Resolution of Comments

SSG-5: Safety of Conversion Facilities and Uranium Enrichment Facilities (DS517)

COMMENTS BY REVIEWER **Reviewer:** **Page.... of....** **Country/Organization:** **Date: 16 July 2021**					**RESOLUTION**			
No.	Comment	Para/Line No.	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/ rejection**
1.	GER001	General	*We are missing certain consistency in processing of Member States comments: as far as text blocks are often very similar in all three drafts, it is expected that comments, accepted in one draft, would be checked and transfared to others, even if not explicite requested by reviewers. Up till now it was not always the case. We would like to put your kind attention to this issue*	As example can serve comments # 2, 6, 7, 12, 19 and others from the current table, which were already submitted by Germany and accepted in Step 7 for the other two drafts of DS517, namely DS517B and DS517C.	X			We agree, detailed harmonization was performed during Step 9 between the three SSGs. This does not mean that some differences will not occur. This is also due to the application of graded approach to different hazard category facility types. Harmonization was achieved through detail technical editing.
2.	RUS02	General All text (paras 5.20, 5.97, 5.105)	The statement “shall” have to be excluded and/or replaced by “should”.	In accordance with the Introduction to the IAEA Safety Standards	X			
3.	GER002	1.2 Line 4	…. The conversion process and the enrichment process rely to a large extent on operator	Clarification – passive safety measures should be mentioned first.	X			

			intervention and administrative controls to ensure safety, in addition to passive and active ~~and passive~~ engineered safety measures.					
4.	USA01	1.2	Add the word “can” before “rely.”	Certain enrichment facilities may not rely to a large extent on operator intervention.	X			
5.	RUS01	1.3	The safety of conversion facilities and uranium enrichment facilities is addressed by means of ……. and decommissioning, **as well as design and manufacturing of equipment**.	As per legislative acts, laws and regulations, including Federal Law No. 170-FZ of November 21, 1995 on The Use of Atomic Energy, “design and manufacturing of equipment for nuclear installations” is deemed as Safety Related along with other activities in the area of the nuclear energy use.			X	The design is already listed, manufacturing of equipment we agree but this is part of the construction phase. The intention is not to enumerate all factors but to make a link to general phases of a life-cycle of this type of nuclear installations.
6.	GER003	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,	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.”		

			associated conditioning and storage of waste, and facilities for the fuel cycle related research and development) are established in SSR-4 [1].					
7.	GER004	1.6 Line 9	…. These recommendations are supplemented by more detailed guidance on criticality safety 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.
8.	USA02	1.6	Delete the sentence "At the present enrichment…" to remove reference to gaseous diffusion process from this paragraph and the rest of the document.	This guide was initiated in the early 2000s. However, the last gaseous diffusion plant was shut down several years later. The likelihood of a gaseous diffusion plant being built in the future anywhere in the world is near zero.		"The provisions of this Safety Guide are applicable to the gas centrifuge enrichment process."		To make the scope clear and explicit.
9.	USA03	1.6	Add a sentence or two explaining why this guide only applies to facilities with enrichments below 6%.	For advanced reactors, including SMRs, the potential and need for designing and building enrichment facilities for up to 20% enrichment is high and real.			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 is ongoing in a parallel project.
10.	GER005	2.1	In conversion facilities and enrichment facilities, large amounts of uranium compounds ~~(in gaseous, liquid or solid state)~~ are present ~~in a dispersible form~~: - In conversion facilities~~, uranium exists in diverse chemical and physical forms and is used in conjunction with flammable or chemically reactive substances as part of the process.~~ the raw uranium mining product is processed to UF_6, thus various chemicals being e.g. flammable and hazardous are used, and different uranium	Corrections to avoid misleading		X		See the revised text.

			compounds in gaseous, liquid, dissolved or solid state are handled, too. In enrichment facilities, most of the uranium is in the chemical form UF6.					
11.	USA04	2.1	Replace the word “are” with “can be.”	All enrichment facilities do not contain large amounts of uranium compounds in dispersible form.	X			
12.	RUS03	2.2 Line 2	Proposed to delete	It is not a hazard	X			
13.	GER006	2.5	The chemical toxicity ~~hazards~~ of ~~uranium in a *soluble form* such as~~ UF6 is more significant than its radiotoxic hazards. Along with UF6, ~~large quantities of~~ hazardous ~~chemicals such as~~ HF is ~~are~~ present~~.~~ If released, ~~Also, when~~ UF6 ~~is released, it~~ reacts with the ~~moisture~~ water in the air ~~to produce~~ mainly to HF and water-soluble uranyl fluoride (UO2F2), which present additional safety hazards. Therefore, comprehensive safety analyses for conversion facilities and enrichment facilities should also address the potential hazards resulting from these chemicals.	This sentence needs further review and clarification. For example, it is no clear what is meant by “soluble form”, the moisture is water etc.	X			

14.	USA05	2.5	Begin the first sentence with “For lower enrichments and non-reprocessed UF6, the chemical…”	Although there is no clear cutoff where the radiotoxicity overtakes the chemical toxicity, it is understood that for lower enrichments the chemical toxicity dominates the radiotoxicity.	X			
15.	USA06	2.6	Begin the paragraph with “In general, conversion facilities…”	Since this does not apply to all facilities addressed by SSG-5.	X			
16.	CAN10	2.7	~~2.7. 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.	GER007	3.3	The integrated management system should be established and put into effect by the operating organization <u>in a timely manner before transitions between major stages</u> ~~early~~ in the lifetime of a conversion and uranium enrichment facility, to ensure that safety measures are specified, implemented,	Please put in accordance with Requirement 4 of SSR-4		X		See the revised text following the technical editor’s review.

