Resolution of Comments

SSG-6: Safety of Uranium Fuel Fabrication Facilities (DS517)

COMMENTS BY REVIEWER Reviewer: Country/Organization:				Page.... of.... Date:	RESOLUTION			
No.	Comment	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	FIN001	General Whole document		Although a lot of improvement has been done, I would still urge you to cross compare the two standards SSG-6 and SSG-7 and review them together. A consistency between the two should be ensured. I addition, the wordings of the 'similar' paragraphs would be as far as possible, the same. Otherwise it might cause confusion as for the reason of formulating the paragraph differently. (You would think there is a reason behind the difference, although there isn't really any.) It should also be checked and ensured that no requirements given to one and relevant also to the other are left out. I have tried to capture the differences in the following comments, but not necessary all are there, so please do a thorough cross checking between the two	X			
2.	ISR01	General		**General Remark no. 1** regarding **the three revised Guides:** Since the revised guides are presented as individual guides, we	X			

				would like to suggest to assign them separate working ID's, namely DS517A, DS517B and DS517C (for the revisions of guides SSG-5, SSG-6 and SSG-7 respectively), as it was done with the seven individual guides on operation of NPP's (DS497A to DS497H). This will be useful also in addressing our present comments to these three guides.				
3.	ISR02	General		**<u>General Remark no. 2</u>** <u>regarding the revised Guides:</u> We understand that the Document Preparation Profile (DPP DS 517, April 2019, which was approved by the CSS in its April 2019 meeting and is also included in the September 20, 2020 Note Verbal) serves as the "general planning and working basis" for the various working groups (consultants' meetings and Safety Standards Committees) when making the revisions on these guides. We are aware, of course, that during the actual process of revision, not all the intentions detailed in the DPP can (or have to be…) "literally" followed. However, we do ask ourselves if those working groups are aware of the "not fulfilled" DPP items-when such exist-and do they point out (to themselves) the reasons for such situation.	X The scope of the two guides was changed to cover also the mentioned elements.			

				On this matter, we bring examples from DPP DS517 and the relevant draft safety standards DS517, regarding issues from the DPP asked to be revised or specifically addressed, but apparently not done so in the actual revisions. The Scope section of the DPP and the Annex of the DPP include (on page 5 and pages 9-11 of the DPP) listing of revisions that are needed, specifically for the individual Guides: **For revision of SSG-6** the DPP specifies: (iv) To include information on analytical laboratories. (Not mentioned in revision of SSG-6. Mentioned in revision of SSG-5). (v) The specific issues to be addressed (page 5 of the DPP) include: …"confirm that fuel fabrication with reprocessed U containing traces of Pu is covered.." The Main Revisions listing for the sections of SSG-6 (on page 10 of the DPP) also specifies for section 1: " *Clarify that fuel fabricated with reprocessed U containing traces of Pu is covered…*"				

				(Not found in draft DS517B or the other two revised guides)				
4.	FIN002	1.3/2	… safety and preparation for decommissioning.	as in SSG-7	X			
5.	GER001	1.5	The safety requirements applicable to fuel cycle facilities (i.e. facilities for uranium ore refining, conversion, enrichment, reconversion, interim storage and storage of fissile material, fabrication of fuel including uranium and plutonium mixed oxide fuel, storage and reprocessing of spent fuel, associated conditioning and storage of waste, and facilities for the fuel cycle related research and development) are established in SSR-4 [1].	According to IAEA Safety Glossary 2018 "storage", using of solely "interim" might not be fully appropriate.		X Following the guidance in IAEA Glossary: " Storage as defined above should not be described as interim storage."		
6.	GER002	1.6	This Safety Guide deals specifically with the handling, processing, material transfer and storage of natural uranium and low enriched uranium (LEU) that has a ^{235}U concentration of no more than 6%, derived from natural, high enriched or reprocessed uranium; it covers fabrication of uranium oxide fuels but does not cover facilities that handle uranium metal fuels.	Clarification	X			
7.	USA01	1.6	Explain why SSG-6 is limited to no more than 6% enriched uranium. Indicate how uranium fuel fabricating facilities at enrichments up to 20% (HALEU) fuel might use this guide.	Currently, most of the new fuel manufacturing facilities or processes that are in the design stage are for HALEU. These are anticipated to be built and operated in the next ten years.			X	Yes we agree that higher than 6% enrichment are under considerations for SMRs, however this was not envisaged in the DPP and needs to be considered in the light of the whole

								set of SSGs for Nuclear fuel cycle facilities and in SSR-4 as well. This was out of the scope of this revision. Revision of IAEA Safety Standards for SMRs applicability is ongoing in a parallel project.
8.	USA02	1.6	Although not mentioned, this safety guide was written for facilities fabricating uranium oxide fuel for Light Water Reactors. Indicate how this safety guide can be used for fabricating uranium fuel for advanced reactors such as Small Modular Reactors.	Most, if not all, fuel fabricating facilities being planned are for manufacturing fuel for advanced reactors. These reactors will be using fuel in various forms, including uranium metal.			X	Simmilar to comment USA01, the applicability of SSG-6 to SMRs was out of the scope of this revision, parallel activity is ongoing to address this.
9.	INDO01	1.6 /3	1.6. This Safety Guide deals specifically with the handling, processing, material transfer and storage of natural uranium and low enriched uranium (LEU) that has a 235U concentration of no more than 6%, **20%** derived from natural, high enriched or reprocessed uranium; it does not cover facilities that handle uranium metal fuels. Recommendations are also provided for auxiliary activities	Replace 6 % with 20% in line with the definition of LEU in the 2018 Edition of IAEA Safety Glossary			X	Yes we agree that higher than 6% enrichment are under considerations for SMRs, however this was not envisaged in the DPP and needs to be considered in the light of the whole set of SSGs for Nuclear fuel cycle facilities and in SSR-4 as well. This was out of the

			such as sampling, homogenization and blending. Completed fuel assemblies are usually stored at the fuel fabrica- Replace 6 % with 20% in line with the definition of LEU in the 2018 Edition of IAEA Safety Glossary tion facility before being transported to the nuclear power plant. Such a storage facility is considered to be part of the fuel fabrication facility. This Safety Guide is limited to the safety of uranium fuel fabrication facilities; it does not deal with any impact that the manufactured fuel assemblies may have on safety for the reactors in which they are going to be used.					scope of this revision. Revision of IAEA Safety Standards for SMRs applicability is ongoing in a parallel project.
10.	JPN01	1.6./ L2	This Safety Guide deals specifically with the handling, processing, material transfer and storage of natural uranium and low enriched uranium (LEU) that has a ^{235}U ~~concentration~~ enrichment no more than 6%, derived from natural, high enriched or reprocessed uranium; it does not cover facilities that handle uranium metal fuels.	Use an appropriate wording.	X			
11.	GER0 03	1.7 Line 2	…. These recommendations are supplemented by more detailed guidance provided in the IAEA Safety Standards Series No. SSG-27, Criticality Safety in the Handling of Fissile Material [2].	Clarification, order of supplement.			X	SSG-27 is considered as the main leading guideline for criticality safety and SSGs 5,6,7

