

ADDENDUM TO NS-R-5
APPENDIX IV – REPROCESSING FACILITIES
APPENDIX V – FUEL CYCLE RESEARCH & DEVELOPMENT FACILITIES

RESOLUTION OF MEMBERS COMMENTS

on

DS439 Version 5

CONTENTS

ENISS (Safety Committee not specified)

FRANCE (NUSSC)

GERMANY (NUSSC & WASSC)

JAPAN (NUSSC)

PAKISTAN (NUSSC)

UK (NUSSC & RASSC) – comments made on Version 4

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APPENDIX IV – REPROCESSING FACILITIES
APPENDIX V – FUEL CYCLE RESEARCH & DEVELOPMENT FACILITIES

COMMENTS BY REVIEWER				RESOLUTION			
Country/Organization: ENISS 2012		Date: 25 October Pages: 9					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
General Comments		<p style="text-align: center;">GENERAL COMMENTS:</p> <p>The proposed comments are aimed to require a strict and systematic implementation of the “graded approach concept”</p> <p style="text-align: center;">DESIGN</p> <ul style="list-style-type: none"> ▪ The proposed amendments relate to criticality safety ▪ In the chapter CONFINEMENT of RADIOACTIVE MATERIAL, sub- chapters should be clearly defined on: <ul style="list-style-type: none"> ○ Static and dynamic confinement ○ Cooling ○ Prevention of hazardous concentration of gases from radiolysis and other hazardous explosive or flammable ▪ A specific chapter on “PROTECTION AGAINST RADIATION EXPOSURE” should be developed ▪ A specific chapter on “HUMAN FACTOR CONSIDERATIONS” should be developed <p style="text-align: center;">COMMISSIONNING</p> <p>The proposed amendments relate to training, safety culture, and technical issues like transients and alternative methods when direct testing is not possible in the inactive stage</p> <p style="text-align: center;">OPERATION</p> <p>It is proposed to create</p> <ul style="list-style-type: none"> ▪ A new chapter: QUALIFICATION AND TRAINING OF 					<p>Please note that the majority of comments have been rejected as the requirements are already covered by the requirements in the main text of NS-R-5.</p> <p>Please refer to the notes on the title page of DS439 which explains the relationship between the Appendix and the main text in NS-R-5.</p> <p>Many of the proposed new text reflect the means of complying with the requirements and will therefore be considered in the development of the Safety Guide DS360.</p>

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		<p>PERSONNEL</p> <ul style="list-style-type: none"> ▪ A new chapter: MAINTENANCE ▪ A new chapter on MODIFICATION CONTROL ▪ The use of commissioning as a training period for personnel <p>In addition, improvements are proposed on RADIOACTIVE WASTE AND EFFLUENTS MANAGEMENT related to:</p> <ul style="list-style-type: none"> ▪ Need to keep available information characterizing waste without disposal routes when produced ▪ Decontamination of waste containing alpha emitters ▪ Requirements related to discharges 					
1.	New IV.1	<p>Add:</p> <p>GENERAL REQUIREMENTS FOR REPROCESSING FACILITIES</p> <p>The implementation of the graded approach concept defined in NS-R-5 shall be carefully reflected in a strict and systematic manner at all the stages in the life of reprocessing facilities</p>	Among FCFs, reprocessing facilities have the highest radioactive material inventory i.e. source term of potential radioactive accident			Y	Covered by the requirements in the main text of NS-R-5.
DESIGN							
2.	IV.4 & 6	Transfer § IV.5 and 6 to the Chapter "CONFINEMENT OF RADIOACTIVE MATERIAL (Page 3)	Cooling is related to the safety function "Confinement" should be within the			Y	As acknowledged in comment no 19, cooling contributes to more than just confinement.

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			corresponding Chapter starting at IV.19				
3.	IV.8	Replace: “The priorities for choosing the methods ensuring criticality safety in any process shall be: - Passive engineered control involving equipment design; - Active engineered control involving the use of process control instrumentation; - Administrative control involving compliance with operating procedures.”	This hierarchy is more precise			Y	Covered by the requirements in the main text of NS-R-5.
4.	IV.10	Add: at the end: “Reflection and interaction shall be taken into account during the design of the facility”	Important parameters			Y	Parameters listed here were only an example and not a definitive list. However, reflection and interaction covered by the requirements in the main text of NS-R-5.
5.	IV.17	Add at the end: “When criticality control of fissile liquid is achieved by geometry; loss of containment shall be anticipated by the use of criticality safe drip trays”	Of particular importance for the chemical cycles		See response to France comment no 7.		

