COMMENTS BY REVIEWER Reviewer: Country/Organization:			Page. Date: 24 October 2019		RESOLUTION			
Comment No.	Country Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
General								
1.	USA 19	Global	Make use of "reactor", "facility", "reactor facility", "research reactor", "research reactor facility" consistent throughout document, such that "reactor" means just the reactor and "facility" means the entire facility; suggest limit to just one term for each. E.g., use "research reactor facility" instead of "research reactor" in 2.3, "research reactor facility" instead of "facility" in 2.7, "research reactor facility" instead of "research reactor" in 4.38, but ok to keep "research reactor" in 3.3.	Distinction between these terms is not clear from their usage in the document. Some revisions already proposed but don't appear to be consistent.		X		The set of guides will be harmonized.
2.	USA 20	Contributors to drafting and review	Change "Helveston" to "Helvenston"	Name misspelling	X			

Section 1								
3.	USA 1	1.2	"In establishing these programmes, special attention should be paid…"	Clarity and maintain intent of this statement in current (2008) revision of the document	X			
4.	Korea 1	1.3	1.3. The objective of this Safety Guide~~publication~~ is to provide operating organizations, regulatory bodies, designers and other relevant organizations with recommendations and guidance on meeting the requirements established in Refs [1-4] for radiation protection and radioactive waste management in the design and operation of research ~~reactors~~reactor facilities.	'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 with Safety Guide. 'research reactors' and 'research reactor facilities' are used simultaneously. Some guideline which can be applicable to all NS-G-4.* is necessary for the usage of two words in same safety guide.	X			
5.	USA 2	1.4	Add Ref. [11], SSG-15, to last sentence.	Spent fuel management not discussed in detail in Refs. [5-7]	X			
6.	Korea 2	1.5	1.5. … each research reactor, as mentioned in paras 1.7–1.9~~1.10~~ (on the graded approach), …	Correct typo error. 1.10 is not exist	X			
7.	Germany 1 RASSC	1.5	This Safety Guide is applicable to research reactors, including critical assemblies and subcritical assemblies.	Clarification, since the specification is made in para 1.2 and the draft includes some requirements on critical and subcritical assemblies.	X			

8.	Germany 2 RASSC	1.6	This Safety Guide does not provide guidance on radiation protection and radioactive waste management in the decommissioning of research reactors. However, it provides recommendations on design aspects to be considered for decommissioning.	Clarification that decommissioning aspects are needed to be considered in the design phase as mentioned in para.1.10.			X	We agree that decommissioning aspects need to be considered in the design phase. However, as only general guidance is provided in Para 4.6 on this aspect, it is felt that separate mention in Para 1.6 is not warranted.
9.	Korea 3	1.9	1.9. In accordance with para 2.17 of SSR-3 [1], the factors shall be considered in applying a graded approach. ~~The factors to be considered in applying a graded approach include:~~	Since the same factors are listed in para 2.17 of SSR-3, it is not necessary to list these factors again here. Even other Safety Guides are referring the Graded Approach, however the factors are not listed directly.		X In accordance with para 2.17 of SSR-3 [1], the factors to be considered ...		Ref to SSR-3 para 2.17 added but list retained as useful guidance. See comment on 1.9 from Germany
10.	Korea 4	1.9	(g) Control of radioactive discharge and doses to the representative person	Application of graded approach to the estimation of radioactive discharges and doses to the representative person specified GSR Part 1, GSR Part 3 and IAEA Safety Standard Series No. GSR Part 4 (Rev.1)			X	The list is in accordance with SSR-3 (See comment on 1.9 from Germany) and adding an extra item to the list would introduce inconsisteny.

11.	Korea 5	1.9	Propose insert below sentence in para. 1.9. 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.	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.	USA 3	1.9(j)	"…, and the evaluation of airborne and liquid releases…"	"Characteristics" is vague and I don't think captures what is meant or clearly ties to site location. I think this is trying to say not just what is released, but also the effect it could have given site characteristics and facility design.			X	See comment on 1.9 from Germany .
13.	Germany 1	1.9	The factors to be considered in applying a graded approach include: (a) The reactor power; (b) The ~~radiological~~ potential source term; (c) The amount and enrichment of fissile ~~material~~ and fissionable material ~~present~~; (d) Spent fuel elements ~~storage areas~~, high pressure systems, heating systems and the storage of flammable~~s~~ materials, which may affect the safety of the reactor; (e) The type of fuel elements ~~and its chemical compositions~~,	We suggest to stick to the formulation, provided in SSR-3 Para. 2.17 (SSG-22 is under revision at the moment)	X			

			(f) The type and mass of moderator, reflector and coolant; (g) The amount of reactivity that can be introduced and its rate of introduction, reactivity control, and inherent and additional ~~engineered~~ safety features (including those for preventing inadvertent criticality); (h) The quality of the containment structure or other means of confinement; (i) The utilization of the reactor (experimental devices, tests and ~~,~~ ~~radioisotope production,~~ reactor physics experiments); (j) The ~~location of the~~ site evaluation, including ~~the potential for~~ external hazards associated with the site ~~(including those due to the proximity of other nuclear facilities) and the characteristics of airborne and liquid releases of radioactive material~~ and the proximity to population groups; The ~~reactor's proximity to population groups and the feasibility of implementing emergency plans~~ ease or difficulty in changing the overall configuration.				

