

DS360- Safety of Nuclear Fuel Reprocessing Facilities

COMMENTS BY REVIEWER				RESOLUTION			
Country/Organization:		Date: 2015/05/22					
Com ment No.	Para/Lin e No.	Proposed new text	Reason	Acce pted	Accepted, but modified as follows	Rejec ted	Reason for modification/rejection
CA- N01	02.002 -	“The main risks are criticality, loss of confinement, chemical hazards and radiation exposure from which workers, the public, and the environment needs to be protected by adequate technical and administrative measures provided during siting, design, construction, commissioning, operation and decommissioning.”	The chemicals inventory constitutes an important risk in these facilities.		The main risks are criticality, loss of confinement, radiation exposure and chemical hazards from which workers, the public, and the.....		To keep radiological hazards together
CA- N02	04.001 -	“2) Confinement of radioactive materials (including removal of decay heat and dilution of radiolysis gases) and chemical hazards;”	See comment 1.			X	These are as defined in NS-R-5. “confinement of chemicals” is a significant issue but are not (glossary definition) “main safety function”
CA- N03	04.078 -	“Where no fail-safe state can be defined, consideration should be given to ensure that the functionality (safety function) of SSCs important to safety is	Separation of the redundant SSCs important to safety should be considered to avoid an event that makes unavailable redundant SSCs. For	X “separ ation”	Also: Error in drafting “duplication should be redundancy”		Standard IAEA terminology

		maintained (by duplication, separation, diversity and independence as necessary).”	example, two redundant pumps in the safe room could become unavailable if a fire occurs in the room.				
CA-N04	04.086 -	“In accordance with the safety assessment the design of supply systems should be of adequate reliability with diversity, separation and redundancy as necessary;”	See comment 3.				See CA-N03
CA-N05	04.086 -	“(c) Loss of pneumatic supply to pneumatically actuated valves. In accordance with the safety analysis, valves should be used that are designed to fail-safe, as far as practical, or have an independent air tank supply;	The failure of the air supply system should not prevent pneumatic valves important to safety to be operated during an event. Therefore, air tank supply should be considered to ensure that the function remains available.			X	4.86 (a) covers diverse supplies which could include “tank” supplies. 4.86 (c) is if all supplies fail e.g. the supply line to the actuator is often an unavoidable CCF point unless duplicate actuators are also installed
CA-N06	04.103 -	“Depending on the reprocessing facility site characteristic and facility location, as evaluated in the site assessment (Section 3), the effect of a consequential event, such as a fire, a chemical spill or a extreme flooding event should be addressed in the facility design (Ref. [1]: Appendix IV: para.	Earthquake can cause different events that can jeopardize the safety of the facility. These are not limited to a flooding.			X	Previous comment requested linking between NS-R-5 requirements and recommendations in the Safety Guide and complete coverage or requirements this subsection gives a number of examples of the potential effect of an “earthquake”. The safety assessment and facility design need to address all potential PIE and faults and demonstrate the their consequences are

		IV.46).”					“acceptable” (NS-R-5)
CA-N07	04.107 -	“(f) Consequential events to extreme weather conditions should be considered in the design.”	Extreme weathers can cause other events that can jeopardize the safety of the facility.	X			
CA-N08	04.138 -	“(b) Radiological and chemical consequences of AOOs or DBAs (or equivalent) to the public that should be within the limits specified for accident conditions and consistent with the optimization of protection (Ref. [6]);”	The safety analysis should also consider AOOs.			X	Bullet (a) Operational states includes AOOs
CA-N09	07.089 -	“Particular attention should be given to the impact of the fire system on criticality.”	The fire systems response should not cause a criticality event.	X	New 7.90a The Procedures and training for responses to fires in areas containing fissile material should pay particular attention to the prevention of a criticality and preventing any unacceptable reduction of criticality safety margins.		This issue is more clearly addressed in a separate para. Located before 7.90 which also deals with procedures
CA-N10	Annex page 100		The following text does not appear above recovered nitric acid: “(See Separation)”	X			
DE-W01	Footnote 04 (p. 3)	“... DEC: <u>Postulated</u> Accident conditions that are not considered for design basis accidents, but that are considered in the design process of the	2 - Ensuring consistency with the definition of the term ‘design extension conditions’ in the IAEA Safety Requirements SSR-2/1 (Rev. 1) as endorsed by	X			In the approved version of SSR-2/1 (Rev. 1) both DBA and DEC now have “postulated...” included and reference to core melting etc. have been removed.

		<p>facility in accordance with best estimate methodology, and for which releases of radioactive material are kept within acceptable limits (Ref. [9]).”</p>	<p>the CSS (November 2014) and the Board of Governors (March 2015).</p> <p>The definition of this term – as provided in SSR-2/1 (Rev. 1), excluding any reference to core melting – has meanwhile introduced in the Draft Safety Requirements DS478 (revision of NS-R-5 (Rev. 1), latest draft version dated 19 April 2015, see “Note on definitions” therein) and hence adopted to nuclear fuel cycle facilities. In order to be consistent with the overarching new requirements – although DS360 is still referring to NS-R-5 (Rev. 1) – the same definition has to be used in DS360 as well.</p> <p>Herewith, we disagree with the resolution to reject the German comment No. 5 on Footnote No. 4, see IAEA resolution table of Member States comments (March 2015). In our view, the TO’s justification is not convincing.</p>				
DE-W02	02.009 -	<p>2nd sentence: “In selecting and designing a reprocessing facility, for SSCs important to safety</p>	<p>3 - Wording/Editorial.</p>	X			