								only supplement SSG-27.
12.	ISR03	1.8		These paragraphs (which are part of the scope in the introductory section of the guides) mention that these revised safety guides do not include nuclear security recommendations for the relevant nuclear fuel cycle facilities and they refer to relevant IAEA Nuclear Security Series publications. However, we would like to suggest to consider adding a short remark to that introductory paragraph mentioning that the present revised guides do include detailed addressing of interfaces between safety, nuclear security and the State system of accounting for, and control of, nuclear material (as called for in the DPP and in the explanatory note of the Note Verbal).	X			
13.	FIN004	2 Section 2	SSR-4 requires to to perform a safety analysis in which potential accidents are analysed to ensure that they are adequately prevented, detected and, if they do occur, mitigated. This requires application of the concept of defence in depth (requirement 10 of SSR-4	SG-7 has this statement (para 2.3), was 2.6 in older version). Is this not required or relevant to uranium fabrication?		X		We agree it is relevant also for fuel fabrication facilities, however Section 2 shortly summarizies main hazards and safety aspects and the scope of provisions here is commensurate with the risk magnitude

								of the facility type. Safety assessment is covered by Section 4 in SSG-6.
14.	FIN003	2.1/5	… process. Thus, in these facilities, the main (hazards? or safety objectives?) are potential nuclear criticality and releases of uranium …	SSG-6 says "the main hazards are ..." while SSG-7 says "the main safety objectives are the prevention of ..." Choose one and use it consistently in the two, unless there is a real reason for using different wording.	X			
15.	RUS01	2.3	Proposed to supplement the para with the safety aspects related to recycled uranium and relevant radiation exposure and contamination concerns.	Completeness		X This is covered by various provisions throughout the text.		
16.	CAN16	2.5	~~2.5. For application of the requirement that the concept of defence in depth be applied at the facility (see Concept of defence in depth in Section 2 in SSR-4 [1]), the first two levels of defence in depth are the most important, as risks can be reduced to insignificant levels by means of design and appropriate operating procedures (see Sections 5 and 8).~~	There is no support for this in Section 2 in SSR 4. All levels of defense are important and no priority should be suggested. If the perceived risk turns out not to be reasonable, the damage could be enormous. Some operations may never be acceptable due to the large consequences of an accident, irrelevant how low the frequency (probability) is. Criticality is an event being postulated to occur and there are many design and operational countermeasures. Para. 2.12 level (3): "In the design of the facility, such accidents are postulated to occur."		X We agree with the intention of the comment. The text was modified to capture the essence, no priority to any level of DiD is given.		
17.	FIN006	3 Section 3	VERIFICATION OF SAFETY paragraphs 3.21 through 3.23 from SSG-7	Is Verification of Safety not needed in a uranium fuel facility? (SSG-7 3.21-3.23)	X			

18.	UK01	3.13 / 3	The operating organization should ensure, through audits, that suppliers of items ***and resource*** important to safety etc.	Procurement can also be of skills and capability, not just items. Such resource must also be assured in relation to ensuring safety.	X			
19.	UK09	3.14 / 2	The procedures should specify all parameters which are intended to ***be controlled*** and the criteria ***that must*** be fulfilled.		X			
20.	FIN005	3.18	The audits should also cover measures for emergency preparedness and response	Should the audits also cover measures for emergency preparedness and response (SSG-7 3.18)	X			
21.	UK02	3.19 / 5	There is also a requirement to identify and manage conditions that may change slowly over time, due to factors such as ageing of the facility, or increased production pressures	To provide advice on what to do, namely, to monitor such changes and take action to address (manage) them.		X		This provision was deleted, and ageing management is addressed in Sections 5 and 8.
22.	USA03	4.3	After "population" add ", and any special population groups such as schools, day care centers, hospitals and nursing homes,"	Certain population groups can be more susceptible to any potential environmental impacts resulting from the facility.			X	We believe the proposed is included in the term "population"
23.	FIN007	4.4, 4.5, 4.6		Why is here wording and even the order of the paragraphs so different from SSG-7 4.6-4.7? Harmonising needed throughout the three paragraphs! This is confusing when the wording is different.		X All three guides were harmonized as much as practicable.		
24.	RUS02	4.5	Recommended to clarify what "potential conflicts between safety and security" should be considered during site evaluation and site selection process.	Clarification		X This provision was removed, reference to requirement was provided.		

25.	UK10	4.5 / 1	To prevent potential conflicts **the** interface between safety and security aspects should be considered	Grammar.	X			
26.	UK11	4.6	Site evaluation and selection …	Extra (4.6) in text.	X			
27.	RUS03	5.1 Section 5	Proposed not to exclude the general information addressing the main safety functions and safety issues typical for uranium fuel fabrication facilities	Clarification			X	In fact, this section did not include any specific guidance, only the repetition of requirements from SSR-4.
28.	RUS04	5.1 Subsection Specific engineering design guidance	This subsection doesn't contain any specific engineering design guidance for uranium fuel fabrication facilities and needs to be renamed or supplemented.	Clarification	X			
29.	JPN02	5.3.	The requirements on protection against external exposure are established in Requirement 36 and following paras of SSR-4 [1].	Editorial.	X			
30.	CAN01	5.5	Remove items 5.5 (e), 5.5 (f) and 5.5 (g)	Consistency with SSR-4 and para. 5.7: events 5.5(e), 5.5(f) and 5.5(g) are postulated initiating events (PIE) as listed in Appendix of SSR-4 (reminded in para. 5.7). If needed to emphasize of these particular PIE, it might be mentioned in 5.7 instead (e.g.- "Among these PIE, particular consideration should be given to: […]")		X		e) and f) removed, harmonized with "hazards" in other bullets
31.	INDO 02	5.5 /8 & 12	The specification of a design basis (or equivalent) will depend on the facility	Since fire is already mentioned twice, both in (e) and (g) II, consider	X			

			design, its siting and on regulatory requirements. However, particular consideration should be given to the following hazards in the specification of design basis safety analysis at uranium fuel fabrication facilities…. (e) fire… (g) ii Internal and external fire	deleting (e) fire				
32.	RUS08	5.5 a)	Proposed to redefine the provision as nuclear criticality accidents are not typically considered as design basis	Correctness and consistency with SSR-4	X			
33.	JPN03	5.5.	The specification of a design basis (or equivalent) will depend on the facility design, its siting and on regulatory requirements. However, particular consideration should be given to the following hazards in the specification of design basis safety analysis at uranium fuel fabrication facilities: nuclear criticality accident; release of uranium such as from an explosion in a reaction vessel; release of UF_6 such as due to the rupture of a hot cylinder; release of HF such as due to the rupture of a storage tank; ~~fire;~~ loss of electrical power; Internal and external events, including: Internal and external explosions (in particular hydrogen explosions); Internal and external fire;	Delete the bullet (e). This is because the internal fire is duplicated in the bullet 5.5.(e) and 5.5.(g)ii.	X			