Section 2								
14.	Germany 2	2.1 Line 6	[…] This safety assessment should ~~examine~~ consider all plant states: (1) ~~All planned~~ normal operation~~al modes of the facility~~; (2) ~~Performance of the facility following~~ anticipated operational occurrences; (3) Design basis accidents; (4) ~~Event sequences that may lead to~~ design extension conditions (DEC).	Clarification			X	"examine" is accepted text. Original text except BDBA changed to DEC
15.	USA 4	2.3	Delete last sentence and revise first sentence to "…annual dose limits authorized by the regulatory body (in accordance with the requirements of GSR Part 3 [2]) for site personnel and the public…"	"should" in this sentence is really a requirement per GSR Part 3	X			
16.	Vietnam 1	2.3	**2.3. The design of a research reactor should be such as to ensure that authorized annual dose limits1 for authorized by the regulatory body for site personnel and the public will not be exceeded in operational states (normal operation and anticipated operational**	The scope of terminology "**site personnel" in this paragraph is too large, it should be replaced by "radiation worker" or other suitable word**			X	The authorized dose limits apply to site personnel including radiation workers. in accordance with editorial guidance for standards
17.	USA 5	2.6	"…should also be applied to design features, and procedures, whose purpose is to prevent…"	Not clear what "intervention procedures" means, revised to what I think was meant. Also think it is worth keeping design features for accidents because optimization principle applies for that too.	X			

Section 3								
18.	Germany 3	3.1	~~Research reactors are a diverse group of facilities that can be classified in many ways (e.g. as research reactors, training reactors and prototype reactors, critical and subcritical assemblies, by type of moderator and coolant or by purpose of utilization). No matter how these facilities are categorized, it is clear that their radiological hazards and the methods of control of these hazards will vary greatly.~~ This section and those that follow discuss issues relating to radiation protection and radioactive waste management at research reactors. It is the duty of the radiation protection officers to evaluate which of these issues are applicable to the type of facility for which they are responsible.	It is better to use the definition/classification as in SSR-3. The one, given here, is confusing		X The radiological hazards and methods of control vary depending on the hazard potential of the research reactor.		Introductory text to aid the reader.
19.	Germany 4	3.2 Line 3	[…] A careful evaluation of the radiological hazards, their magnitude and their impacts for the specific type of research reactor should be carried out to ensure the proper implementation of adequate programmes for radiation protection and radioactive waste management.	Clarification	X			
20.	Vietnam 2	3.3	Should not replace "reactor" by "research reactor", If you make it change, you need replacing in whole document.	- Reactor in this document is understood that is research reactor. - To ensure the consistent, If you make it change, you need replacing in whole document.		X		Research reactor or research reactor facility is used for consistency with SSR-3 where

								research reactor is cited.
21.	Germany 5	3.4	In the case of research reactors with very low power levels, including critical and subcritical assemblies, the usually low neutron fluxes generally result in an insignificant production of activation products.	There may be (especially in the future) some assemblies with very high neutron fluxes.		X Typically low neutron flux		
22.	Germany 6	3.4.	In the case of research reactors facilities with very low power levels~~,~~ ~~including critical and subcritical assemblies~~, the low neutron fluxes generally result in an insignificant production of activation products.	Some modern subcritical assemblies are characterised, for example, by 300 kW, wording "very low power lever" is misleading			X	... including critical and subcritical assemblies retained
23.	USA 6	3.6	"…fuel damage from residual decay heat becomes a possibility…"	Fuel damage could occur from other factors (e.g. handling accident, reactivity excursion) regardless of reactor power level.		X "…fuel damage, including damage from from residual decay heat becomes a possibility		Fuel damage could occur from other factors as well..
24.	Vietnam 3	3.17	- Should add "radioisotopes produced by research reactor" - (e) Solid and liquid radioactive waste and material arising from the treatment of radioactive waste and decommissioning;	- Almost research reactors have the radioisotopes producing activity, then should be added it is one of radiation sources - Decommissioning process also creates a large amount of radioactive waste			X	Many research reactors do not produce radioisotopes as a product. But this is coverd by (i) Material that has been irradiated in the reactor.