		the processes that could cause the degradation of structural materials should be taken into account.”					
DE-W03	03.001 -	<p>1st sentence: “(Ref. [14]) and its supporting guides (Refs. [15], [16], [17], [18], and [19] and [40]) establish the requirements and present recommendations for site safety evaluation, site selection criteria and site selection process for a fuel reprocessing facility.”</p> <p>Please add the Safety Guide NS-G-3.1 to the list of references: “[40] INTERNATIONAL ATOMIC ENERGY AGENCY, External Human Induced Events in Site Evaluation for Nuclear Power Plants, Safety Standards Series No. NS-G-3.1, IAEA, Vienna (2002)”</p>	<p>2 - The Safety Guide NS-G-3.1 provides recommendations and guidance for the examination of the region considered for site evaluation for a reprocessing facility in order to identify hazardous phenomena associated with human induced events (of accidental origin) initiated by sources external to the facility. In some cases it also presents preliminary guidance for deriving values of relevant parameters for the design basis. Thus, a reference to this publication should be included here. See also our related comment on Para 4.115.</p>			X	IAEA guidance is not to reference NPP and RR documentation in nuclear fuel cycle facility safety standards and guides except in very well defined cases (e.g. alignment of new, accepted definitions)
DE-W04	03.002 -	<p>Note: Numbering and grouping of bullets in this paragraph are obviously wrong, so the comprehensibility of the text is impaired.</p>	<p>2 - Rearrangement of bullets is required.</p>			X	
DE-W05	04.005 - e	<p>2nd sentence: “All processes with fissile materials should be designed in such a way as to avoid prevent an accidental criticality</p>	<p>1 - Compared to the previous draft version 1.6 dated 8 July 2014 (see 5th bullet of Para 4.5 therein), replacing ‘prevent’ by ‘avoid’ would be an</p>			X	The intent was not to weaken the recommendation but the change was based on a misinterpretation of the intent of the original comment (i.e. that “prevent” was too strong a word)

		<p>event.”</p>	<p>unmotivated weakening of the recommendation provided in this bullet. Furthermore, it is not consistent with the statements provided in Para IV.2 of NS-R-5 (Rev. 1) as well as those found elsewhere in DS360 (see Paras 4.1, 4.13, 4.14, 4.112, and 8.5). Para IV.2 of NS-R-5 (Rev. 1) clearly states: <i>“The facility shall be designed to prevent a criticality accident and the accidental release of hazardous materials. ...”</i></p> <p>Herewith, we disagree with the resolution of the German comment No. 21 on Para 4.5 and the modified wording, compare with the IAEA resolution table of Member States comments (March 2015).</p>				
DE-W06	04.015 -	<p>“Criticality hazard should be controlled by design as far as practicable (Ref. [1]: para. 6.43 and Appendix IV: para. IV.10). Where a credible hazard cannot be eliminated, the prevention of criticality by means of design, the double contingency principle is the preferred approach for the prevention of criticality by means of design (Refs. [1]: para. 6.45 and [21]).”</p>	<p>2 - Clarification. The original wording of the 2nd sentence is confusing.</p>	X			

DE-W07	04.016 -	<p>“When required by the safety analysis, the pre-vention of the precipitation of fissile material within solutions should be prevented by e.g. the following methods: ...”</p>	<p>2 - Clarification.</p> <p>With respect to this proposal, compare also with the IAEA resolution table of Member States comments (March 2015), German comment No. 36 on Para 4.50. This comment has been accepted but incorrectly implemented into the latest version of DS360.</p>	X			
DE-W08	04.022 -	<p>“The criticality safety analysis should involve the use of appropriate and qualified computer codes that are validated and verified (i.e. compared with benchmarks to determine the effects of code bias and code uncertainties on the calculated, effective multiplication factor, (k_{eff}) used within their applicable range and with appropriate data libraries of nuclear reaction cross-sections. Detailed guidance is provided in (Ref. [21]: paras. 4.20-4.25).”</p>	<p>1 - The original sentence is incomplete.</p> <p>With respect to this proposal, compare also with the IAEA resolution table of Member States comments (March 2015), German comment No. 41 on Para 4.54. This comment has been accepted but incorrectly implemented into the latest version of DS360. Please note that the introducing statement has been lost after the text of the bullet was moved from 4.54 into a new paragraph.</p>	X			4.22 was intended to be bullet (d) of the 4.21 but is clearer as a separate sentence as suggested
DE-W10	04.041 -	<p>1st sentence: “Where easily dispersed dispersible radioactive materials are processed, the main risk is loss of containment with the potential for contamination or ingestion; gloveboxes</p>	<p>3 - More appropriate wording.</p> <p>With respect to this proposal, see also the IAEA resolution table of Member States comments (March 2015), German</p>	X			

		are often the preferred design solution.”	comment No. 29 on Para 4.29. This comment has been accepted but not fully implemented into the latest version of DS360.				
DE-W11	04.137 (a) Footnote 36	“The requirements relating to equipment failure for a reprocessing facility are established in (Ref. [1]: Section 2, para. 4.2 and Appendix IV: para. IV.37).”	3 - Wrong paragraph is cited in the footnote. With respect to this proposal, see also the IAEA resolution table of Member States comments (March 2015), German comment No. 47 on Footnote No. 31. This comment has been accepted but not implemented into the latest version of DS360.	X			
DE-W12	04.115 -	“In evaluating the consequences of impact or the adequacy of the design to resist aircraft or secondary missile impacts, only realistic crash, rotating equipment or structural failure scenarios should be considered. These require the knowledge of such factors as the possible angle of impact or the potential for fire and explosion from aviation fuel. Further guidance is provided in Section 5 of Ref. [40] . In general, fire cannot be ruled out following an aircraft crash, and the Therefore , specific	1 - The Safety Guide NS-G-3.1, Section 5 “Aircraft crashes”, provides more detailed recommendations and guidance on hazard evaluation for accidental aircraft crashes. Thus, a reference to this publication should be included here. It is more appropriate to say requirements should be established rather than they should be designed.	X		X	See DE-W03