			Dropped loads and associated handling events; Natural phenomena (including earthquakes, flooding and tornadoes); Accidental aircraft crashes					
34.	GER004	5.6	All of the above events may have both on-site and off- site consequences. Only the (d) type can have a purely chemical impact<u> while the others may or will have both radiological and chemical impact</u>.	Clarification.		X More general wording was used to accept also comment UK03		
35.	UK03	5.6 / 1 - 2	All of the above events may have both on-site and off- site consequences.	e, f and g could also lead to purely chemical impacts dependent upon where a fire, electrical failure or internal / external event occurred. Delete the last sentence in Para 5.6 because it does not add value ("Only the (d) type can have a purely chemical impact").	X			
36.	FIN008	5.7		check the reference	X			
37.	GER005	5.7	The events listed in para. ~~5.6~~ <u>5.5</u> may occur as a consequence of a postulated initiating event (PIE).	Incorrect reference.	X			
38.	INDO03	5.7 /1	The events listed in para. **5.5** 5.6 may occur as a consequence of a postu-lated initiating event (PIE).	The events are listed in para 5.5 and not in para 5.6	X			
39.	FIN009	5.8		Needs harmonising with SSG-7, 5.8.	X			
40.	GER006	5.9	The following paragraphs highlight some of the main elements that are specific for uranium fuel fabrication facilities. ~~There are other topics related to criticality safety that are relevant for enrichment facilities and are not adequately covered by this Safety Guide.~~ <u>There are some topics related</u>	Distinction of SSG-7 parts on fuel fabrication and enrichment.	X			

			to criticality safety which are partly relevant also for enrichment facilities; these are not fully covered here but in the corresponding part of SSG-7.					
41.	RUS09	5.9 Second Sentence	The second sentence is unclear: "There are other topics related to criticality safety that are relevant for uranium fuel fabrication facilities and are not adequately covered by this Safety Guide" It's recommended to redefine it	Clarification	X			
42.	CAN02	5.9 header	Replace "Prevention of criticality" by Prevention of Nuclear Criticality	"Nuclear Criticality" is the term mostly used elsewhere and in other SSGs. It is better to keep it in a title.	X			
43.	JPN04	5.9.	The following paragraphs highlight some of the main elements that are specific for uranium fuel fabrication facilities. There are other topics related to criticality safety that are relevant for ~~enrichment~~ uranium fuel fabrication facilities and are not adequately covered by this Safety Guide. The principal guidance is obtained in SSG-27 [2].	Correction. DS517B is for uranium fuel fabrication facilities.	X			
44.	CAN17	5.10	If a fuel fabrication facility processes ~~natural uranium, depleted uranium, or~~ uranium with **a ^{235}U mass fraction** less than 1 % ^{235}U**,** ~~enrichment~~ criticality safety would not need to be taken into consideration	The intention is to cover uranium with a mass fraction less than 1 % (space is required between value and %). There is no need to refer to natural, depleted or enriched uranium. A comma before criticality safety.	X			
45.	CAN18	5.12	…geometrically **favourable** ~~safe…~~	See comment to 5.16 below.	X			
46.	CAN19	5.13	~~The~~**One** aim of the criticality safety analysis…	Criticality safety analysis involves more than calculation of k_{eff}. The title of the subsection is "Prevention of criticality". The design and operation also require criticality safety analysis to cover what could happen if	X			

				criticality occurs. An event may become real and thus credible even if not perceived to be so in the prevention analysis. It is not possible at this time to change or clarify every reference to “criticality safety” (it is not done in SSR-4 and SSG-27) but here it is easy.				
47.	FIN010	5.13		Check which reference is right and also harmonise wording and location of this paragraph as far as possible with SSG-7, 5.10.	X			
48.	INDO04	5.13 /4	The aim of the criticality safety analysis is to demonstrate that the design of equipment together with the related safety measures are such that the values of controlled parameters are always maintained in the subcritical range. This is generally achieved by determining the effective multiplication factor (keff), which depends on the mass, **geometry**, the distribution and the nuclear properties of the fissionable material and all other materials with which it is associated. The calculated value of k eff (including all uncertainties and biases) is then compared with the value specified by the design limit (which should	Consider adding geometry as a factor that influences k_{eff}, since Geometry is one of the main factors that affect k_{eff}.	X			

			be set in accordance with paras 2.4 - 2.7 of SSG-27 [2]).					
49.	FIN011	5.15		Are the bullets from SSG-7, 5.15 not relevant for uranium facility?	X			
50.	GER007	5.15 Bullet 2	The use of appropriate and qualified computer codes that are validated together with the appropriate data libraries of nuclear reaction cross-sections, for the normal and credible abnormal conditions being analysed, while taking into account any bias and its uncertainties ….	Specification.	X			
51.	CAN03	5.16	Add a first item "Enrichment": ***Enrichment*. The analysis should consider errors in the uranium enrichment of a fissile material when the maximum authorized enrichment level is not considered (see 5.12)**	Errors leading to abnormal enrichment in U are important credible abnormal conditions in UOX fuel fabrication facilities	X			
52.	CAN20	5.16	The terms "favourable geometry" and "unfavourable geometry" are the established ones in SSG-27 and many other documents. Safe is an older and sometimes misleading term. Unfavourable does not mean unsafe.	SSG-27, para. 3.6 "equipment with a favourable geometry[4]. Special care is then necessary to avoid unintentional transfer to an unfavourable geometry." "[4]A system with a favourable geometry is one whose dimensions,shape, and construction materials are such that a criticality event cannot occur even with all other parameters at their worst credible configuration." In SSG-27 also 3.18(a), 3.30, 3.37(j), 4.9, 5.10, 5.21, 5.28(b) twice but also uses "geometrically safe" (slip?), 5.53, 5.56 (twice), 5.67 (twice),	X			

53.	CAN21	5.16	The following parameters should be included in the scope of a ~~criticality safety~~ **subcriticality** analysis for a uranium fuel fabrication facility **(for analysis of potential criticality accident consequences, other criteria apply)**:	This section deals with prevention analysis and the criteria for determining conservative values apply to that, not to the other "half" of criticality safety, i.e. potential impact and mitigation of a criticality accident.	X			
54.	FIN012	5.16		Enrichment is missing? Consider also harmonising the wording between SSG-6 5.16 and SSG-7 5.17!	X			
55.	CAN04	5.16 (a)	Replace by: "*Mass.* The mass margin should be sufficient to compensate for possible over-batching of uranium (see also para. 3.17 of SSG-27 [2])."	Consistency with SSG27 and SSG7. The text of SSG7 is much clearer: "double batching" and a margin of 100% are not always necessary; but "over batching" is, as stated in SSG-27.	X			
56.	CAN05	5.16 (d)	Replace"…, in particular when transfers of fissile material take place" by "…, for example when additives are added in the powder"	Inhomogeneous moderation is much more likely to occur during the addition of additives rather than during transfers.	X			
57.	CAN06	5.16 (e)	Last sentence: "Consideration should be given to ~~situations where~~ **those** material**s** ~~may be present~~ that could lead to a greater increase of the neutron multiplication factor than **with** ~~in~~ a ~~full~~ water reflection (para 3.22 of SSG-27)".	This warning about more effective reflectors is applicable for any water thickness considered (not only full reflection). Paragraph (i) allows one to consider a thickness of water not necessary equals to the full reflection.	X			
58.	GER008	5.16 (e) Line 4	… Consideration should be given to situations where material may be present that could lead to a greater increase of the neutron multiplication factor than in a full water reflection system, e.g. concrete floor or walls ….	Specification.	X			
59.	CAN07	5.16 (f)	Remove the end of last sentence "… ~~and the presence and proper use of the isotopic neutron sources~~"	Neutron sources have no impact on the k_{eff} value (they are not fissile materials).	X			