			monitored, audited, documented and periodically reviewed throughout the lifetime of the facility or the duration of the activity.					
18.	GER008	3.7	…. In general: — Management responsibility includes the support and commitment of management necessary to achieve the objectives of the operating organization in such a manner that safety is not compromised by other priorities. — Resource management includes the measures necessary to ensure that the resources essential to the implementation of strategy and the achievement of the safety objectives of the operating organization are identified and made available. — Process implementation includes the activities and tasks necessary to achieve the goals of the organization. — Measurement, assessment, evaluation and improvement provides an indication of	In this paragraph priority to safety is missing. The proposed modification will align the draft with Requirement 5 of GSR-Part 2 and Requirement 3 of SSR-4.		X		See the revised text following the technical editor's review.

			the effectiveness of management processes and work performance compared with objectives or benchmarks; …..					
19.	GER009	3.9 After 3.9 New item	<u>There should be clear, written assignment of responsibilities, as criticality safety officer, radiation protection officer, and others.</u>	Please add this important item		X		This aspect was addressed by a more general para (3.6).
20.	UK20	3.9 / 3	The management should also ensure that all personnel ***are*** adequately trained to perform etc.	Grammar	X			
21.	UK01	3.10	Add a final bullet - make provision for succession planning and retention of corporate knowledge.	To ensure that knowledge is retained within the company	X			
22.	GER010	3.10 Line 4	… The management of operating organization should: — participate in the activities by determining the required personnel competence and providing <u>initial and periodic</u> training, as necessary;	Clarification		X		See revised para 3.11
23.	UK02	3.12 / 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			
24.	UK21	3.13 / 2,3,4	The procedures should specify all parameters	Grammar	X			

			which are intended to ***be controlled*** and the criteria ***that must*** be fulfilled.					
25.	FR01	3.14	The management system of uranium conversion (if applicable, **see 5.14**) and uranium enrichment facilities should include also […]	Clarification of "if applicable" (refers to the possible exclusion of the criticality risk according to para. 5.14)	X			
26.	UK03	3.18 / 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.
27.	GER011	4.1 Line 5	…. Risks posed by possible significant external hazards (e.g. earthquakes, accidental aircraft crashes, fires, accidential explosions in nearby public traffic, e.g. in a railway wagon with liquefied gas, and extreme weather conditions) will probably dominate in the site evaluation process and need to be incorporated into the design of the facility. …..	Additional risk		X Text harmonized with other comments and SSGs 5,6,7		
28.	USA07	4.3	After "…population" add "and sensitive population centers such as schools,	The risk of a potential exposure can vary by individual			X	We believe the proposed is included in the term "population"

			hospitals, nursing homes, and daycare centers”					
29.	RUS04	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.		
30.	GER012	4.8 After 4.7 new item	A periodic review of persistent applicability and identification of changes in those reasons which potentially require adjustment and reassessement of safety provisions should be performed.	Regard for ongoing applicability of reasons, and potential changes in them.		X Integrated within the last para.		
31.	RUS05	5.1 Subsection Specific engineering design guidance	This subsection doesn’t contain any specific engineering design guidance for conversion and uranium enrichment facilities and need to be renamed or supplemented.	Clarification	X			
32.	USA08	5.2	Delete the word “internal”	Even though internal exposure hazards dominate most release scenarios attributed to such facility types, the external exposure contribution should not be neglected	X			
33.	RUS06	5.3	**Protective measures** should be considered for processes or areas that could involve sources of high levels of external	Protective measures is a broader term, and, apart from the shielding, implies the staff protection by "time", "distance" , etc., that allows to keep up one of the basic principles of providing radiological safety – the principle of optimization.	X			

			gamma radiation, such as reprocessed uranium or newly emptied cylinders (e.g. exposure to daughter products of 232U and 238U).					
34.	RUS20	5.4	Lists of initiating events for design basis accidents and a list of beyond design basis accidents shall be established in the conversion and uranium enrichment facilities design.	Requirement of Russian regulatory documents		X New para 5.45 added		
35.	RUS21	5.5 a)	Proposed to redefine the provision since nuclear criticality accidents are not typically considered as design basis	Correctness and consistency with SSR-4	X			
36.	RUS23	5.5 and 5.6	The list of hazards for conversion and uranium enrichment facilities needs to be revised to be consistent with each other and Appendix of SSR-4 (e.g. there is no loss of electrical power considered for enrichment facilities with no reason).	Completeness and consistency of the provisions for conversion and uranium enrichment facilities with each other and SSR-4.	X			
37.	USA09	5.5(b)	After “tank” add “piping”	Tanks are not the only items containing HF and NH3	X			
38.	USA10	5.5(d)	Change to “fires resulting	H2 and solvents do not by themselves cause a fire	X			

			from exothermic reactions involving substances such as H_2 and solvents;"					
39.	FR02	5.5	Remove items 5.5 (e) and 5.5 (f)	Consistency with SSR-4 and para. 5.7: events 5.5(e) and 5.5(f) 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: […]")				
40.	FR03	5.6	Events listed in para 5.5 (a)-~~(e)~~**(d)** are of major safety significance as the might result in chemical and radiological consequences for personnel. ~~However,~~ **In addition**, they may also result in some adverse off-site consequences for public or the environment. **However**, a nuclear criticality (para. 5.5 (a)) would generally be expected to result in limited or no off-site consequences unless the facility is in close proximity to occupied areas. *[first sentence moved at this end of the para. and change in the linking words]*	Clarification (the original text could be seen as contradictory stating first that a criticality has little impact off-site and finally that events 5.5 (a)-(e) (i.e. including criticality) may result in some adverse off-site consequences.	X			
41.	RUS22	5.6	Proposed to redefine para	Correctness and consistency with SSR-4	X			