		<p>requirements for fire protection and emergency preparedness and response should be designed <u>established</u> and implemented as necessary.”</p> <p>Please add the Safety Guide NS-G-3.1 to the list of references: “[40] INTERNATIONAL ATOMIC ENERGY AGENCY, External Human Induced Events in Site Evaluation for Nuclear Power Plants, Safety Standards Series No. NS-G-3.1, IAEA, Vienna (2002)””</p>					
DE-W13	04.151 -	<p>1st sentence: “‘The requirements and recommendations on facility design from the relevant IAEA standards (Refs. [8] [2], [11] and [12]) apply fully to the wastes streams (solid, liquid and, gaseous) and effluents resulting from the operation of reprocessing facilities and from their eventual decommissioning.”</p>	<p>2 - Wrong reference is cited. The IAEA Safety Glossary (2007 Edition) must be replaced by the General Safety Requirements GSR Part 5.</p>	X			
DE-W14	04.162 -	<p>“The design and location of effluent discharge systems for a reprocessing facility should be chosen to maximize the dilution and dispersal of discharged</p>	<p>2 - Wrong reference is cited. This paragraph refers to General Safety Requirements GSR Part 5, not to the IAEA Safety Glossary (2007 Edition).</p>	X			

		effluents (Ref. 8 [2]: para 4.3) and eliminate, as far as practicable, the discharge of particulates and insoluble liquid droplets which could compromise the intended dilution of radioactive effluents.”					
DE-W15	07.011 -	“For manual activities, training should include but is not be limited to: ...”	3 - Grammar.	X			
DE-W16	07.012 -	“For automatic modes of operation, training should include but is not limited be to: ...”	3 - Grammar.	X			
DE-W17	08.001 - a	“The initial decommissioning strategy is selected in accordance with the national policy on the management of radioactive waste;”	3 - Missing word.	X			
DE-W18	08.002 - b	“Updated provisions are made for adequate resources and their availability, when needed, and;”	2 - Clarification. It is crucial that the financial and human resources are available when they are needed for decommissioning.	X			
DE-W19	08.003 -	“... particular care should be taken that the following aspects are addressed throughout the lifetime of the reprocessing facility: ... (e) Comprehensive record preparation for all significant activities and events ...; (f) Minimizing the eventual generation of	1 - In the original text, the last bullet (f) was inadvertently moved to the beginning of Para 8.4. However, it belongs to Para 8.3 as it completes the list of aspects to be addressed throughout the lifetime of a reprocessing facility.	X			

		radioactive waste during decommissioning. ”					
DE-W20	08.004 -	“ Minimizing the eventual generation of radioactive waste during decommissioning. General requirements in the event of decommissioning being significantly delayed after a reprocessing facility has permanently shut down for decommissioning or shut-down suddenly ...”	1 - See our related comment on Para 8.3.	X			
DE-W21	Ref 03	“INTERNATIONAL ATOMIC ENERGY AGENCY, Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, Governmental, Legal and Regulatory Framework for Safety, IAEA Safety Standards Series No. GSR Part 1 Rev. 1 , IAEA, Vienna (2010) (2015) .”	3 - Citation of the correct title of GSR Part 1. In the frame of the IAEA Action Plan on Nuclear Safety, GSR Part 1 was revised by amendment (DS462). The final version of DS462 was endorsed by the CSS (November 2014) and the Board of Governors (March 2015). Rev. 1 will be published this year.	X			
DE-W22	Ref 09	“INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants: Design, IAEA Safety Standards Series No. SSR-2/1 Rev. 1 , IAEA Vienna (2012) (2015) .”	3 - In the frame of the IAEA Action Plan on Nuclear Safety, SSR-2/1 was revised by amendment (DS462). Rev. 1 will be published this year.	X			
DE-W23	Ref 14	“INTERNATIONAL ATOMIC ENERGY AGENCY, Site Evaluation	3 - In the frame of the IAEA Action Plan on Nuclear Safety, NS-R-3	X			

		for Nuclear Installations, IAEA Safety Standards Series No. NS-R-3 Rev. 1 , IAEA Vienna (2003) (2015).”	was revised by amendment (DS462). Rev. 1 will be published this year.				
DE-W24	Ref 24, 25	Note: TECDOC-727 and TECDOC-994, both of which are referred to in Para 4.142 and Footnote No. 41, were issued in 1997 and 1998, respectively. Considering the progress in science and technology in this time span, some of the information and data provided therein might no longer be up-to-date. Therefore, it should be examined whether there are newer publications available which could replace the old ones.	2 - Update is recommended in order to reflect the current standards in equivalent non-nuclear industries when evaluating releases of hazardous chemicals, affecting the public or the environment, from a nuclear fuel reprocessing facility.			X	Noted for consideration
DE-W25	Ref 26	“INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Assessment for Facilities and Activities, IAEA Safety Standards Series No. GSR Part 4 Rev. 1 , IAEA Vienna (2009) (2015).”	3 - In the frame of the IAEA Action Plan on Nuclear Safety, GSR Part 4 was revised by amendment (DS462). Rev. 1 will be published this year.			X	
DE-W26	Annex II	“HEAD-END PROCESS This table identifies, for a typical reprocessing facility, the main “devices” (SSCs) which detect deviations from normal,	2 - Ensuring consistency with the terminology used in the overarching Safety Requirements NS-R-5 (Rev. 1) as well in the IAEA Safety Glossary (2007 Edition). The term			X	