								Decommissioning is addressed elsewhere.
Section 4								
25.	Vietnam 4	4.3	Suggest using the terminology "safety culture" instead of "culture for safety"	Because the term "safety culture" is familiar with almost of people.			X	Culture for safety is in accordance with GSR Part 2.
26.	Germany 7	4.6	(a) Their expertise in all areas relating to the production, handling and transport of radioactive material on the site and the transport of radioactive material to ~~the environment~~ other facilities;	Clarification		X and the release of radioactive material to the environment.		clarification
27.	Germany 8	4.8 Line 15	(e) ~~Lifetime analysis should be conducted to allow for the removal and replacement of all components through~~ Activation of SSCs will not prevent their removal or replacement over the lifetime of the facility.	Clarification and further specification	X			
28.	USA 7	4.8(e)	"Lifetime analysis is conducted…"	Redundant "should"	X			See resolution of Germany comment 8
29.	USA 8	4.14(c)	"Zoning of the facility should be consistent with national requirements, and needs to be consistent with GSR Part 3 [2]."	Clarify that national requirements aren't IAEA requirements.		X Zoning of the facility needs to be consistent with national requirements, and with GSR Part 3 [2]		Further Clarity

30.	Germany 9	4.23 Line 5	[…] ~~Subcritical assemblies and l~~Low~~er~~ power research reactors facilities typically do not generate significant quantities of radioactive waste and design provisions for radioactive waste management in these facilities should be applied using a graded approach.	Modern subcritical assemblies are not necessarily low power facilities, we suggest to keep the issue more general			X	The formulation does not preclude modern subcritical assemblies.
31.	USA 9	4.34	"…solid radioactive waste (generated at the research reactor facility, including waste generated by experiments) considered in the design…"	Revise for clarity	X			
32.	Germany 10	4.38 Line 4	[…] These design objectives should be achieved through high quality design and special features, such as items important to safety ~~protection and safety systems~~, that are incorporated into the design of the facility.	Clarification			X	Retaining text on protection systems and safety systems is helpful.
33.	USA 10	4.42	"...at operating facilities, and needs to be consistent with the requirements of SSR-3 [1]."	SSR-3 is requirements, not appropriate to say "should be consistent with"	X			
Section 5								
34.	Germany 11	5.4	At most research reactor facilities, areas accessible to the general public ~~are~~ should be ~~–~~sufficiently far away from radiation sources to give assurance that direct external radiation doses to members of the	Clarification	X			

			public are negligible under normal operating conditions.					
35.	Germany 12	5.4 Line 5	[…] Doses to the public would generally only be incurred as a consequence of the various routine discharges of radioactive effluents from the reactor and its associated facilities. Nevertheless, any ~~direct~~ exposure pathway should be considered (e.g. the food chain, ground deposition).	The term "direct exposure" is not defined and also for radiation protection any exposure pathway should be considered.	X			
36.	Vietnam 5	Para.5.13 and 5.15	- **It should be remained.**	Two concepts "Reference levels" and "Intervention levels" are clearly to understand and familiar with almost people. It also appears on many member state's regulation. Then **It should be remained**			X	GSR Part 3 (and the Glossary) define a reference level as:" For an *emergency exposure situation* or an *existing exposure situation*, the level of *dose*, *risk* or *activity concentration* above which it is not appropriate to

								plan to allow *exposures* to occur and below which *optimization of protection and safety* would continue to be implemented."
37.	USA 11	5.24, 5.54, 6.2(c)	- Change "predisposal" to "predisposal management" (also, the "and" before "predisposal" in the last sentence of 5.54 should not be deleted	Not clear what "predisposal" means on its own. "Predisposal management" is consistent with SSG-40, etc.	X			
38.	Germany 13	5.29 Line 8	[…] ~~In many research reactors, ventilation systems are essential for the fulfilment of the confinement function.~~	This statement is not clear. Actually confinement isolation is required			X	As many research reactors do not have containment structures, it is helpful to note that in many reactors the ventilation systems are essential for confinement.
39.	USA 12	5.29	"Depending on the design of the facility, a ventilation system should include a separate subsystem with charcoal filters…"	If this is being changed from "may" to "should" there should be a qualifier that this depends on facility design, as emergency exhaust systems and charcoal	X			

				filters aren't needed for most low power research reactors.				
40.	USA 13	5.37	Change "personal contamination" to "personnel contamination"	Industry standard term and consistency with paragraph 7.13	X			
41.	USA 14	5.52	"A formal approval should be required for undertaking work…"	Currently reads like it could be a requirement, but no reference cited, revise to make clear that it is a recommendation			X	Types of approvals covered in paras 5.53 to 5.57
42.	Pakistan 1 WASSC	Section 5	If the applicable dose limits for occupational or public exposure or the authorized limits for radioactive releases are exceeded, the reactor manager, the safety committee, the regulatory body and other competent authorities shall be informed in accordance with the requirements.	Said information has not been provided as required by Section 7.113 of IAEA SSR-3.		X 6.62 revised… as necessary, notifying the the reactor manager, the safety committee, regulatory body and other competent authorities, and assessing any impact on members of the public or the environment		This is addressed in 6.62
Section 6								