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		Chapter “ CONFINEMENT OF RADIOACTIVE MATERIAL Sub Chapter “ Public and environmental protection “				Y	To maintain consistency with other Appendices.
6.	After IV.29	Add just after: “During operation, airborne discharges of radioactive materials shall pass through a filter stage before reaching any discharge into the environment”	Self explanatory		This is the design section and requirements already covered in the design section. See response to France comment no 16.		
7.		Add: “All liquids collected from the RF site shall be discharged into the environment through dedicated liquid effluent release routes”	Requirement of specific safety significance for reprocessing facilities			Y	Requirement to control liquid discharges covered in the man text of NS-R-5 and this design section. The comment reflects the means of complying with the requirements and will therefore be considered in the development of the Safety Guide DS360.
8.	IV 20	Chapter “ CONFINEMENT OF RADIOACTIVE MATERIAL Create a new subchapter	This major area is not detailed enough (only in IV.20 and partially			Y	The requirements for confinement (i.e. static and dynamic) are covered by the requirements in the

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		“ Static and dynamic containment » after “Occupational protection “ and “Public and environmental protection”	IV.23 !!)				main text of NS-R-5. Comment Nos 9-18 reflect the means of complying with the requirements and will therefore be considered in the development of the Safety Guide DS360.
9.		<u>Static Containment</u> Add: Static containment shall be the main method for protection against the spread of contamination	Basic specific requirement			Y	See response to comment no 8.
10.		Add : The static containment shall have at least one static barrier between radioactive materials and operating areas (workers) and at least one second static barrier between operating areas and the environment	Basic specific requirement			Y	See response to comment no 8.
11.		Add : Reprocessing facilities shall be designed to retain liquid leakage from process equipment, vessels and pipes, and to recover the volume of liquid to the primary containment, and to maintain the function of the second static barrier. This also applies to	Basic specific requirement			Y	See response to comment no 8.

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		equipment inside glove boxes that contain liquids.					
12.		Add: “The static containment shall be designed such that its effectiveness is maintained as far as achievable in case of loss of dynamic confinement.”	Basic specific requirement		See response to comment no 8. See also response to France comment no 9.		
13.		<u>Dynamic containment</u> Add: “Except in few cases to be agreed with the national safety authorities, the static containment shall be supplemented with a dynamic containment to create a pressure differential to induce airflow toward areas that are more contaminated”	Basic specific requirement		See response to comment no 8. See also response to France comment no 9.		
14.		Add: “The dynamic containment system shall be organized in a systematic way according to design rules.”	Self explanatory requirement in line with the size and complexity of reprocessing facilities			Y	See response to comment no 8.
15.		Add: “Off-gas treatment units that reached the lowest pressure within the facility	Missing			Y	See response to comment no 8.

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		shall be designed and operated as process units”					
16.		Add: “The ventilation system shall include a final filtration stage of which design shall accommodate testing requirements in accordance with accepted standards such as those of the International Organization for Standardization (ISO) and the American Society of Mechanical Engineers (ASME).”	Missing		See response to comment no 8. See also response to France comment no 10.		
17.		Add: “On-line and standby fans shall be provided according to the safety assessment results”	Requirement valid to any FCF but of specific safety significance for reprocessing facilities			Y	See response to comment no 8.
18.		Add: “In order to prevent the propagation of a fire through ventilation ducts and to maintain the integrity of firewalls, ventilation systems shall be equipped with fire dampers unless the consequences of such a fire are acceptably low”	Requirement valid to any FCF but of specific safety significance for reprocessing facilities		See response to comment no 8. See also response to France comment no 16.		
19.		Chapter “ CONFINEMENT OF RADIOACTIVE MATERIAL	The link between “Cooling” and			Y	The requirements in the comment are already covered in Appendix

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		Insert here the sub-chapter “Cooling” Replace IV.4 and IV.5 with: “Cooling systems shall be designed to prevent releases of radioactive material, exposure to workers, and criticality accidents. They shall provide adequate capacity, as defined in the safety analysis, to remove heat from radioactive decay and chemical reactions. The cooling system shall be designed with redundancy and emergency power supplies as defined in the safety analysis”.	“Confinement” is not clear enough				IV. As acknowledged by the comment, cooling contributes to other safety functions and so is retained in its own section.
20.		Chapter “ CONFINEMENT OF RADIOACTIVE MATERIAL” Add a sub chapter: “Prevention of hazardous concentration of gases from radiolysis and other hazardous explosive or flammable materials”				Y	The requirement to address these hazardous substances and their potential impact on nuclear safety is covered by the requirements in the main text of NS-R-5. Comment Nos 21-22 reflect the means of complying with the requirements and will therefore be considered in the development of the Safety Guide DS360.
21.		Add: “As far as practicable, a dilution	Missing (para. IV is wider and not on the			Y	See response to comment no 20.