		planned or expected conditions, <u>Operating Operational</u> Limits and Conditions parameters (OLCs, defined in the safety assessment), ...”	‘operational limits and conditions’ is defined therein.				
DE-W9	04.038 -	“ <u>Firefighting features Fire dampers</u> to prevent the propagation of a fire through ventilation ducts and to maintain the integrity of firewalls, should be installed unless the likelihood of a fire spreading or the consequences of such a fire are acceptably low (Ref. [1]: Appendix IV: para. IV.36).”	2 - To be in line with the wording used in Para IV.36 of NS-R-5 (Rev. 1), the term “firefighting features” should be replaced by “fire dampers”.	X			
EN-N00	General	2 important recommendations concerning the management of waste were cancelled that should be kept in the “Operation” section.	The previous draft was already mature. In the section “Operation”, some additional recommendations of lower importance were added	X			See EN-N16
EN-N01	03.002 -	3.2. In the siting of new reprocessing facilities particular attention should be given to: (a) The site’s ability to accommodate normal operational radioactivity releases, including: - The physical factors affecting the dispersion and accumulation of	Typo (wrong numbering and bullets grouping)	X			

	<p>released radioactivity and the radiological risk to people;</p> <p>(b) The suitability of the site to accommodate the engineering and infrastructure requirements of the facility, including:</p> <ul style="list-style-type: none">- Waste processing and storage (for all phases of the facility's life);- Reliable provision of utility supply services;- The capability for safe and secure on-site and off-site transport of nuclear fuel and other radioactive and chemical materials (including products and radioactive waste, if required);- Off-site support and supplies in the case of emergency (including diversity of water supplies). <p>(c) Feasibility of implementing emergency arrangements, including those for the evacuation of the site personal and, as appropriate, the population from the affected areas and</p>	<p>The reason of pointing out only flooding among the other external events (e.g. earth quake) is not clear</p>				
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		<p>arrangements for access for off-site emergency services to the site (Ref. [10]);</p> <p>(d) Flooding:</p> <ul style="list-style-type: none"> - Some aspects of reprocessing facilities are particularly affected by potential flooding (criticality, water penetration through openings in static barriers, damage to vulnerable items e.g. gloveboxes); - Physical security measures in accordance with the guidance provided in the Nuclear Security Series publications (Ref. [20]). 					
EN-N02	04.010	<p>The specification of a DBA or DBE (or equivalents) will depend on the facility design its siting, and national criteria. However, particular consideration should be given to the following hazards in the specification of design basis accidents for reprocessing facilities:</p>	<p>The classification which is proposed is not clear :</p> <ul style="list-style-type: none"> (a) PIEs (b) PIEs induced by natural and human-induced hazards 	X			

		<ul style="list-style-type: none"> • <u>Nuclear criticality;</u> • <u>Fire (loaded extractors, Pu glove boxes, organic waste storage vessel...);</u> • <u>Explosions ;</u> • <u>Loss of cooling;</u> • <u>Loss of electrical power</u> • <u>External events (earthquake, flooding, tornadoes, fire/explosion from surroundings...).</u> 					
EN-N03	04.031 -	Similar attention should be paid to those sections of reprocessing facilities handling solid (powder) radioactive, fissile or toxic <u>hazardous</u> materials	Precision	X	Hazardous radioactive... non-		To distinguish from hazardous (radioactive) materials
EN-N04	04.038 -	Firefighting features <u>Fire dampers</u> to prevent the propagation of a fire through ventilation ducts and to maintain the integrity of firewalls ²⁰ , should be installed unless the likelihood of a fire spreading or the consequences of such a fire are acceptably low (Ref. [1]: Appendix IV:	The right word used in the reference	X			As DE-W9

		para. IV.36).					
EN-N05	04.070 -	To accomplish the dual aims of fire prevention and mitigation the design and the control of the ventilation system should aim at limiting the spread of fire, at maintaining as long as possible the dynamic containment system for the area (room or cell) involved in the fire and but protecting the final level of filtration.	This choice is very important and has generally to be done during the fire itself, <u>which means during operation</u> (and not design)		Wording change agreed. But keep in Design.		It is also important to design the systems with these issues in mind to both allow such for such needs and to avoid the need for such decisions if possible.
EN-N06	04.100 -	Delete	Same text than 4.99	X			Editorial error
EN-N07	04.133 -	(d) Good task design and job organization, particularly during maintenance work, when automated control systems may be disabled;	This is operation		Design provisions that accommodate and promote (d).....		The intent was that this should be considered in 'design' so that design provisions are made to facilitate actions in operations
EN-N08	04.141 -	The calculation of estimated dose for the public should include all the radiological contributions originating in the facility, i.e. direct or indirect (e.g. sky or ground deposition ground shine)	The previous text was clearer. Keep it as it was	X			
EN-	04.153 -	The design of	Stronger wording used in	X			

N09		reprocessing facility should try, as far as practicable, <u>to ensure that</u> to identify designated disposal routes for all wastes anticipated to be produced during the life cycle of the facility <u>have designated disposal routes</u> . Where necessary and practicable, process options should be chosen or design provision should be made to facilitate the disposal of such wastes by existing routes	the previous draft. Keep it	X X			Remove “necessary” drafting error
EN-N10	04.155 -	For identified <u>and</u> existing disposal routes etc. ,	Both adjectives are necessary	X			
EN-N11	04.156 -	As disposal is the final step of radioactive waste management, any interim waste processing techniques and procedures applied should provide waste forms and waste packages compatible with the anticipated waste acceptance requirements for disposal <u>with care</u> , attention should also be paid to the	Clarity	X			

