc. Adding a new chapter is not consistent with the DPP509
53.	Germany 12	New Chapter 6B	<u>HANDLING OF DEVIATIONS DURING COMMISSIONING</u>	We suggest to add a new chapter, dealing with handling of deviations during commissioning (taking the example from SSG-28)			X This is covered in the text, e.g. see 7.2, etc. Adding a new chapter is not consistent with the DPP509.
Section 8							
54.	USA 6	Chapter 8	Fix the paragraph numbering.	Paragraph numbering is incorrect.	X		
55.	USA 7	Para. 8.2	All new experimental devices, experiments and modifications are required to be subject to an adequate undergo commissioning programme to demonstrate functionality and safety prior to being placed in service	To better align with para. 7.50 of SSR-3.	X		

Appendix

56.	Germany 13	A1	The number of tests and the order of their performance generally depend on the type of research reactor <u>facility</u> and the circumstances of the commissioning programme.	Bringing in accordance with the rest of the text of current document	X			
57.	Germany 14	A2	The commissioning programme usually includes tests for all SSCs of the research reactor <u>facility</u> .	Bringing in accordance with the rest of the text of current document	X			
58.	Turkey 2	A.14	A new bullet can be added to the content of emergency procedures as “(d) Provision of adequate drills and exercises.”	Drills and exercises are also very important parts of the emergency preparedness and they should be considered and mentioned in the emergency procedures.	X			
59.	Turkey 3	A.20 (p)7 th bullet	The "emergency centre" expression can be written as "emergency management centre".	Better understanding can be achieved with the proposed expression.	X			