			or remove as such criticality accidents can't be considered as design basis (especially with serious consequences for the workers and the public)					
42.	USA11	5.6	Change "facility" to "location of the event" and after "areas" add "offsite."	The distance between the location of the event and an offsite individual is important	X			
43.	FR04	5.8	The potential occurrence of a criticality accident should be considered for facilities that process uranium with a 235U enrichment of more than 1%. ~~Particular consideration should be given to the potential occurrence of criticality accident for facilities treating various feed products including reprocessed uranium.~~	The first sentence is sufficient.			X	The two sentences are different, one applies to enrichment level, the other to reprocessed uranium.
44.	USA12	5.8	Change "treating" to "handling and processing"	Not all feed product are treated	X			
45.	FR05	5.9	Remove items 5.9 (d) and 5.9 (e)	Same comment as for para. 5.5: Consistency with SSR-4 and para. 5.11: events 5.9(d) and 5.9(e) are postulated initiating events (PIE) as listed in Appendix of SSR-4 (reminded in para. 5.11). If needed to emphasize of these particular PIE, it might be mentioned in 5.11 instead (e.g "Among these PIE, particular consideration should be given to: […]")				

46.	UK04	5.9 / (b)	The rupture of a cylinder containing liquid ***or gaseous*** UF6 or the rupture of piping containing liquid ***or gaseous*** UF6 (depending on the facility design for product take-off)	Potential for incidents involving gaseous as well as liquid UF6.	X			
47.	USA13	5.9(c)	Delete the term "especially for diffusion facilities"	These do not exist nor will they likely exist in future	X			
48.	RUS07	5.10	These hazards would result primarily in **chemico-toxic and** radiological consequences for site personnel, however may also result in some adverse off-site consequences for public or the environment. The last type of hazard on the list would generally be expected to result in limited or no off-site consequences unless the location of the accident is in close proximity to populated areas.	For enrichment facilities chemical toxicity factors of soluble uranium compounds, such as UF6, shall be of primary safety concern. These factors are more notorious than radiological risks. Along with UF6, there are a lot of other hazardous chemicals such as HF.	X			
49.	RUS08	5.10	Paragraph 5.10a to be added as follows: The potential occurrence of a criticality accident should be considered for facilities that process	Additional clarification	X			

			uranium with a 235U enrichment of more than 1%. Particular consideration should be given to the potential occurrence of a criticality accident for facilities treating various feed products including reprocessed uranium.					
50.	USA14	5.10	Start with "The hazards listed in para 5.9"	See 5.11	X			
51.	FIN001	5.10/1	These hazards would result primarily in radiological consequences for site personnel. However, they may also result in some adverse off-site consequences for public or the environment	Clarity: one thing in one sentence makes it easier to read and understand.	X			
52.	CAN01	5.13 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			
53.	CAN02	5.14	Add, after "see para. 6.138 of SSR-4 [1])": "as, for example, the use of recycled uranium."	In conversion facilities, one main reason of having U enriched by more than 1% is the use of recycled uranium.	X			
54.	FR06	5.14	If a conversion (~~or deconversion~~) facility processes natural uranium, depleted uranium or uranium …	Deconversion facilies are not concerned	X			
55.	CAN06	5.15	Add and delete: "Degree of moderation, e.g. by means of control of the ratio of hydrogen to 235U in UF6 cylinders and in	Hydrolysis products of UF_6 can have a significant impact on k_{eff} in UF_6 cylinders and in cascades due to their chemical composition.	X			

			~~diffusion~~ cascades, **taking into account the hydrolysis products of UF_6 (UO_2F_2 in particular) whose H/U ratio can be higher than the maximum retained for UF_6"**	Diffusion is not the only enrichment technique				
56.	FR07	5.15	*[second bullet]* – Geometry and~~/or~~ interaction […]	Controlling "interaction" is not an option when geometry is controlled	X			
57.	RUS09	5.15	— Mass and degree of enrichment of fissile material present in a process**;**	Exclude concretization, as limitation of these parameters is common for enrichment facilities in general and not only for those areas listed.	X			
58.	RUS10	5.15	- Degree of moderation, e.g. by means of control of the ratio of hydrogen to 235U in UF6 cylinders and in **gaseous centrifuge (diffusion)** cascades.	Content of light impurities is one of the main parameters of nuclear safety related to gaseous centrifuge cascade	X			
59.	CAN11	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	X			

				"geometrically safe" (slip?), 5.53, 5.56 (twice), 5.67 (twice),				
60.	CAN07	5.18	Modify the second sentence as follows: "This is generally achieved by determining the effective multiplication factor (k_{eff}), which depends on the mass, the distribution and the nuclear properties of uranium and all other materials with which it is associated, **including low temperature effects (in the parts of the process operating at temperature far below 0°C)**."	Some parts of enrichment plants can operate at very low temperatures. These temperature effects lead to an increase in the k_{eff} value (variation in UF6 and HF densities, impact on nuclear data).	X			
61.	CAN03	5.20	Replace the first bullet "mass" by: "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			
62.	CAN04	5.20	In the last bullet "Neutron absorbers": Change "shall" to "should"	Shall is for SSRs	X			
63.	CAN12	5.20	Under "neutron absorbers" .. and if there is a ~~risk of~~**potential for** degradation	The intended term appears to be potential, with no consideration of consequences.	X			