		retrievability of wastes destined for interim storage					
EN-N12	06.001 -	However failure of a reprocessing facility to meet its design intent in both performance and process areas may have significant implications for safety if major process or facility modifications are necessary after active operations have started and this should be considered in specifying the scope of commissioning.	Of course: it is worth?	X			
EN-N13	07.018 -	Consideration should be given to classifying procedures in accordance with their safety significance (a graded approach) including those for controlling and minimizing environmental discharges and radiological or chemical hazards to the workers, the environment and the public. Such classifications schemes should be taken into account when setting priorities for: peer	Too detailed, that may be misleading	X			

		review; routine review; training; re-training; assessment, and; in the internal reporting of minor events and “near-misses”.					
EN-N14	07.061 -	The objective should be to ensure that all areas have radiation and contamination levels which optimize operator protection, balancing the radiation hazards and risk from working in an area “as it is” with that of reducing those risks by e.g. decontamination, shielding etc.	Unclear: delete	X	Agreed unclear, but may rewrite		
EN-N15	07.080 -	In addition to personal and area monitoring, routine in-vivo monitoring and biological sampling should be implemented according to national regulations.	Add a coma to be clear	X			
EN-N16	07.097 -	Add somewhere: <u>Any waste generated at reprocessing facility should be characterized by physical, chemical and radiological properties to allow its subsequent optimum</u>	These paragraphs were in the previous revision (§7.92 and 7.93). These important recommendations should be kept in the operation section	X			

		<p><u>management, i.e. appropriate pretreatment, treatment, conditioning and selection or determination of an interim storage or disposal route.</u></p> <p><u>To the extent possible, the management of waste should ensure that all waste will meet the specifications for existing interim storage and/ or disposal routes. For future disposal options (i.e. if a disposal route is not available), a comprehensive waste characterization should be performed in order to provide a data base for future waste management steps.</u></p>						
EN-N17	08.003 -	<p><u>3 (f).</u> Minimizing the eventual generation of radioactive waste during decommissioning.</p> <p><u>8.4.</u> General requirements in the event of decommissioning being significantly delayed after a reprocessing facility has permanently shut down</p>	Typo	X				
				X				

		for decommissioning or shut-down suddenly (e.g. as a result of a severe process failure or accident) are given in (Ref. [22]) and include the potential need to revise the decommissioning strategy, the decommissioning plan and the safety assessment.						
1	JP - N 0	04.001 -	2) Confinement of radioactive materials (including <u>protection against internal exposure</u> , removal of decay heat and dilution of radiolysis gases);	Clarification. To be consistent with NS-R-5 “Contamination control and protection against internal exposure”.	X			
2	JP - N 0	04.005 -	(d) The requirements for protection against <u>external</u> exposure are established in (Ref. [1]: paras. 6.40–6.42 and Appendix IV: IV.26–IV.30).	Appendix V.26 of NS-R-5 is related to internal exposure.		reference should be Appendix IV: paras IV:27-IV:30	X deletion of external	Intent was to address external radiation. Reference incorrect. Note: IV.28 applies to both internal and external radiation
3	JP - N 0	ANNEX II: SAFETY FUNCTION SEPARATION PROCESS	Consequential events: Loss of <u>Defense</u> <u>Defence</u> in Depth (DiD) for downstream process	Editorial.	X			
KR-N01		General	There is no requirement on installation of the seismic monitoring system (SMS) or the automatic seismic trip system (ASTS). Therefore, the requirement for the installation of the	The SMS (or ASTA) is required to be applied to nuclear power plants and research reactors according to the IAEA safety requirement.			X	This is a Safety Guide and only provides recommendations on meeting Requirements. (Currently there is no general requirement for a SMS for nuclear fuel cycle facilities. The installation of a SMS would come from the facility specific safety

		SMS or the ASTS should be added if it is applicable to fuel cycle facilities by its safety principle.				assessment.)
KR-N02	03.002 -	(a) The site's ability to ... , including: a. <u>The Physical factor</u> affecting ... risk to people; (b) The suitability of ... ; including; (c) Waste processing ... ; ... (f) Off-site support ... (... supplies); (g) Feasibility of ... (Ref. [10]); (h) Flooding; (h) Some aspects of ... (olveboxes); <u>(i) Tectonic hazards (earthquake, surface faulting, tsunami, etc.) conditions of the site;</u> (j) Physical security ... (Ref. [20]).	Editorial errors in places, including - "a. The physical..." (Where is this line belonged to?) - "(b)... of the facility, including;" (This phrase seemed incomplete.) It is recommended to include 'tectonic hazards' in the list of major concerns. (* The items listed from (a) to (j) are recommended to be revised carefully if any other missing parts exist.)	X		
KR-N03	04.021 -	The criticality safety assessment ... and also during and after DBA conditions DBAs.	The expression "DBAs" rather than "DBA conditions" seems to be more appropriate in this sentence.	X		
KR-N04	04.159 -	... which normally consists of a number of high efficiency particulate air (HEPA) filters in series <u>and charcoal filter (if necessary).</u>	The charcoal filter should be included to absorb the Iodine if it is necessary.	X	The gaseous effluent activity discharge from a reprocessing facility should be reduced by process specific ventilation treatment systems. These should include, where necessary, equipment for	To expand on "process specific...treatment.." as the intent of the comment. However charcoal filters are not always the means adopted, particularly in the presence of nitric acid and oxides of nitrogen

					reducing the discharges of radioiodine and other radioactive volatile or gaseous species. The final stage of treatment normally consists of dehumidification, (spark arrestors and debris guards to protect filters) and filtration, which normally consists of a number of high efficiency particulate air (HEPA) filters in series.		
SA-NO	General		Consider consistency in wording as the document use both “fuel reprocessing facility” and “reprocessing facility”.	X			3.1, 4.7, 4.99, 4.100
SA-NO....	03.002 -	Feasibility of implementing emergency arrangements, including those for the evacuation of the site personnel and, as appropriate, the population from the affected areas and arrangements for access for off-site emergency services to the site	Change personal to personnel	X			
SA-NO....	03.002 -		Consider rearranging the bulletin h,i and j as it is not clear if i and j are linked to h or they are stand-alone sentences	X			