60.	CAN08	5.16 (g)	Add a last sentence to the seventh (last) bullet: "**Absorber parameters include thickness, density and nuclide composition of both the absorber material and the hydrogenated material used to increase its absorption efficiency (if applicable)**"	Consistency with SSG-5.	X			
61.	GER009	5.17	To meet the Requirements 34 and 42 of SSR-4 [1] on protection against internal radiation exposure and against toxic chemical hazards the use of and the inventory of liquid UF_6 in the facility should be kept to a minimum.	Missing word.	X			
62.	RUS05	5.17.	To meet the Requirements 34 and 42 of SSR-4 [1] on protection against internal radiation exposure and toxic chemical substances the use of and the inventory of UF6 in dispersible form in the facility should be kept to a minimum.	At fuel fabrication facilities, protection against internal exposure containment is required wherever UO2 is present also in powder form.	X			
63.	RUS06	5.22 *Protection of personnel*	*Protection of workers*	In the case of the radiological or other harmful impact, the term **workers** should be used instead of **personnel** in compliance with SSR-4 (e.g Requirement 34).	X			
64.	RUS07	5.22	The first and second sentences are proposed to be reversed.	The second sentence is more general than the first.	X			
65.	FIN013	5.23	For normal operation ~~Where possible~~, the need for the use of protective …	In all cases or for normal operation as in SSG-7, 5.37?	X			
66.	USA04	5.25	Add a second sentence as follows: "Means for monitoring any areas within the ventilation system to detect unwanted accumulation of radioactive or fissile material should be provided."	Unwanted accumulation of uranium can occur within certain locations in ventilation ducts resulting in criticality and radiation hazards.	X			
67.	FIN014	5.27		Check and reconsider the position of this paragraph. In SSG-7 this is not under Protection of personnel	X			

				but before that one (see SSG-7, 5.30).				
68.	FIN015	5.28		Check and reconsider the position of this paragraph. Shouldn't this paragraph be before the subtitle protection of personnel, directly under Confinement of radioactive material (See SSG-7, 5.23)		X This para is different from 5.23 in SSG-7. Was added also to SSG-7 on the same place.		
69.	GER010	5.29	The design should provide for the minimization of releases to environment during normal operation by application of ~~best available~~ state of the art technology commensurate to the potential risks.	Refer to the potential risk which is much lower as compared to e.g. NPP, thus “best available” might be inappropriate.	X			
70.	UK12	5.29 / 1	The design should provide for the minimization of releases to **the** environment during normal ….	Grammar.	X			
71.	FIN016	5.30		Check and reconsider the position of this paragraph. In SSG-7, physical barriers are discussed immediately after the subtitle "Confinement of radioactive material"			X	Also in SSG-6 barriers are discussed after “Confinement…” title. This para is slightly different.
72.	FIN017	5.34	5.34. Relevant requirements on design provisions for protection against external radiation exposure are listed in Requirement 36 and the subsequent paras. of SSR-4 [1]. 5.35 External exposure should be controlled by means of an appropriate combination	Consider separating to own paragraph as in SSG-7, 5.40	X			
73.	GER011	5.35	When the UO_2 is of low density (as is the case in conversion or blending units for instance), the shielding provided by the vessels and pipework of the uranium fuel	We suggest to make an own, separate Para for issues, accompanied with 232U	X			

			fabrication facility will normally be sufficient to control exposure. 5.35A. In cases where reprocessed uranium is used, specific precautions should be taken to limit the exposure of personnel to the decay products (208Tl and 212Bi) of 232U. Such precautions may include administrative arrangements to limit the period of time for which uranium is stored on the site or the installation of shielding.					
74.	FIN018	5.36	~~Uranium fuel fabrication facilities, like all industrial facilities, have to be designed to control fire hazards in order to protect personnel, the public and the environment.~~ Fire in uranium fuel fabrication facilities may lead	This was removed from SSG-7 5.44. Remove it from here or put it back to SSG-7, but I would think the relevance is the same for both facilities.	X			
75.	GER012	5.36 Line 4	[…] or may cause a criticality accident by affecting the system or the parameters used for the control of criticality (e.g. the moderation control system or the dimensions of processing equipment). Special consideration shall be given to the fire-fighting media deployed, and its potential moderation effect.	Specification.		X "shall" replaced with "should		
76.	FIN019	5.39	Fire hazard analysis should involve~~s~~ identification of the causes of fires,	(See SSG-7 5.47)	X			
77.	CAN22	5.44	"…with account taken of the ~~risk of~~ **potential for** criticality.	It is very important to separate the concept of risk (consequences and frequency/probability) from the potential occurrence of an event. Here, risk does not seem to be the most appropriate term.	X			

78.	FIN020	5.45 before 5.45	A detection and/or suppression system should be installed that is commensurate with the risks from internal fires and explosions and is in compliance with national requirements.	SSG-7, 5.53 states "A detection and/or suppression system should be installed that is commensurate with the risks from internal fires and explosions and is in compliance with national requirements. " Is this not needed in Uranium facilities? (SSG-6)	X			
79.	FIN021	5.45/4	… Fire dampers should be mounted in the ventilation system ~~unless the likelihood of widespread fires is acceptably low. The fire dampers should close automatically on receipt of a signal from the fire detection system or by means of temperature sensitive fusible links.~~ Spark arrestors should …	This was removed from SSG-7, 5.54, but not from SSG-6 5.45. Should it be kept in or removed from both? Or is this specific for uranium plants?	X			
80.	UK04	5.50 – 5.52	At the end of Para. 5.52 add "Flooding can potentially result in buoyancy induced failure of vessels, pipes and equipment. Where this could result in significant domino effects the supports should be designed to accommodate this loading".	During flooding items may float or be disturbed – they could impact or otherwise damage pipes / tanks etc. Also, tanks themselves may float if empty and not fully secured.	X			
81.	CAN09	5.51	"[…] the criticality analyses should ~~be~~ take~~n~~ into account ~~concerning~~ the presence […]"	Misprint	X			
82.	FIN022	5.51		Harmonise with SSG-7, 5.61	X			
83.	FIN023	5.52/2	capable of withstanding the water load ~~to avoid any 'domino effect' due to their failure~~ and safety related equipment should not be affected by flooding	See SSG-7, 5.62. IAEA may also chose to use the original wording from SSG-6 in SSG-7.	X			
84.	CAN10	5.53	Leaks of hydrogenous fluids (water, oil, etc.) can alter the neutron moderation **and/or reflection** ~~in fissile material~~ and thereby reduce criticality safety**.**	Flooding may affect both moderation and reflection conditions (+ consistency with SSG-5.)	X			

85.	UK05	5.53 / 1	At the start of Para. 5.53 add “In addition to the loss of raw materials and its environmental impact, ……”.	In addition to hazards and generation of waste, loss of chemicals has an adverse impact due to potential loss of useful raw materials, along with associated environmental impacts related to generation, transport etc.	X			
86.	UK06	5.54 / 1	Vessels containing significant amounts of nuclear material, **or hazardous chemicals**, in solution form should be equipped with level detectors and alarms to prevent overfilling and with secondary containment features such as bunds or drip trays of appropriate capacity. **For fissile material the configuration must ensure criticality safety.**	Hazardous chemicals in solution may need protection by alarms, detectors and secondary containment. Minor change of wording to reflect this and improve clarity		X Reference to SSR-4 requirement was made.		
87.	FIN024	5.57 before 5.57/sub title		The title in SSG-6 is "Loss of services" while SSG-7 uses "Loss of support systems". Choose one and use it consistently, or are the two facilities so different that the different subtitles are justified?	X			
88.	INDO 05	5.57 /3	To fulfil the requirement established in para. 6.89 of SSR-4 [1], an emergency power supply should be provided at least for… (a) Criticality accident detection and alarm systems, **CAAS**	This system already known as ‘Criticality Accident Alarm System (CAAS)’. Hence, delete ‘detection and’.			X	The term is in line with SSG-27
89.	FIN025	5.59	~~Loss of~~ criticality ~~safety~~ due to loss of safe geometry or loss of moderation	Wouldn't it be simpler and better to just say criticality due to		X Combined with CAN23 comment		