64.	RUS24	5.20 Line 4	Moderation…. the subcriticality of an individual UF6 cylinder should rely on moderation control.	The criticality control in this case could also include other types of control, e.g. control of reflection for array of UF6 cylinders.	X			
65.	UK05	5.20 / 13	the subcriticality of a UF6 cylinder should ***not*** rely only on moderation control.	To ensure that there is defence in depth.	X			
66.	GER013	5.21	In meeting the requirements 34 and 42 of SSR-4 [1] on protection against internal radiation exposure and against toxic chemicals~~~~ hazards, the following parameters should be minimized as far as possible:	Missing word.	X			
67.	RUS25	5.21 Line 1	The amount of UF6 in process areas, e.g. by limiting the size of crystallization (desublimation) vessels for liquid UF6 in both conversion and enrichment facilities;	The amount of UF6 in all states is important in process areas	X			
68.	RUS26	5.21 Line 2	The amount of radioactive material accumulated in the process vessels;	Unaccounted accumulation of nuclear material is crucial for criticality and external exposure consequently (not for internal exposure)		X We agree that it is important for external exposure as well, however also for internal exposure. The text was modified for clearance. Liquid UF6 is		

						highlighted as this represents highest concerns (overpressure).		
69.	RUS11	5.25	Add the following text: and also (vii) potential accumulation of nuclear fissile materials in ventilation elements (filters, ventilation ducts) for purposes of nuclear safety.	As a rule, filters and ventilation ducts are considered unsafe equipment ("O" type equipment under nuclear safety rules) so design of such equipment shall consider nuclear fissile material accumulation control requirements.	X			
70.	UK06	5.25	Add (vii) – the humidity and potential for moisture within the ventilation system.	To minimise the potential for filters to blind due to moisture.	X			
71.	RUS12	5.27 Last sentence	… Wherever possible, the layout of ventilation equipment should be such that the flow of air is from the personnel workplaces, traffic routes, personnel evacuation routes.	Clarification of requirements.	X			
72.	RUS27	5.27 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			
73.	RUS28	5.27	The first and second sentences are proposed to be reversed.	The second sentence is more general than the first.	X			
74.	USA15	5.28	Change "rely" to "reliance"	Editorial	X			

75.	UK07	5.29	Add “Where possible, the reliance on a single filter (e.g. during other filter maintenance or replacement) should only occur during shutdown of main processes within the facility.”	To ensure that redundancy in the filter system is not required during system maintenance activities.	X			
76.	USA16	5.29	After “practical” add a “.” Replace the rest of the sentence with the following new sentence “In designing ventilation systems, consideration should be given to preventing the potential for unwanted deposition of uranium due to insufficient air velocity or accumulation areas within the ducts. Means for periodically surveilling areas where accumulation could occur should be provided.”	Unwanted accumulation of uranium in ducts can cause criticality issues	X			
77.	USA17	5.33	Change “is likely to exist” to “could exist for normal operations”	Is likely implies there will be contamination there.	X			
78.	GER014	5.34	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			

			The state of the art in science in technology should be considered in the design of measures to minimize releases to the environment during normal operation.					
79.	UK22	5.34 / 1-2	The design should provide for the minimization of releases to **the** environment during normal operation by application of best available **techniques**.	Grammar. “techniques” has wider application than “technology”.	X			
80.	UK08	5.38	The efficiency of filters and their resistance to chemicals (HF and NH3), moisture in the ventilation system and high temperatures of the exhaust gases and fire conditions should be taken into consideration.	To minimise the potential for filters to blind due to moisture.	X			
81.	USA18	5.40	Delete this paragraph	It is redundant with 5.41		X		Both provisions relate to reprocessed uranium, however the meaning is slightly different. Paras were merged for better clarity.
82.	RUS13	5.41	When reprocessed uranium is processed, **additional protective measures should be considered** for protection	It is worth using the edition of section .5.35 (DS517B): In cases where reprocessed uranium is used, specific precautions should be taken to limit the exposure of personnel to the decay	X			

			of the personnel, because of the higher gamma dose rates from 232U daughters and fission products.	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.				
83.	UK23	5.41	When reprocessed uranium is processed, shielding should be strengthened for protection **of personnel**, …….	Grammar.	X			
84.	RUS14	5.42	In selecting the areas for storage of tailings, requirements on distance, occupancy time and shielding should be considered to minimize the direct exposure of the **personnel** to gamma and neutron radiation.	The areas for storage of tailings are located on the territory of industrial sites, so the exposure of 'the members of the public' is out of the question but the exposure of the personnel shall be controlled.	X			
85.	GER015	5.45 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"		