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		system shall be designed to prevent explosive conditions and the subsequent loss of confinement resulting from radiolysis. For containers, design shall take into account potential corrosion and gas production”.	way to prevent explosion due to radiolysis H2)				
22.		Add: “Design requirements, guidance contained in international and national standards, and international experience shall be used to prevent the build-up of explosive product. The design shall consider initial process configuration and/or its credible changes leading to chemical explosions, detection and alarming of critical parameters and minimization of inventories”	Self explanatory, requirement in line with the size and complexity of reprocessing facilities			Y	See response to comment no 20.
23.		Add a chapter “PROTECTION AGAINST RADIATION EXPOSURE”	Missing. This is the 3 rd safety functions which leads to requirements very specific to reprocessing facilities			Y	The requirement to address radiation exposure is covered by the requirements in the main text of NS-R-5. Unless specified otherwise, the content of some of the comment Nos 24-33 reflect the means of complying with the requirements and will therefore be

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							considered in the development of the Safety Guide DS360.
24.		Add: “The design of equipment installed in hot cells (High active units) shall consider the potential irradiation and contamination levels during maintenance, calibration periodic testing and inspection”	Requirement specific to reprocessing facilities		Covered by the requirements in the main text of NS-R-5. See also response to France comment no 11.		
25.		Add: “Consistent with national regulations, the designer shall classify areas taking into consideration the magnitude of the expected normal exposures, the likelihood and magnitude of potential exposures, and the nature and extent of the required protection and safety procedures. Access to areas where radiation levels may lead to non-acceptable doses for workers shall be restricted and the level of control shall be commensurate to the hazard (Ref 12 of NS-R-5)”	Requirement valid to any FCF but of specific safety significance for reprocessing facilities			Y	Covered by the requirements in the main text of NS-R-5.
26.		Add:	Requirement valid to			Y	Covered by the requirements in

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		“Ionizing radiation shall be monitored and any abnormal conditions shall be detected in order to evacuate workers. Areas of potential radiation exposure to workers shall be appropriately identified and labeled (Ref 12 of NS-R-5)”	any FCF but of specific safety significance for reprocessing facilities				the main text of NS-R-5.
27.		Add: “Radiation protection monitoring shall be provided consistent with national and international regulations. To avoid the spread of contamination by staff, checkpoints with contamination monitoring equipment for personnel (feet, hands and working suits) shall be located at the exit interlocks from potentially contaminated areas and to the extend practical, close to the workplaces with contamination hazards”	Requirement valid to any FCF but of specific safety significance for reprocessing facilities			Y	See response to comment No 23.
28.	IV.36	Change “During the design of a reprocessing facility, the loss of support systems shall be considered and their impact on safety shall be assessed.	Consistency with the title “Loss of support systems”		See response to France comment no 18.		
29.	IV.40	Replace by	This is the core subject,		See response to		

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		“An adequately conservative ground motion shall be applied to calculate the structural response in order to guarantee: - The stability of buildings and transfer canals between buildings and to assure the ultimate barrier of confinement in case of an earthquake, taking into consideration the consequences to the workers, the public, and the environment,, - SSCs availability during and after the earthquake”.	especially after Fukushima accident		France comment 21.		
30.		Add a new external initiating event: “ External fire and explosion”	Missing			Y	Covered by the requirements in the main text of NS-R-5.
31.		Add: “To demonstrate that the risks associated with such external hazards are acceptable, the operating organization shall identify all potential sources of hazard and then estimate the impact sequences based on statistical data”	Missing			Y	Covered by the requirements in the main text of NS-R-5.
32.		Add: “A survey of the external hazards shall be carried out prior to the design of	Requirement valid to any FCF but of specific safety significance for			Y	Covered by the requirements in the main text of NS-R-5.