SA-N01	01.011 -	Section 4 deals with safety considerations at the design stage including safety analysis for operational states and accident conditions, the safety aspects of radioactive waste management in the reprocessing facility and other design considerations.	Consider inserting a comma after accident conditions.	X			
SA-N02	02.004 -	When carrying out periodic safety reviews the previous discharge records should be examined thoroughly to confirm that the current engineered provisions and operational practices are optimizing protection as far as practicable.		X			
SA-N03	02.009	In selecting and designing reprocessing facility, for SSCs important to safety the processes that could cause the degradation of structural materials should be taken into account.		X			

SA-N04	03.002 -		Consider changing the bullet numbering <u>a</u> and increase the indent level to show that it's a subsection of (a)	X			
SA-N0France #1	01.002 -	None	MS comment addressed				Noted
SA-NFrance #11	03.002 -		MS comment addressed, but not accepted. "Flooding" to remain as an assessment item in the siting of new reprocessing facilities				Noted:
SA-NFrance #12	04.001 -	And para 4.3	MS comment addressed. Change not accepted, with reason.				Noted
SA-NFrance #13	04.001 -		MS comment addressed. Change not accepted, with reason.				Noted
SA-NFrance #14	04.001 -		MS comment addressed				Noted
SA-NFrance #2	01.006 -		MS comment addressed				Noted
SA-NFrance #22	04.030 -	Para revised from 4.16 ...retain and <u>promptly</u> detect liquid leakage from process equipment, vessels and pipes and to recover the volume of liquid to the primary containment (Ref. [1]: Appendix IV: para.	Change sentence order. MS comment addressed.	X			

		IV.38) promptly					
SA-NFrance #23	04.030 -	(revised 4.16)	MS comment addressed, by addition of new paragraph, specific for solids	X			
SA-NFrance #24	04.033 -	(revised 4.19)	MS comment addressed, but the cross referencing need to be corrected	X			Should be: IV.23-IV.25
SA-NFrance #3	01.006 -		MS comment addressed				Noted
SA-NFrance #30	General		MS comment addressed				Noted
SA-NFrance #33	04.024 -	(revised 4.56) "To" missing in the document	MS comment addressed, but the paragraph needs to be checked for a missing word.	X			
SA-NFrance #36	04.067 -	(revised 4.62) Areas where radioactive fissile material is processed and stored	MS comment accepted but text not changed accordingly	X	a) Areas.... fissile material is.... b) Areas.... radioactive material is....		Change made but on further consideration decision made to include both changed and original words as (a) & (b) as each should be considered separately
SA-NFrance #37	04.067 -		MS comment addressed				Noted
SA-NFrance #38	04.069 -	(revision of 4.64)	MS comment accepted but text not changed accordingly			X	Text is in 4.71 and was modified as e).... the likelihood of a wide-spread fire a.....
SA-NFrance #4	02.004 -	(numbered as 2.3)	MS comment addressed with a different wording "optimize protection as far as practicable"				Noted: This is a stated in Resolution table. (However further advice from Tech Ed is that this should be: "optimize protection and safety")
SA-NFrance	04.069 - 4.77 from		MS comment accepted but rephrased				Considered sufficient on review when taken with "general

ce #43							requirements” on robustness of power supplies in subsequent paras
SA-NFrance #47	04.077 - 4.87 from		MS comment accepted but text not changed accordingly	X			This para was subsequently rewritten (4.85, 4.87) for clarity taking into account the comment
SA-NFrance #49	04.085 - 4.94 from	New 4.55 4.53 added	New 4.55 added to address the MS comment				Noted
SA-NFrance #5	02.003 -		MS comment addressed with a more generalized text as compared to what was proposed by the MS				Noted: Wording is as proposed in resolution table
SA-NFrance #57	04.113 -		MS comment accepted but text not added accordingly		Response was to add new subsection to cover issues raised 4.111-4.113 and Footnote 63		Changes were made to address the issue raised
SA-NFrance #58	04.119 - 3.131 revised		MS comment accepted but subtitle not deleted.	X			
SA-NFrance #6	02.003 -	None	MS comment already covered by the text in the same paragraph				Noted
SA-NFrance #61	06.006 -		MS comment addressed as per input from ENISS #15.				Noted
SA-NFrance #66	06.013 -	Clear and concise communications between management, supervisors and workers (and between and within different shifts of workers under normal and abnormal circumstances and with the relevant emergency	MS comment accepted but not fully addressed.	X			

		services) is a vital component of overall facility safety.					
SA-NFrance #7	02.010 -	(para # revised)	MS comment addressed				Noted
SA-NFrance#46	04.075 -	4.84 from	MS comment accepted but text not changed accordingly	X			This para was subsequently rewritten (4.84, 4.85) for clarity taking into account the comment and the safety significance of the item and its current status was chosen as more relevant than the diversity of supplies to the item
SA-NGermany #109	Ref 19		MS comment not addressed. Reason not provided	X			
SA-NGermany #11	02.015 -		MS proposal not accepted. The proposed text: “the ease with which...” is not include in the document			X	Changes made as stated – changed by subsequent input by IAEA Human Factors/Ergonomic Expert
SA-NGermany #17	04.023	Footnote 11	MS comment regarding correction of reference (from 52 to 50) accepted but not addressed			X	Footnote 11: 11 The requirements for design for a reprocessing facility are established in (Ref. [1]: Section 6 and Appendix IV: paras. IV.2-IV.50)
SA-NGermany #20	04.005 -		MS comment addressed, but change not accepted				Noted
SA-NGermany #21	04.005 -	Bullet (e) Delete accidental.	Reprocessing facilities are not meant to be critical.	X			
SA-	04.006 -		MS comment not fully		1.12... this Safety	X	“G” intended to be used only in