86.	USA19	5.47	Add (1)(i) and (2)(g) "Vehicles such as UF6 cylinder transporters and forklifts that use hydrocarbon fuel."	A vehicle fuel spill fire can conceivably result in liquifying and rupturing a UF6 cylinder under certain conditions.	X			
87.	USA20	5.48	Change "for the areas where:" to "to the areas where:" Also, after "voltage cables)" add "are present"	Editorial	X			
88.	RUS15	5.48(a)	high-risk fire sources such as diffusers are located;	Facilities with gaseous centrifuges are considered non fire-hazardous	X			
89.	CAN13	5.53	potential ~~risk~~ of HF generation	The term "risk" appears strange and since potential (without consequences) is all that is intended.	X			
90.	UK09	5.53	Add to end of Para. 5.53 – Where practicable, consideration should be given to the practicability of using fire extinguishing agents that could not result in criticality.	Water-based extinguishers may cause a criticality.		X Reference to para. 5.45 made		
91.	UK24	5.57 / (b) & (c)	Solid chemical compounds (in conversion facilities only: ammonium nitrate when in a high temperature environment); Monitoring of possible deposits should be implemented to prevent any accumulation of ammonium nitrate.	Bullet (c) relates to bullet (b), it is not a separate explosion source.	X			
92.	UK10	5.58 / 5	At the end of Para. 5.58 add "Flooding can potentially result in	During flooding items may float or be disturbed – they could impact or otherwise damage pipes / tanks etc. Also, tanks	X			

			buoyancy induced failure of vessels, pipes and equipment causing a loss of confinement".	themselves may float if empty and not fully secured.				
93.	UK11	5.60	In facilities where vessels and/or pipes containing water are present (including any installed firefighting systems), the criticality safety analyses should take into account the presence of the maximum amount of water that could be 20 contained within the room under consideration as well as the maximum amount of water in any connected rooms.	To recognize that water base fire fighting systems could fail and become a water source.	X			
94.	UK12	5.62 / 1	At the start of Para. 5.62 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			
95.	UK13	5.63 / 2	For conversion**, uranium recovery and enrichment facilities**, 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	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.		

			containment features such as bunds or drip trays of appropriate capacity. **For fissile material the configuration must ensure criticality safety**					
96.	UK14	5.65	To fulfil the requirement established in para. 6.89 of SSR-4 [1], an emergency power supply should be provided that can be deployed in a timely manner to provide back-up power, at least for:	To recognize that standby electrical power supplies must be made available in a timescale that will support delivery of required safety functions.	X			
97.	CAN14	5.66	could accumulate in an ~~unsafe~~ **unfavourable** geometry	Unfavourable is the established term.	X			
98.	USA21	5.66	Delete bullet on diffusion process	Diffusion is a legacy process, nor is it expected in future	X			
99.	RUS18	5.74 Section «External hazards » Page 22	Add sub-section “External malicious attacks threat”. Its content shall include standard requirements for physical protection of facilities.	Important safety and security aspect			X	Physical protection is out of the scope of the document (see the Scope section).
100.	RUS29	5.74	The first sentence is proposed to complete by referencing the Safety Guides associated with SSR-1 and include these references into REFERENCES.	Completeness		X		
101.	RUS30	5.78 Extreme weather	Extreme meteorological conditions	In compliance with SSR-4	X			

		conditions						
102.	UK15	5.78	2nd bullet changed as follows – The prevention of flooding of the facility including adequate means to evacuate water from the roof in cases of extreme rainfall and to prevent failure of water pipes due to freezing;	Pipework in roof spaces (or unheated areas) may freeze during low temperatures.	X			
103.	USA22	5.82	After "If" add "it is important from the standpoint of safety, or"	Although, the building temperature may need to be maintained, this may not be identified as a safety limit.			X	The sentence starts with "If **safety limits**…" which means it is only from the standpoint of safety.
104.	CAN15	5.84	structures, systems and components important to safety ~~at risk of~~**when vulnerable to** damage	Vulnerable seems to be the intended term, not risk.	X			
105.	UK16	5.85	Add "High tides, tsunamis and other effects of combined water levels should be given due consideration".	Other sources of flooding.	X			
106.	GER016	5.88	Instrumentation should be provided to monitor the relevant ~~variables~~ parameters ….	Clarification	X			
107.	GER017	5.89	Instrumentation should be provided for measuring all the main ~~variables~~ parameters whose variation may affect ….	Clarification	X			

108.	UK17	5.91	2nd sentence changed as follows – The layout of instrumentation and the manner of presentation of information should provide the operating personnel with an adequate impression of the status and performance of the facility, with consideration being given to important parameters that should be recorded for future use.	Some plant parameters may be useful during future analysis and trending of operational data.	X			
109.	CAN05	5.93	change (1) as follows. ***(1) I&C relating to criticality control and criticality detection and alarm:*** – ***Process controls, including in particular, for enrichment facilities, in-line devices for enrichment measurement to monitor the enrichment levels of products.*** Radiation detectors […]	Monitoring the enrichment is not a means for criticality detection and alarm (the current title of (1)). It is a means to prevent a criticality (among many others – most of the process controls are; not only enrichment control). + It is better to give first the means of prevention and then the emergency provisions.	X			

110.	FIN002	5.93 before HUMAN FACTOR CONSIDEREATION	Why was 5.99 in version 7a removed from the I&C chapter? 5.99 in version 7a reads "According to the requirements of the safety analysis and any defence in depth consideration, instrumentation and control systems should incorporate redundancy and diversity to ensure an appropriate level of reliability and availability. This should include the requirement for a reliable and uninterruptable power supply to the instruments, as necessary. "			X		This was removed as a redundancy to para 6.172 of SSR-4
111.	RUS16	5.93 recital (1)	Exclude recital (1)	As per recital (1) 5.93 “I&C relating to criticality detection and alarm” is considered as I&C system. But as per Russian regulatory documentation “I&C relating to criticality detection and alarm” is not considered as I&C system. It is considered Normal Operation System Important to Safety (class 3H) so ‘I&C relating to criticality detection and alarm’ couldn’t be considered I&C system.			X	We believe it is important to keep the provision in the document. The precise categorization may depend on national practice and requirements.
112.	CAN16	5.93(5) (6)	(5) …if there is a ~~risk of~~ **foreseeable potential for** exceeding regulatory limits (6) … if there is a ~~risk of~~ **foreseeable potential for**	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			