43.	Pakistan 2 WASSC	Section 6	An appropriate record should be kept of the quantities, types and characteristics of the radioactive waste processed and stored on the reactor site or removed from the reactor site for the purpose of processing, storage or disposal.	However information regarding an appropriate record (quantities, types and characteristics of the radioactive waste processed and stored on the reactor site or removed from the reactor site for the purpose of processing, storage or disposal) has not been provided as required by section 7.119 of IAEA SSR-3.			X	Paras 6.25 to 6.30 provide details of appropriate records (a register or database) and documentation relating to the management of radioactive waste.
44.	USA 15	6.2	"A graded approach should be considered in the application of the waste management programme requirements, and the programme should include…"	Use of graded approach is a recommendation, not a requirement.			X	Use of a graded approach is Requirement 12 of SSR-3
45.	Pakistan 3 WASSC	6.2	Following may be included: • A description of the processes in which radioactive waste is generated at the facility • A description of the radioactive waste streams and the efforts to be made to • Operational limits, conditions and controls • Identification of waste management options and associated steps, as well as • Responsibilities of waste management personnel • Packaging of radioactive waste	The proposed contents may be included in the RWMP Contents. The information related to these contents is given in IAEA GSR Part 5, SSG-40, WSG 6.1, etc.		X Additional references to GSR Part 5 and SSG-40 are added to 6.2		References are added. The list is not meant to be exhaustive and replicating the content of other guides is discouraged.

			• Storage Facility • Operational limits, conditions and controls • Waste acceptance criteria • Training of waste management personnel • Program review frequency • Record keeping • Program Implementing Procedures • Definitions and Abbreviations References					
46.	Germany 14	6.52 (a)	For the effective processing of liquid radioactive waste, the following should be considered: (a) The choice of processing option should be made with careful consideration given to all relevant factors, including exposure of the ~~operator~~ site personnel and members of the public, and generation of secondary waste;	Site personnel or workers is more appropriate here.	X	worker		
47.	Turkey 14	6.63	The expression "arranged" can be used instead of "effected" in the last sentence of the paragraph.	Editorial correction.		X site emergency response arrangements should be implemented as necessary.		To avoid repetition
Section 7								

48.	Germany 15	7.7 Line 6	(e) When operations are being carried out under abnormal circumstances, such as those following anticipated operational occurrences or accidents ~~an incident or an accident~~.	Clarification			X	AOOs are not necessarily abnormal circumstances.
49.	USA 16	7.22	Revise to quote GSR Part 3, Paragraph 3.100, directly	This is restating a requirement (with "shall") so should use a direct quote (or revise to be a recommendation).	X			
50.	USA 17	7.23	"…individual monitoring should not be required but the occupational exposure of the worker should be assessed on the basis of the results of monitoring the workplace or individual monitoring (Ref. [2])."	Currently uses "shall" to denote things that don't appear to be requirements. I think the proposed text is different enough from GSR Part 3 Paragraph 3.101 that "should" is ok.		X As stated in para 3.101 of GSR Part 3 [2],...		Revised to quote the requirement.
Section 9								
51.	Pakistan 4 WASSC	9	Chapter 9 may be modified to include information related to waste management.	Waste management may be included as the document is on radiation protection and waste management.		X 9.1 Aspects related to predisposal management of radioactive waste are covered in SSG-40 [6]		To avoid duplication, Ref to SSG-40 added to 9.1
52.	Turkey 15	9.7 (f)	The expression can be rewritten as "(f) Emergency preparedness and response".	It is better to use the common use of the expression.	X			

53.	Germany 16	9.20	Chapter "TRAINING, RETRAINING AND QUALIFICATION OF PERSONNEL"	This chapter is more general, than oriented on the special training for Radiation Protection. Our suggestion is to consider the possibility to delete general issues, if they are available in NS-G-4.5 "The Operating Organization and the Recruitment, Training and Qualification of Personnel for Research Reactors"		X (See Ref [24])		Reference to N-S-G-4.5 added
54.	USA 18	9.16	"A management system [12, 13] should be established…"	I don't see an exact requirement for this in the cited documents, revise to clarify that this is a recommendation.			X	A management system is required.
Section 10								
55.	Canada 4 EPReSC	Para 10.1	An emergency plan including detailed procedures should be developed to cover all foreseeable aspects of emergencies at a research reactor facility, <u>in accordance with the requirements in GSR Part 7.</u>	Clarity. Add an explicit reference to GSR Part 7.	X			