90.	CAN23	5.59(c)	~~Loss~~**Reduction** of criticality safety due to loss of ~~safe~~ **favourable** geometry	Criticality safety is not necessarily lost in this way. See 5.16 above for favourable.	X			
91.	FIN026	5.60 after 5.60		Handling errors are not discussed! Are they not relevant? (See SSG-7, 5.71-5.72)			X	We do not say handling errors are not relevant, however these were not covered in SSG-5 and 6 up to now, only in SSG-7 in accordance with graded approach. Handling errors are mentioned in para 5.8. The experts did not see any further specific guidance to be provided, requirement is applicable.
92.	UK13	5.61 / 1	Particular consideration should be given to the containment **of** highly corrosive HF	Grammar.	X			
93.	FIN027	5.62		Cross compare between SSG-6 5.62 and SSG-7 5.74 and see where/how they could be harmonised?	X			
94.	RUS10	5.64 and References	The first sentence is proposed to complete by referencing the Safety Guides associated with SSR-1 and include these references into REFERENCES.	Completeness		X The associated Safety Guides are listed in References and are enumerated in Section 4.		
95.	FIN029	5.65		Is there no need for emergency control panels in a uranium			X	This is one of the examples where

		after 5.65		facility like in SSG-7, 5.78 or a tsunami paragraph like SSG-7, 5.79?				following the graded approach such recommendation is not provided for SSGs 5 and 6 considereing much lower hazards types of facilities.
96.	JPN05	5.65 after 5.65.	5.65.A Depending on the uranium fuel fabrication facility's site characteristics and location, as evaluated in the site assessment (Section 4), the effect of a tsunami induced by an earthquake and other extreme flooding events should be addressed in the facility design.	The effects on a tsunami induced by an earthquake should be added to keep a consistency with para. 5.79. in DS517C.	X			
97.	FIN028	5.65(d)		could the items i) to iii) be on separate lines, for clarity?			X	This is done by technical editors to be consistent with other safety standards.
98.	FIN030	5.67	… To evaluate the possible effects of flammable liquids, toxic spills, volcanic ashes, falling objects (such as chimneys), air shock waves and missiles resulting from explosions, their distance from the facility		X			
99.	RUS11	5.68 Extreme weather conditions	Extreme meteorological conditions	In compliance with SSR-4		X Meteorological phenomena as in SSR-4		
100.	CAN24	5.74	structures, systems and components important to safety ~~at risk of~~**when vulnerable to** damage	See 5.44. vulnerable seems to be the intended term, not risk.	X			
101.	RUS12	5.77.	For evaluating the consequences of impacts or the adequacy of the design to resist	Correctness and consistency with SSR-4	X			

			aircraft impacts, crash scenarios included in the design basis should be considered					
102.	FIN031	5.77/3	… which may require knowledge of such factors as the possible angle of impact, velocity or the potential for fire and explosion due to the aviation fuel load.	SSG-7, 5.91	X			
103.	FIN033	5.81	Provision should be made for the automatic measurement and recording of values of parameters that are important to safety and where applicable, manual periodic testing should be used to complement automated continuous testing of conditions.	SSG-7, 5.95 has this added to the end of the paragraph. Is this not relevant for uranium facility?	X			
104.	CAN11	5.83	change (1) as follows. I&C relating to criticality control and criticality detection and alarm: Depending on the method of criticality control, the control parameters usually include mass, density, moisture content, moderation, poisoning, reflection and spacing between items Radiation detectors […]	Consistency with SSG5&7	X			
105.	FIN036	5.83 (6)/3	… such as X ray generators and radioactive sources (for monitoring …		X			
106.	INDO07	5.83 /22 and 32	5.83. Safety related I&C systems of a uranium fuel fabrication facility should include systems for the Following… (5) Control of gaseous and liquid effluents. Real time measurements should be provided if there is a risk of exceeding regulatory limits; otherwise, retrospective measurements on continuously sampled filters and/or probes will generally	(5) and (7) are the same. Hence consider deleting either one.	X			

			be sufficient…. (6) ... ~~(7) Control of gaseous and liquid effluents. Real-time measurements are necessary if there is a risk of authorized limits being exceeded; otherwise, retrospective measurements on continuously sampled filters or probes should be sufficient.~~					
107.	FIN034	5.83 (1)	~~I&C relating to criticality detection and alarm:~~ Criticality detection and alarm system and building evacuation systems	As in SSG-7, 5.97! There is no need to repeat I&C relating as it is already in the beginning of the paragraph.	X			
108.	FIN035	5.83 (5)	The detection and alarm system of abnormal releases should be ensured.	Is there no need to ensure the detection and alarm system of abnormal releases, like in MOX facility (SSG-7, 5.97 (6&7) second dash)	X			
109.	INDO 06	5.83 /3	(1) I&C relating to criticality detection and **accident and alarm system**	This system already known as 'Criticality Accident Alarm System (CAAS'			X	The term is in line with SSG-27
110.	CAN25	5.83(5) (7)	(5) …if there is a ~~risk of~~ **foreseeable potential for** exceeding regulatory limits (7) … if there is a ~~risk of~~ **foreseeable potential for** authorized limits being exceeded	See 5.44. Foreseeable is used here instead of credible, meaning that it may not be perceived as credible but foreseeable if the probability perception is incorrect.	X			
111.	FIN037	5.85	- The ease of operator intervention in all facility states; - Possible effects on safety of inappropriate or unauthorized human actions (with account taken of ease of ~~intervention by the operator and~~ tolerance of human error);	See SSG-7 5.99	X			

112.	FIN038	5.87	The safety ~~analysis~~ assessment of uranium		X			
113.	RUS13	5.87.	The second sentence should be redefined because there is no requirement established in GSR Part 4 which requires that "all credible postulated initiating events shall be assessed".	Consistency with GSR Part 4	X			
114.	FIN039	5.88 after 5.88		Is a similar paragraph as SSG-7, 5.104 not needed for uranium facility?			X	Compared to MOX fuel fab.facilities uranium fuel fab. facilities are much simpler, with more unified designs and lower hazards. Following the graded approach, it was decided not to include similar guidance to SSG 5 and 6.
115.	FIN040	5.89		Why different numbering between SSG-6, 5.89 and SSG-7, 5.105, and why so different wording? In SSG-7, the public exposure is in its own paragraph!		X Text harmonized between the documents. Some differences are caused by different elements (assumptions) which are highlighted for a specific type of facility.		

116.	RUS14	5.89.	A facility specific, realistic, enveloping and robust (i.e. conservative) assessment of internal and external occupational exposure and exposure of the public during normal operation and anticipated operational occurrences should be performed on the basis of the following assumptions…	Clarification of operational states of facilities	X			
117.	FIN041	5.90	… fuel fabrication facility ~~would generally be limited to~~ could cause consequences for individuals …	SSG-7, 5.111	X			
118.	RUS15	5.90.	Proposed to give recommendations and/or references how to evaluate the toxic exposure.	Completeness		X Given in 8.50		
119.	FIN042	5.91		Move this to the beginning of this section, at 5.90 as in SSG-7.	X			
120.	FIN043	5.93 around 5.93	Accident consequences should be assessed in accordance with the requirements established in GSR Part 4 (Rev. 1) [15] and with relevant parts of its supporting Safety Guides.	Is paragraph SSG-7 5.113 not relevant for uranium facilities?	X			
121.	RUS16	5.93	Please, clarify the sources (references) for definition of the approaches recommended in this para and confirmation of it applicability to the safety analysis according to Requirement 20 (paras 6.65-6.72) of SSR-4.	Clarification and consistency with SSR-4	X			The two approaches were identified by the experts in consultancy meetings as approaches implemented and provide practical guidance. These are consistent with requirements in SSR-4.
122.	RUS17	5.93 (2) Second sentence	(2) …It should be then demonstrated in a conservative way, taking no account of any (active) structures, systems and components	According to Requirement 16 of GSR Part 4, the detailed acceptance criteria may be	X			Yes we agree and that is exactly what is meant by this