			exceeding regulatory and safety limits					
113.	USA23	5.93(8)	Change “measured” to “monitored”	Monitoring involves detection and ensuring that action levels are not exceeded.	X			
114.	RUS31	5.97.	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 Modified to ensure consistency with GSR Part 4		
115.	USA24	5.98	After “external hazards and” replace the rest of the sentence with “be used to develop the resulting event scenarios for the purpose of establishing structures, systems and components important to safety. The functions of the structures, systems and components being relied upon for safety should not be adversely impacted by the event scenarios.”	The way this sentence is written assumes that the SSCs important to safety are predefined and the PIEs and scenarios are developed later. Whereas it is the other way around for fuel cycle facilities. That is PIEs and event scenarios are developed first and then the SSCs important to safety which are needed to prevent or mitigate the scenarios are identified later and are based on the PIEs and the scenarios that have been developed for the PIEs.	X			
116.	USA25	5.99	After “specific,” add “and realistic, with the use of enveloping and robust (i.e. conservative) assumptions,”	As written, it implied that the assessment should be realistic and conservative at the same time.	X			
117.	USA26	5.99(1)	Change “use:” to “be based on:”	The licensed inventory is not automatically used for the source term.	X			
118.	USA27	5.99(2)	Delete “doses due to”	Editorial	X			

119.	RUS32	5.99.	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			
120.	USA28	5.103(1)	After "safety" add ", based on an analysis of all credible accidents that can exceed pre-established criteria for facility personnel, members of the public and the environment," and at the end add a new sentence as follow: "This approach would also inform the emergency plans."	It is important to state how the SSCs important to safety will be identified. The new sentence should be added because it is true and since it is stated in 5.103(2), it should be stated in 5.103(1) as well.	X			
121.	RUS33	5.104. First sentence and 5.105 last sentence	The first sentence of para 5.104 is a duplication of the last sentence of para 5.105 and should be excluded.	Duplication.	X			
122.	HUN01	5.109	"subcriticality" instead of "sub-criticality"	it should be one word like in the rest of the guide	X			
123.	RUS19	5.110 Section «	Rename this section	For enrichment facilities the risks of chemical accidents are primary, including	X			

		Assessment of possible radiological or associated chemical consequences» Page 30	«Assessment of possible radiological or chemical consequences»	with the threat to general public, while the risks of radiological accidents are secondary.				
124.	RUS34	5.110	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 section was re-arranged by technical editors to be harmonized with other standards.		
125.	GER018	5.111	~~Considerations for~~ The interface between safety and security should be considered. 5.111A 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			

126.	FIN003	5.111/1	Should this be a subtitle or what? This is not really a full sentence "Considerations for interface between safety and security."	This is not really a full sentence.	X			
127.	USA29	5.112	After "meteorological" add "conditions, such as wind speed, stability class, building wake effects," and after "hydrological conditions" add ", such as surface water flow rate,"	Providing examples clarify the text.	X			
128.	RUS35	5.114.	The general requirements for safety for waste and effluent management	There are no specific requirements for optimization of protection in mentioned standards.	X			
129.	UK18	5.117 / 4 to 6	Change the last sentence in Para. 5.117 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			
130.	UK25	5.119	Where necessary, equipment should be provided to reveal failure of treatment systems, for example differential pressure gauges to identify failed filters. If	Grammar and clarity.	X			

			required, discharge monitoring should be provided via continuous sampling of the activity or gas concentration, coupled with continuous measurement of the discharge flow rate.					
131.	UK26	5.120	Add the following at the start of Para. 5.120: "**In addition to the utilization of best available techniques to remove suspended solids, residual r**adionuclides in effluents discharged to the environment should be in soluble form, **as far as possible**, to allow effective ….."	Sentence added regarding the removal of particulates. Some qualification provided - best available techniques should be employed to remove all solids / p-articulates, but 100% removal may not be feasible in all cases	X			
132.	UK19	5.121	In meeting requirement 7 of SSR-4 [1], **at an early stage in the facility design, the selection of equipment and materials should ensure confinement, limit the accumulation of uranium, and increase the ease of cleaning and/or surface decontamination**.	Words added to include selection of materials suitable for the chemicals in conversion/enrichment facilities (e.g. strong acids) to avoid escape of radionuclides.	X			
133.	GER019	5.127	For cases where misidentification of containers could impose hazard, provisions for	Provisions for easy identification should be possible in any case	X			

			easy identification of the content should be used~~, if possible~~ (for example unique colors, shapes, valves).					
134.	RUS17	5.128	Instrumentation control systems (computer based) **could be** used for control of container technical conditions.	Mandatory control requirement (**«should be controlled»**) is excessive in most cases.		X The use of a computer based system for the control of all containers should be considered (actual status, position, technical conditions).		
135.	USA30	5.131	Deleted “depleted”	Other than depleted UF6 can be stored		X The storage of depleted UF6 is underline because that usually takes long periods.		
136.	GER020	7.6	Where possible, lessons learnt from the commissioning and operation of similar conversion facility or an enrichment facility should be sought out and applied.	Clarification in order to put in accordance with text in general	X			
137.	GER021	8.1 First sentence	Organization of operation of conversion facilities and uranium enrichment facilities	This part seems to be a caption	X			
138.	HUN02	8.1	“facilitiesThe”	a space was missing	X			