NGer many #22			addressed. There is no consistency in writing “guide”. Both “g” and “G” are used in the document.		Gguide 4.6...Gguide 4.49 ..this Safety Gguide 4.151 ..this Safety Gguide 6.1 This Ssafety Gguide		when referring to this publication as in “this Safety Guide”. All other uses are “g” unless referring to a specific (numbered) Safety Guide
SA-NGer many #29	04.041 -		MS comment not fully addressed. Reason not provided	X			See DE-W10
SA-NGer many #30	04.042 -		MS comment addressed				Noted
SA-NGer many #36	04.016 -		MS comment addressed, with consideration of Russia#20				
SA-NGer many #41	04.022 -	effects of code bias and code uncertainties on the	-“Uncertainties” missing. -MS comment addressed	X			
SA-NGer many #47	04.143 Footnote 37		MS comment accepted but text not deleted as per comment	X			
SA-NGer many #48	05.007 Footnote 38		MS comment accepted but footnote deleted. No reason provided			X	Text moved from footnote to main body as para. 4.80
SA-NGer many #72	04.149 -		MS comment accepted – Inconsistency: the deletion of the “s” in representative person(s) was rejected in Germany #69			X	#69: Different ‘representative person’ for different events/releases etc. hence ‘person(s)’ #72 singular source/event hence ‘person’

SA- NGer many #86	07.095 -		MS comment accepted but not addressed.	X			
SA- NGer many #9	02.010 -		MS comment addressed				Noted
SA- NGer many #98	08.003 -		MS comment addressed				Noted
SA- NNR A #24 <i>Original Comment</i>	04.092/1	<i>“Emergency control panels” should be clarified and stated in a footnoted as stated in para. 4.155.</i>	MS comment not addressed. The link to the reason provide: “reference to 4.163” is not clear <i>Clarification</i>		New foot note added to 4.102 Emergency control panels: where justified by the safety assessment control or monitoring functions required during or after a DBA may not need to be located in a designated supplementary control room.		4.102 (<i>should read</i>) Supplementary control room or emergency control panels..... 4.168. use of appropriately located supplementary control rooms or alternative arrangements e.g. emergency control panels.
SA- NNR A #28	04.132 -		MS comment not fully addressed. Reason not provided.		The new wording was reviewed by IAEA Human Factors expert and revised wording proposed		
SA- NNR A #32	04.146 -		MS comment addressed, but acceptance of deletion of “ people” is in contradiction to response to Germany #71				

SA-NNR A #36	04.153 -		MS comment accepted but text not changed as per comment (“Isotope” to “nuclide”	X			
SA-NNR A #54	07.062 -	Addition made to 7.61 7.62 and-reference made to 7.62 7.63	-Wrong numbering -MS comment addressed				Noted
SA-NNR A #7	02.013 -	/4-6	MS comment not addressed. Sentence still confusing and needs to be rephrased.	X	The paragraph will be reviewed to remove any confusion		(Para 2.16)
SA-NRus sia #16	04.054 -	See France #33 31	-Wrong reference -MS comment addressed				Noted
SA-NRus sia #33	06.007 -		MS comment accepted but not addressed.			X	A footnote was planned but the subsequent publication of SSG-38 Construction for Nuclear Installations (DS441) which makes extensive use of the term and internal advice was that the term does not require clarification
SA-NRus sia #8	04.007 -		MS comment addressed as per the France #16				Noted
US-N01	General	The document needs to be harmonized with several key documents under development. For example DS478 (Safety of NF Cycle Facilities); DS381 (Safety of NF Cycle Research and Development Facilities), and NST023 (Physical Protection of Nuclear Materials and Nuclear	Consistency and harmonization with other IAEA documents that are being developed in parallel with DS360.			X	DS360 and DS381 complete a process initiated with the first edition of NS-R-5 several years ago and re-affirmed by several committees since.

		Facilities). These documents are overlapping and interdependent documents at different stages of completion that need to be considered for consistencies and harmonization.					
US-N02	General	DS360 Sections mentioned monitoring aspects in several instances. However, the document is unclear regarding application of action levels and annual limits of effluent for protection of workers (e.g.; derived annual concentration limits) or annual effluent release limits as well as sampling of biota and flora.	Completeness to address limits of onsite/off-site effluent releases for workers safety as well as protection of the public and the environmental focusing on monitoring data and inspection records.	X	Operational controls should be covered in section 7		
US-N03	01.001 -	1.1. This Safety Guide on the Safety of Nuclear Fuel Reprocessing Facilities recommends how to meet the requirements established in the Safety Requirements publication on the Safety of Nuclear Fuel Cycle Facilities (Ref. [1]) and supplements and develops those requirements. <u>This guide is not applicable for</u>	Although not explicitly mentioned, this guide appears to have been developed to address aqueous reprocessing facilities only. Although IAEA seems to separate pyroprocessing from reprocessing, the NRC considers pyroprocessing as a type of reprocessing (as opposed to aqueous reprocessing; e.g., PUREX process). If this		For clarity the scope as defined in NS-R-5 Appendix IV will be restated in 1.1		Agreed about the scope of DS360. The scope is stated to be the same as NS-R-5 Appendix IV which states: REQUIREMENTS SPECIFIC TO REPROCESSING FACILITIES The following requirements are specific to reprocessing facilities using liquid-liquid extraction processes (e.g. plutonium and uranium recovery by extraction (PUREX) processes) on an industrial scale.