			important to safety or administrative measures, that the consequences of these limiting accident conditions are within established acceptance criteria.	developed that could be facility dependent.				provision. Reference to GSR Part 4 added for better clarity.
123.	RUS18	5.94. First sentence and 5.95 last sentence	The first sentence of para 5.94 is a duplication of the last sentence of para 5.95 and should be excluded.	Duplication	X			
124.	HUN01	5.99	"subcriticality" instead of "sub-criticality"	it should be one word like in the rest of the guide	X			
125.	RUS19	5.100	It is proposed to move the para to the beginning of the section "Safety analysis" as general information related to safety analysis as a whole.	Consistency and coherence of the document			X	The sections are in chronological order, assessment of consequences should not be listed before safety analysis.
126.	FIN044	5.100 (a)	Analysis of the actual site conditions (e.g. meteorological, geological and hydrogeological site conditions) and conditions expected in the future…	SSG-7, 5.119	X			
127.	FIN045	5.101	Considerations for interface between safety and security 5.101. The analysis of the site …	Should this be a subtitle?	X			
128.	GER013	5.101	~~Considerations for~~ The interface between safety and security should be considered. 5.101A The analysis of the site conditions involves a review of the meteorological, geological and hydrological conditions at the site that may influence facility operations or may play a part in transporting material or transferring energy that might be released from the facility.	Two different issues within one paragraph, we suggest to separate both issues in two distinct paragraphs.	X			

129.	INDO 08	5.101	5.101. ~~Considerations for interface between safety and security.~~ The analysis of the site conditions involves a review of the meteorological, geological and hydrological conditions at the site that may influence facility operations or may play a part in transporting material or transferring energy that might be released from the facility.	There's no correlation between the first and the second sentence. Hence, consider deleting the first sentence.	X			
130.	FIN04 6	5.103	The identification of personnel and members of the public (the critical group ~~of maximally exposed off-site individuals~~) who may potentially be	This was removed form SSG-7 5.122. OR if you keep it here, keep it also there.	X			
131.	FIN04 7	5.106 after 5.106		SSG-7 has here a few paragraphs (5.126 & 5.127) concerning emergency preparedness and response. Wrong place in SSG-7 or not relevant for SSG-6?	X			
132.	FIN04 8	5.107	MANAGEMENT OF RADIOACTIVE WASTE ~~AND EFFLUENTS~~	Move effluents to next subtitle, like in SSG-7.	X			
133.	FIN04 9	5.107	The general requirements for optimization of protection and safety for waste and effluent management and the formulation of a waste strategy are established	Why different wording between SSG-6 5.17 and SSG-7 5.128 when referring to other IAEA standards and guides?	X			
134.	RUS2 0	5.107.	The general requirements for safety for waste and effluent management	There are no specific requirements for optimization of protection in mentioned standards.	X			
135.	FIN05 0	5.110 after 5.110	Quality control regimes should be applied to the treatment and disposal of waste from all streams to ensure compliance with authorizations for disposal.	Is this no relevant for uranium facility: quality control to ensure compliance with authorization in SSG-6? (see SSG-7 "5.130	X			

136.	UK07	5.110 / 5 - 7	Change the last sentence in Para. 5.110 to "An appropriate balance should be sought between the benefits of recovering useful material, the solid and liquid waste generated and the environmental and fiscal impact".	A balance should be struck between waste generated and disposed of (lost), either solid or liquid, the impacts of those losses (environmental and value) and the cost and environmental impacts of recovering useful material. The current wording seems to just refer to balancing solid waste loss with liquid effluent loss. In addition to balancing uranium loss and liquid effluents, other factors should be considered such as energy usage, costs etc.	X			
137.	FIN05 1	5.111	MANAGEMENT OF GASEOUS AND LIQUID ~~RELEASES~~ EFFLUENTS	SSG-7 has effluents in this heading? Are the two so different that is justifies the difference in the title?	X			
138.	FIN05 2	5.111 before 5.111	uranium fuel fabrication facilities should be designed so that effluent discharge limits can be met in normal operation and accidental releases to the environment are prevented.	Is there a need to design the facility so that effluent discharge limits can be met? (see SSG-7, 5.131)	X			
139.	UK08	5.111	Change Para. 5.111 to "Liquid effluents to be discharged to the environment should be monitored, treated **and managed** as necessary to reduce the discharges of radioactive material and hazardous chemicals.	Management of liquid effluents to protect the environment can also involve treatment to dilute in some circumstances, or also to discharge in a certain manner (e.g. with tides) to minimise environmental impact. Minor modification to sentence to capture the spirit of this comment (e.g. managing the environmental impact by discharging with the tide. Dilution would be a form of treatment.	X			

140.	FIN053	5.122		Different wording in SSG-6 5.122 and SSG-7 5.149 for the same thing, obviously SSG-7 misses the reference to SSR-4.	X			
141.	RUS21	5.124	An ageing management programme should be implemented at the design stage to allow timely identification of unacceptable degradation of structures, systems and components, its maintenance or anticipating equipment-replacements.	The para should be supplemented because ageing management programme should be implemented not only to allow timely maintenance or replacements but also identification of unacceptable degradation of structures, systems and components	X			
142.	FIN054	5.125 End of section 5	Design provisions for decontamination and decommissioning 5.xxx. To facilitate decontamination and the decommissioning of the facility, surface areas of the MOX fuel fabrication facility where there may be contamination should be non-porous and easy to clean. This may be achieved by applying special coatings to surfaces and ensuring that no areas are difficult to access. In addition, all surfaces that could become contaminated should be made readily accessible to allow for periodic and incidental decontamination. 5.xxx. The design should allow dismantling of the equipment within gloveboxes rather than using destructive techniques during the decommissioning.	Is there really no need for designs provision for decontamination and decommissioning in Uranium facility as in MOX facility? (see SSG-7 5.152 &5.153)			X	Commensurate with the hazards of this type of facility guidance as in SSG-7 was not included. Nature of UF6 and Plutonium in MOX facilities is very different. This does not mean ease of decontamination should not be part of the design, but no specific guidance in provided.
143.	FIN055	6.2, 6.3 and 6.4		Can paragraphs 6.2-6.4 in SSG-6 and paragraphs 6.2-6.4 in SSG-7 somehow be harmonised? Are there requirements that are in one but are missing from the other though relevant for or applicable to it?	X			

144.	FIN057	7.02 (1)/6		See SSG-7 7.2 (1), are there issues like training personnel etc that would be relevant also for a uranium facility?	X			
145.	FIN056	7.02/1		Could the phases be listed here as in SSG-7 7.2? Or is it considered not needed?	X			
146.	ISR05	7.2		The first phase (inactive–cold processing) of the main three phases of commissioning, points out the need for availability of sufficient operating personnel for qualification of this phase and training of the personnel in the operation procedures (including maintenance, safety requirements and emergency procedures). Although it is obvious, we suggest to refer shortly to these points of personnel qualification and training, also regarding the next two phases of the commissioning (Uranium commissioning and Plutonium-hot processing commissioning), or in common for all three phases of the commissioning. Remark: In the parallel paragraphs 7.2 of the commissioning sections in DS517A and DS517B the commissioning is divided into ("only") two main phases (inactive-cold and active-hot), and there is no mentioning of personnel qualification and	X			