139.	USA31	8.1	Start the sentence with "The distinctive features…"	Editorial	X			
140.	UK27	8.1 / 1	Organization of operation of conversion facilities and uranium enrichment facilities.	Missing full stop.	X			
141.	FIN004	8.1/1	Organization of operation of conversion facilities and uranium enrichment facilities 8.1 The distinctive features of a conversion	Something broken here? Or should it be a subtitle?	X			
142.	FIN005	8.1/4	8.2 In this section, specific recommendations on operational practices and additional considerations in meeting the safety requirements for a conversion facility or an enrichment facility are presented.	Either remove, as the other section do not have such a paragraph or make it an own paragraph as in SSG-6 and SSG-7.	x			
143.	RUS36	8.4	Personnel shall be prepared to act in design basis and beyond design basis accidents.	Requirement of Russian regulatory documents			X	Safety Guide cannot contain "shall" statements. This requirement is already covered by Requirement 58 and subsequent paras in SSR-4
144.	RUS37	8.4	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	This is covered by para 9.41 of SSR-4
145.	RUS40	8.4	In addition, personnel should be provided	Additional requirement	X			

			periodically with basic training in **nuclear and** radiation safety.					
146.	USA32	8.4	Delete reference to gaseous diffusion		X			
147.	RUS38	8.4 / line 1	Emergency drills shall be periodically conducted to train the personnel to act in emergency conditions.	Requirement of Russian regulatory documents			X	Safety Guide cannot contain "shall" statements. This requirement is already covered by para 9.44 in SSR-4
148.	RUS39	8.4 / line 1	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 Safety Guide cannot contain "shall" statements. See new para added.		
149.	RUS41	8.5 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 with regard to interface between safety and security.	X			
150.	GER022	8.12	When carrying out maintenance in a conversion facility or an enrichment facility, particular consideration should be given to the potential for surface contamination or airborne radioactive material, and to specific chemical hazards such as hazards	Clarification: uranium is a heavy metal and it is toxic when incorporated	X			

			due to uranium compounds, hydrogen fluoride, fluorine, hydrogen and nitric acid.					
151.	GER023	8.13 Bullet 4	- 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 plans.	Specification.	X			
152.	UK28	8.15 / 3	When maintenance is performed on installations that may contain ….	Plural.	X			
153.	RUS42	8.15. 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			
154.	RUS43	8.22.	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. 5.144).	In compliance with para 1.2 SSG-48	X			
155.	RUS44	8.24	The subsection should be supplemented by	Completeness and compliance with SSR-4		X		

		Subsection "CONTROL OF MODIFICATION"	referencing to relevant requirements of SSR-4.			References to related requirements were added.		
156.	GER024	8.33	In a conversion facility or an enrichment facility, the main radiological hazard for both the personnel and members of the public is from the inhalation and incorporation of airborne material containing uranium compounds. In conversion facilities, ~~insoluble compounds~~ powdery solids of uranium such as the uranium oxides UO2 and U3O8 pose a particular hazard because of their long biological half-lives (and therefore effective half-lives)….	Incorporation is also an important issue They are not insoluble. Is meant, that these compounds are handled in their solid form? Please clarify			X	Incorporation is not a main radiological hazards in this context. UO2 and U3O8 are practical insoluble in water and in most of the common chemicals. This is the reason why the biological half-live is very long. The powdery solid Uranyl fluoride (UO2F2) is very well soluble in water and has a short biological half-live.
157.	USA33	8.33	Change "is from the" to "involves potential"	All personnel and public do not inhale uranium	X			
158.	USA34	8.35(a)	Delete "external"	That is not the only exposure pathway during maintenance	X			
159.	CAN17	8.38 (j)	increases the ~~risk of~~**potential for** causing contamination	"potential for" appears to be better.	X			
160.	USA35	8.42	Change "smear checks" to "surface smear sampling"	Editorial	X			

161.	CAN18	8.50	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 Control of nuclear criticality hazards		
162.	RUS45	8.51 (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			
163.	CAN08	8.51 (b)	Modify to: "The control of the enrichment level should be such that deviations that could lead to enrichment above the maximum enrichment used in criticality safety analysis, **both steady state and transients**, should be detected before a significant amount of material above this limit has accumulated"	Some enrichment processes can have significant dynamics in the variation of 235U content.	X			
164.	RUS46	8.51 (c)	In the management of moderating materials; for example, before an empty cylinder is used in the facility to receive material enriched by 235U above	It is reasonable for presence of water (according to para 8.52)	X			Comment is unclear, what is being suggested? Error in mentioning water

			1%, checks should be undertaken to ensure that no hydrogenous material is present in the cylinder (e.g. water, oil, water or plastics);					twice was corrected.
165.	GER025	8.51 new bullet	In addition operational aspects of the control of criticality hazards in conversion facilities and enrichment facilities should include: The double contingency principle (single failure criterion) should be applied where appropriate and possible.	The double contingency principle should be applied			X	We agree the double contingency principle needs to be applied. It is already a requirement so cannot be repeated as a 'should' statement. And it is related more to the Design rather than Operation.
166.	CAN19	8.51(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 inc"reasing the consequences.	X			
167.	FIN006	8.51(c)/ 3	…(e.g. water, oil, ~~water~~ rubber or plastics);	Water is mentioned twice.	X			
168.	RUS47	8.54	— Chemical hazards due to the presence of UF_6, HF (including HF produced through hydrolysis of UF_6) F_2, HNO_3, NH_3 and uranium compounds;	UF_6 also presents chemical hazards as a gas and source of HF and needs to be confined.	X			
169.	GER026	8.56	The threshold of HF that a human can detect by	Clarification: if it is written this way, one could think HF is visible	X			