		<u>pyroprocessing (electrochemical reprocessing) facilities.</u>	Safety Guide is intended to apply to processes other than aqueous reprocessing, additional requirements should be provided.				
US-N04	01.003 -	...treated and stored safely, to maintain low levels of radiation <u>dose to receptors</u> and minimizing...	The radiation levels are intrinsically high in reprocessing facilities		X		Use IAEA standard terminology for doses
US-N05	01.004 -	...for all stages in the lifetime of a reprocessing facility <u>that uses the aqueous separation process.</u>	Clarify whether this guide only applies to aqueous reprocessing. If this Safety Guide is intended to apply to processes other than aqueous reprocessing, additional requirements should be provided.	X			Agreed but addressed in US-N03
US-N06	01.005 -	"...the requirements established in Ref. [1]." (Delete the sentence following.) Search for Ref. [1] and change any specific references to its text or appendix to a general reference to Ref. [1].	Ref. [1] NS-R-5 is being reformatted/restructured and it is likely that Appendix IV will be deleted.			X	Reference is to current version of NS-R-5
US-N07	01.008 -	...reprocessing facilities <u>themselves, and</u> the protection of <u>their</u> workers, <u>and</u> the public, and the environment.	Editorial	X			
US-N08	04.010 -	(a) Postulated initiating events: - Loss of cooling (for decay heat removal etc.);	A runaway red oil reaction in an evaporator (due to a significant ingress of organic material into the vessel)	X			Note comment on this para above at EN-N02

		<ul style="list-style-type: none"> - Loss of electrical power; - Nuclear criticality accident. - <u>Exothermic chemical reactions (e.g., red oil)</u> 	could have severe safety implications.				
US-N09	04.041 -	...Seals on glovebox window etc. should be capable of testing for leak tightness in operation and gloves should be replaceable without breaking containment. <u>A negative pressure should be maintained in the glovebox.</u>	A negative pressure will help to ensure any airborne radionuclides in the glovebox will not be released to the immediate environment where they could pose an inhalation risk to a worker.	X			
US-N10	04.155 -	<p>Modify Para to read;</p> <p>4.155. For identified, existing disposal routes etc., the reprocessing facility design should establish the characteristics for each. <u>The facility should characterize and classify waste generated to facilitate its disposal. Mixing of waste may be permitted to facilitate limited disposal options.</u> It should provide (or identify existing) equipment and facilities for characterizing, pretreating, treating, and transporting, as necessary, waste to the</p>	Waste characterization and classification as well as potential mixing at the source are important aspects of waste management that need to be emphasized.			<p>X Characterization</p> <p>X Mixing</p>	<p>The suggested “should” statement is a recasting of a “shall” in GSR Part 5. The para provides suggestion to accomplish this</p> <p>Although mixing is a potential design option it is not specific to (in NS-R-5) or have any identified specific recommendations for use in reprocessing facilities.</p>

		appropriate identified disposal route, interim storage or further waste treatment facility.					
US-N11	General Sections 4 & 7	There is significant overlap between Section 4 (Design) and Section 7 (Operation). For example, under Subtitle "Radioactive Waste Management" we note repetitions and redundancies.	Minimize repetitions and redundancies, as practicable. .	X			This will be checked. The Design and Operations sections are deliberately separate as far as practicable and contain their own recommendations to help provide clarity on which recommendation apply separately or to both and mirrors the structure NS-R-5. Switching between recommendations which apply to either and/or both Design and Operation made applicability of recommendations unclear in the original drafts of this Safety Guide
US-N12	07.086 -	7.86. Chemicals should be stored in well aerated locations or dedicated, secure storage arrays outside the process or laboratories areas, preferably in low occupancy areas. <u>Containers used to store chemicals should be clearly marked, including the potential hazards that the chemical poses.</u>	Chemicals should be clearly marked to ensure correct handling and to help prevent inadvertent use of an incorrect reagent in the process.	X			
US-N13	08.001 -	Modify Para to read: 8.1 (d) Adequate financial resources are identified <u>and allotted</u> to carry out decommissioning	Ensure that decommissioning funds are allotted early to ensure availability before cease of operation.	X			

		including the management of the resulting radioactive waste.					
US-N14	Ref 01	DS360 refers to Reference [1] which is NS-R-5. We suggest adding to Reference [1], {DS478, Under development] (See also comment #1).	Reference [1] is actually DS478 which is under development and review at Step #7.				
US-N15	Ref 02 & DS447	<p>In many instances DS360 referred to Reference [2]. The cited reference on page 94 is given below:</p> <p>INTERNATIONAL ATOMIC ENERGY AGENCY, Predisposal Management of Radioactive Waste General Safety Requirements, Safety Standards Series No. GSR Part 5, IAEA, Vienna (2009) {DS447}.</p> <p>It seems there is mix-up between GSR Part 5 which is a general safety requirement (see above) and DS447 which is a safety guide on "Predisposal management of Radioactive Waste from Nuclear Fuel Cycle Facilities." Therefore,</p>	Confusion in referring to GSR Part 5 as DS447 and proper use of references.			<p>DS# added to remind authors to update when published. DS447 involves Refs. [2], [11], [12]</p> <p>From DS447: 1.2..... This Safety Guide supersedes IAEA Safety Standards Series No. WS-G-2.5, Predisposal Management of Low and Intermediate Level Radioactive Waste and No. WS-G-2.6, Predisposal Management of High Level Radioactive Waste, both of which were issued in 2003.</p>	

	<p>when DS360 refers to a safety guide, DS447 (at Step 12) should be referenced.</p> <p>Similarly [DS447] was unnecessarily inserted in references [11] and [12]. It is noted that DS447 covers predisposal management of radioactive waste from Fuel Cycle Facilities, whereas DS448 covers radioactive waste from nuclear power plants.</p>					
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