				training in any of these phases of the commissioning.				
147.	CAN12	7.2 (2)	“Testing in the second step should be carried out with the use of natural **or depleted** uranium to prevent risks of criticality, […]”	Depleted uranium is as convenient as natural uranium for the testing	X			
148.	FIN059	7.4 and 7.5		Different order of 7.4 and 7.5 in SSG-7! Consistency needed between the two.	X			
149.	FIN060	8.2		Is this to mean " recent developments have made individual processes fully automated, which helps ..." or “recent developments have included full automation which…”? There is something in the sentence that doesn’t work and makes it a bit difficult to understand.	X			
150.	FIN061	8.6	Personnel should be provided periodically with basic training in criticality and radiation safety and emphasis should	How about criticality safety? Not relevant for uranium facility? (SSG-7 8.6)	X			
151.	FIN062	8.6	OPERATIONAL DOCUMENTATION	SSG-6 uses the title Operational documentation while SSG-7 uses Facility operation. Choose one and use the same in both documents!	X			
152.	GER014	8.6	Personnel should be provided periodically with basic training in radiation and, in case of handling of enriched uranium, criticality safety and emphasis should be made on protection from radiation exposure, chemical hazards and emergency preparedness and response.	Specification.		X Combined with other comments		
153.	RUS33	8.6	Personnel should be provided periodically with basic training in **nuclear and** radiation safety	Requirement for training in nuclear safety was not considered	X			

154.	RUS34	8.6	Personnel shall be prepared to act in design basis and beyond design basis accidents.	Requirement of Russian regulatory documents			X	No shall statements are allowed in Safety Guides.
155.	RUS35	8.6	The building of a safety culture for personnel should be an integral part of training.	Follows from the Principle 3 «Leadership and management for safety», paragraph 3.12 of SF-1 «Safety Fundamentals»		X We agree and this is covered in Section 3		
156.	RUS36	8.6	In addition, personnel should be provided periodically with basic training **in nuclear and** radiation safety.	Additional requirement	X			
157.	RUS37	8.6	Emergency drills shall be periodically conducted to train the personnel to act in emergency conditions.	Requirement of Russian regulatory documents			X	No shall statements are allowed in Safety Guides. This is paraphrasing existing requirements.
158.	RUS38	8.6	Training shall be provided in the mitigation of chemical effects and the detection of over-exposure.	Requirement 72 «Emergency preparedness», paragraph 9.125 of SSR-4 «Safety of Nuclear Fuel Cycle Facilities»		X Reference added		
159.	JPN06	8.6.	Personnel should be provided opportunities periodically to learn about basic topics ~~with basic training in~~ (e.g.criticality and radiation safety) and emphasis should be made on criticality control, protection from radiation exposure, chemical hazards and emergency preparedness and response.	The basic training for criticality control is important at uranium fuel facilities stated in para 9.41 in SSR-4. It also stated in MOX fuel facilities in para. 8.6 in DS517C.		X Combined also with other comments		
160.	RUS22	8.7 Second sentence	In particular, personnel with responsibilities and expertise in safety analysis and safety assessment as well as in operational safety including radiation protection personnel and nuclear criticality safety staff should be provided…	Practical expertise in operational safety particularly in radiation protection and criticality safety is also very important regarding the interface between safety and security.	X			
161.	RUS23	8.7 Operational	Proposed to rename as “Management of operational safety and facility operation” as more relevant.	In compliance with the content of subsections “Management of			X	This section is limited to

		documentation		operational safety" and "Facility operation" of SSR-4.				Operational documentation
162.	JPN07	8.8 after 8.8.	8.8A. Close attention should be paid to the prevention of events during non-routine operations and supporting operations such as decontamination, washing and preparation for maintenance or testing.	Attention for non-routine operations and secondary operation shouls be paid stated in para 9.52 and 9.70 in SSR-4 and it also states in para. 8.15 in DS517C.			X	We agree in principal, however, in line with graded approach the experts considered to underline this mainly for MOX facilities which have large OLCs and do frequent non-routine operations.
163.	FIN063	8.10	Examples of limits on operating parameters for safe operation (SSR-4 [1], pa	SSG-7 8.17	X			
164.	FIN064	8.12	8.12 In a uranium fuel fabrication facility, the safe operational state attained after any anticipated operational occurrence is often the shutdown state. Nevertheless, specific operating procedures should be used for the shutdown of certain equipment such as UF6 vaporizers, rotary kilns for uranium dioxide and sintering furnaces. 8.xx Operating procedures to directly control process operations should be developed. The procedures should include directions for attaining a safe state of the facility from all anticipated operational occurrences and accident conditions. Procedures of this type should include the actions required to ensure criticality safety, fire protection, emergency planning and environmental protection.	Could this be an own paragraph like in SSG-7 8.20 and 8.21?	X			

165.	JPN08	8.13 after 8.13.	8.13A. Procedures should be developed for planned outages of production needed for activities such as inventory checking, maintenance and other operational needs. These procedures should specify systems for ensuring fissile materials are returned to their safe locations. The duration of scheduled activities and relevant compensatory measures should be specified in the procedures.	Proceduers for planned outages should be described as the same as para. 8.23. in DS517C.	X			
166.	JPN09	8.14.	~~All~~ Maintenance activities in a uranium fuel fabrication facility should be pre-authorised on the basis of a safety assessment.	To keep a consistency with para. 8.25 in DS517C.	X			
167.	CAN13	8.15	"For maintenance performed in areas containing ~~or near~~ enriched uranium **(or near such an area)**, criticality safety staff should […]"	Misprint		X Combined with the next comment.		
168.	FIN065	8.15	Before a maintenance is performed in areas where fissile material is located, criticality safety staff should be consulted (see also para. 5.46 of SSG-27 [2]).	SSG-7, 8.27, formulation is simpler and clearer	X			
169.	FIN066	8.18	(f) Verifying that after maintenance is performed the work area and equipment have been placed back within normal safe condition.	Is verification that everything is back in normal safe condition no needed like in SSG-7 8.28 (f)	X			
170.	GER015	8.18 (d)	Safety precautions for work, e.g. specification of safety precautions, ensuring the availability of fully functional personal protective equipment and ensuring its use, and emergency response procedures.	Specification.	X			
171.	RUS24	8.19. First sentence	Changing equipment configurations during maintenance to abnormal settings and hence unexpected operational modes with no prior safety analysis or operational limits and conditions should be prevented.	The sentence is a recommendation in such wording	X			

172.	FIN067	8.26	8.26 The aging management programme should consider the technical as well as the non-technical aspects of ageing and its effectiveness should be regularly assessed and reviewed (see also para. 5.124). 8.xx The periodic tests and inspections should be completed by regular checks performed by operating personnel, such as: …	This could be as its own paragraph as in SSG-7 8.36.	X			
173.	RUS26	8.26 Subsection "CONTROL OF MODIFICATION"	The subsection should be supplemented by referencing to relevant requirements of SSR-4.	Completeness and compliance with SSR-4	X			
174.	RUS27	8.26 Subsection "CONTROL OF MODIFICATION"	The term "modification control form" does not used neither in SSR-4 nor NS-G-2.3 and proposed to be changed in accordance with these safety standards.	Compliance with SSR-4 and NS-G-2.3	X			
175.	RUS25	8.26.	The aging management programme should consider the physical as well as the non-physical aspects of ageing and its effectiveness should be regularly assessed and reviewed (see also para. 5.124).	In compliance with para 1.2 SSG-48	X			
176.	FIN068	8.27	… equivalent management tool. 8.xx The modification control form should contain a description of what the modification is and why it is being made. The main purpose of the modification control form is to provide the basis for a	This part should be an own paragraph or at least not part of this on. This is rather to give advice how to fulfil the requirement in the previous sentences and deserves thus to be separated. (see SSG-7 8.37 ->). In	X			