			smelling is lower than the occupational exposure level. As a consequence, specific routine occupational measurements for HF need not be implemented. In addition by a releases of UF6, generate colourless gaseous HF and a visible white cloud of UO2F2 particulates is formed and HF that can easily be seen					
170.	USA36	8.56	At the end of the first sentence add "s that can result in acute health effects."	The sentence is incomplete.	X			
171.	CAN20	8.59	RISK OF OVERFILLING OF CYLINDERS	The text in this section does not deal with risk, only potential. Shorter title is sufficient.	X			
172.	CAN21	8.60	monitored to reduce the risk of**potential for** overfilling	Seems to be what is intended (even if the risk may be reduced as well)	X			
173.	GER027	8.63	Movement of cylinders containing liquid UF6 should be minimized. Cylinders containing liquid UF6 should be moved only using appropriately qualified apparatus that has been designated as important to safety. Relevant administrative operational limits and conditions should be established for	The whole paragraph should be deleted because UF6 is not liquid under the circumstances described there (cf. phase diagram of UF6). Only when UF6 is transferred, e.g. from the container to the gas centrifuge or diffusion installation of the enrichment plant UF6 is partially liquid.			X	We agree, that moving cylinders with UF6 should be avoided wherever possible. There are, however, some situations where liquid UF6 is being moved. This guidance is therefore useful. Several countries

			~~the movement and storage of cylinders containing liquid UF6, e.g. predetermined paths, maximum allowed heights, speeds and distances during movement, dedicated storage areas, minimum cooling times, use of valve protectors and restrictions on load movement above hot cylinders.~~					confirmed that this happens even though rarely.
174.	GER028	8.64	~~The length of time required for the cooling of a cylinder containing liquid UF6 should be sufficient to ensure that all of the liquid UF6 has solidified.~~	The whole paragraph should be deleted, because UF6 is not liquid under the circumstances described there (cf. phase diagram of UF6).			X	See comment No. GER027
175.	CAN22	8.66	~~reduce a risk of~~**potential for** rupture	Seems to be what is intended (even if the risk may be reduced as well)	X			
176.	GER029	8.73	~~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 controlled areas. Processes such as incineration, metal melting and compaction may also be used to reduce the volume of waste, but such processes are beyond the scope of~~	We propose to delete this statement as it depends on the waste management strategy chosen, and is beyond the scope of this SSG.			X	It is provided as an example or option, not even a should statement. It is the original text in the current SSG-5.

			~~this publication.~~ As far as reasonably practicable, and in accordance with national regulations, waste material should be treated to allow its further use. Cleaning methods should be adopted at the facility that minimize the generation of waste.					
177.	GER030	8.81.	The programme for the feedback of operational experience at conversion and enrichment facilities should cover experience and lessons learnt from events and accidents at the nuclear facility as well as from other nuclear fuel cycle facilities worldwide and other relevant nonnuclear accidents. 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~~ enrichment facilities and, as far as applicable, at other nuclear installations. The programme should include consideration of technical, organizational and human factors.	Mistake	X			

178.	CAN09	9.2	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			
179.	CAN23	9.2	when handling equipment containing nuclear material for which **subcriticality** ~~criticality safety~~ is controlled by geometry	Subcriticality is appropriate; criticality safety is not.	X			
180.	GER031	9.3 Bullet 1	a) A post-operational cleanout should be performed to remove all the ~~gaseous~~ UF6 and the bulk amounts of uranium compounds and other hazardous materials from the process equipment.	Considering normal conditions UF6 is a solid with a high vapor pressure => meaning solid and gaseous UF6 is present under normal conditions	X			
181.	GER032	9.5 (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			
182.	RUS48	Annex I, II	Figures need to be clarified – abbreviations (e.g. KDU), different colours of the boxes and types of lines (e.g. dotted)	Clarification	X			Pictures will be re-drawn into new graphics. ADU stands for Ammonium Diuranate
183.	JPN01	Annex IV	In-line analysers to monitor for hydrocarbons	Appropriate wording.	X			

			or ~~Freon®~~ halohydrocarbon and for detecting ingress of oil or ~~Freon®~~ halohydrocarbons Reaction of UF6 with water leading to buildup of uranic deposits; Introduction of moderator of the introduction of ~~Freon®~~ halohydrocarbons leading to an explosion	Freon® is a proprietary name and it is not permitted to use. To keep a consistency with paragraph 5.57(a).				
184.	CAN24	Annex IV Table p. 68	Under "Maintenance" 2nd column: Geometrically ~~safe~~ **favourable** containers for the collection of residues. 5th column: Safe**ly subcritical** dimensions of the containers	Safe is not the appropriate term. Subcritical is often not sufficient.	X			
185.	CAN25	Annex IV Table p. 68	Under "Uranium recovery" 2nd column: Storage of liquors and/or recovered uranium in ~~safe~~**favourable** geometry tanks or containers 5th column: Safe**ly subcritical** dimensions of the containers	Favourable is the established term.	X			
186.	CAN26	Annex IV Table p. 69	Under "Off-gas treatment" 2nd column: ~~Safe~~ **Favourable** geometry scrubbers		X			

			5th column: Safe**ly subcritical** dimension of apparatus					