			safety assessment of the modification. The modification control form should be used to identify all the aspects of safety that may be affected by the modification, and to demonstrate that adequate and sufficient safety provisions are in place to control the potential hazards.	SSG-7 this paragraph is part of the paragraph just before the one corresponding to 8.29 of this document. Also, add relevant parts of SSG-7 8.39.				
177.	FIN069	8.28/3	… modification projects are carefully considered. The safety of modifications should be assessed for potential hazards during installation, commissioning and operation. Decision making relating to modifications should be conservative.	Is there no need for assessing hazards during installation, commissioning and operation like in SSG-7 8.39.	X			
178.	RUS28	8.29 Third sentence	The provision "The depth of the safety arguments and the degree of scrutiny to which they are subjected should be commensurate with the safety significance of the modification" is proposed to be put in separate para as having specific and important meaning.	Editorial.	X			
179.	FIN070	8.32	… Therefore, changes to the facility or its documentation should be reviewed, assessed and endorsed from the safety perspective before approval and implementation. In addition, the interface with security should be evaluated to verify that they do not compromise each other.	The wording in SSG-7 8.44 is simpler and clearer. Although the security aspect in a separate sentence is better.	X			
180.	CAN26	8.35	CRITICALITY **HAZARD** CONTROL	Title. The text refers to control of the criticality hazard. This is very different to control of criticality (an accident here). The term "criticality control" is common in SSR-4 but not needed here. The topic is hazard.	X			

181.	GER016	8.35	The requirements for criticality safety in uranium fuel fabrication facilities are established in SSR-4 [1], para. 9.83 – ~~9.85 and~~ 9.86, and […]	Editorial.	X			
182.	RUS30	8.36 (a)	Prevention of unexpected changes in conditions that could increase the risk of a criticality accident; for example, unplanned accumulation of uranium compounds (e.g. in ventilation ducting), inadvertent precipitation of material containing uranium in storage vessels or loss of neutron absorbers;	«Anticipation» is not enough for safety.	X			
183.	CAN27	8.36(a)	… increase the ~~risk~~**probability** of a criticality accident	Probability is better than risk here. The consequences could be larger, compensating the lower probability, leading to a higher risk. This applies, e.g. to water reflection which shields people from some of the radiation. A bare critical system also includes more fissile material than a reflected critical system, potentially increasing the consequences.	X			
184.	CAN14	8.38	"**The collection of ~~W~~w**aste and residues arising from decontamination activities should be ~~collected in containers with a favorable geometry~~ **considered in the criticality safety analysis**"	Waste and residues from decontamination are hardly ever collected in geometrically safe/favorable containers (not necessary). Criticality control is almost always achieved by a mass limit.	X			
185.	CAN28	8.38	in containers with a favo**u**rable geometry.	Just consistent British English spelling. Note that favourable is used, not safe.	X			

186.	FIN071	8.40		Why the different wording between SSG-6 8.40 and SSG-7 8.51 when referring to other standards	X Harmonization was achieved through technical editing.			
187.	FIN075	8.40	section INDUSTRIAL AND CHEMICAL SAFETY	Industrial hazards like those in SSG-7 8.72, 8.75, 8.77-8.80 are missing! Add those that are relevant for uranium facilities!	X			
188.	RUS29	8.41 Second sentences	In uranium fuel fabrication facilities, insoluble compounds of uranium such as the uranium oxides UO2 and U3O8 pose a particular chemical hazard because of their long biological half-lives (and therefore effective half-lives)…	Clarification.	X			
189.	FIN072	8.41/2		"members of " was removed in SSG-7 8.54 but not in SSG-6 8.41. Consistency both within this document and the two is needed.	X			
190.	FIN073	8.42 (b)/3	Specifying protective measures in the work ~~permit protective measures~~	SSG-7 8.56 or is original order of words is used it should also be changed in SSG-7.	X			
191.	CAN29	8.45 (j)	increases the ~~risk of~~**potential for** causing contamination	"potential for" appears to be better.	X			
192.	USA05	8.45(b)	Add the following new sentence at the end: "Surveillance of the ventilation system should be conducted to detect any unwanted accumulation of fissile and radioactive material."	Unwanted accumulation of uranium can occur within certain locations in ventilation ducts resulting in criticality and radiation hazards.	X			
193.	FIN074	8.47	expected level of airborne activity**,** contamination levels and radiation type, and the ….	SSG-78.62	X			

194.	FIN076	8.58	The industrial and chemical hazards ~~found~~ present in… d) Gas storage bottles becoming missiles; e) Chemical hazards in the laboratory; f) Potential fire hazards including metallic fires involving zirconium metal shavings.	What about industrial hazards like in SSG-7 8.71?	X			
195.	JPN10	8.58 after 8.58.	8.58A. The occupational exposure to chemical hazards should be assessed similarly to the assessing of radiation doses and should be based upon the collection of data from air sampling in the workplace, in combination with personnel occupancy data. This method should be assessed and reviewed as appropriate by the regulatory body. The acceptable levels of occupational exposure for various chemical hazards in a fuel fabrication facility can be found in Ref. [XX].	Occupational exposure to chemicals should be described as the same as para. 8.72. in DS517C.	X			
196.	RUS31	8.58	— Chemical hazards due to the presence of UF_6, HF (including produced through hydrolysis of UF_6 in contact with air moisture), F2, HNO3, NH3 and uranium compounds;	UF_6 also presents chemical hazards as a gas and source of HF and needs to be confined.	X			
197.	FIN077	8.64/4	… should be carried out to ensure that new filters are correctly seated and yield a removal efficiency as used in the analyses	SSG-7 8.84	X			
198.	RUS32	8.66.	The phrase “One easy way to minimize the generation of solid radioactive waste - is to remove as much outer packing as possible before material is transferred to contamination areas” is unclear and needs clarification.	Clarification.	X			
199.	FIN078	8.75	… Useful information on the causes and consequences of many of the most	Add a reference to where useful information can be found like SSG-7, 8.92	X			

			important anomalies and accidents that have been observed in … fabrication facilities and other nuclear fuel cycle facilities is provided in Ref. [xx]					
200.	GER017	8.75 Line 3	… It should also include the evaluation of trends in operational disturbances, trends in malfunctions, near misses and other incidents that have occurred at ~~the research reactor~~ uranium fuel fabrication facilities and, as far as applicable, at other nuclear installations.	Mistake.	X			
201.	CAN15	9.3	Add: "…is controlled by geometry **or moderation or poisoning. Care should also be taken for possible changes in the fissile material form.**"	Decommissioning activities have an impact not only on geometry. Removal of an absorber, addition of a moderator, etc. may also arise and lead to a criticality risk.	X			
202.	CAN30	9.3	when handling equipment containing nuclear material **for** which **subcriticality** ~~criticality safety~~ is controlled by geometry	Subcriticality is appropriate; criticality safety is not.	X			
203.	GER018	9.6 (c)	The radioactive waste anticipated remains compatible with available (or planned) interim storage or storage capacities and disposal considering its transport and treatment.	According to IAEA Safety Glossary 2018 "storage", using of solely "interim" might not be fully appropriate.		X Following the guidance in IAEA Glossary: " Storage as defined above should not be described as interim storage."		
204.	RUS39	9.6 (c)	The radioactive waste anticipated remains compatible with available (or planned) interim storage capacities and disposal considering its transport and processing.	Processing is more general and relevant term.	X			
205.	RUS40	Annex I	Figures need to be clarified – different colours of the letters and types of lines (e.g. dotted)	Clarification	X			All figures will be re-drawn into new graphics.