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		RFs and for its periodic safety assessment”	reprocessing facilities (Fukushima accident)				
33.	IV43 4	Delete and replace: “When used, safety automated control systems shall be designed to be highly reliable to ensure that process parameters remain within the OLCs, and when being out of OLCs to bring the process to its safe state.”	More flexible wording		See response to France comment no 23.		
34.		Add a new chapter: “HUMAN FACTOR CONSIDERATIONS”	Missing Human factor is of high importance especially for these facilities that have a potential for serious accidents			Y	Covered by the requirements in the main text of NS-R-5.
35.		Add : “At the design stage of a new reprocessing facility, proper account of human factors shall be considered as a major piece to achieve its operational safety.	Missing			Y	Covered by the requirements in the main text of NS-R-5.
36.	IV.45	Replace with: “The design of reprocessing facilities shall endeavor, as far as practicable, to ensure that all wastes anticipated to be	More clear. As far as possible, periodic wash out is to be avoided to minimize		See response to France comment no 24.		

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		produced during the life cycle of the facility have designated disposal routes. Where these routes do not exist at the design stage of the reprocessing facility, provisions shall be made to facilitate envisioned future options”	the volume of liquid waste				
COMMISSIONING							
37.	IV46	In the first bullet, Delete “including confirmation of the of the weld quality of static containment	These welding tests are usually done at the construction stage			Y	This requirement does not preclude confirmation during the construction phase.
38.	Before IV.45	Add: “The commissioning phase shall be used by the operating organization to become familiar with the facility and for management to promote a positive safety culture and behavioural attitudes”	Requirement valid to any FCF but of specific safety significance for reprocessing facilities			Y	Covered by the requirements in the main text of NS-R-5.
39.	Before IV.48.	Add The management shall ensure that both the facility and the workforce are fully ready for the change to active commissioning before it is implemented. For the workforce, the safety culture shall be enhanced at that stage so as to ensure RF safe operation	Major step for safe operation			Y	Covered by the requirements in the main text of NS-R-5.

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40.	Before IV.50	Create a new sub chapter “ADDITIONAL PROVISIONS” in the “COMMISSIONING” Chapter				Y	Covered by the requirements in the main text of NS-R-5.
41.		Add “During commissioning, operational limits and normal values for safety significant parameters shall be established as well as acceptable variation values due to facility transients and other small perturbations”	Missing		See response to France comment no 27.		
42.		Add: “When the direct testing of safety functions is not practically possible, alternative methods of adequately demonstrating their performance shall be made in accordance with the national authority before hot commissioning commences”	Missing			Y	Covered by the requirements in the main text of NS-R-5.
OPERATION							
43.	Before IV.53	Create a new chapter “QUALIFICATION AND TRAINING OF PERSONNEL”	Missing. Qualification and training is of high importance especially for these facilities that have a potential for			Y	The requirements relating to qualification and training are covered by the requirements in the main text of NS-R-5. Unless specified otherwise, the content of

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			serious accidents				some of the comment Nos 44-46 reflect the means of complying with the requirements and will therefore be considered in the development of the Safety Guide DS360.
44.		Add: The need for training all levels of management shall be considered in order to fully understand the complexity and the range of hazards in reprocessing facilities.				Y	See response to comment no 43.
45.		Add: Comprehensive training shall cover both automatic and manual operations with dedicated facilities set up for staff for both as necessary.	Example of specific training needs related to safety emergency response during automatic sequences, and manual operations in glove-boxes.			Y	See response to comment no 43.
46.		Add: The safety consequences for operators, maintenance staff and other personnel such as decontamination team shall be carefully considered when establishing the training programme.	Decontamination issues are very specific in back-end facilities			Y	See response to comment no 43.
47.	Before	Sub chapter “Specific provisions”	Compared with other		See response to		

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	IV.57	Add “The analytical activities shall be managed and operated so as to minimize doses to workers. The waste resulting from these activities shall be managed according to established procedures.	FCF, the analytical activities in reprocessing facilities are a core part of the operation.		France comment no 29.		
48.		Create a new chapter “MAINTENANCE” And add: “Maintenance (and any preparatory operations) which involve temporary changes to confinement and/or shielding shall be thoroughly analyzed beforehand, including transient stages, to ensure that contamination and doses are acceptable, and appropriate compensatory measures and monitoring requirements are defined.”	Requirement specific to reprocessing facilities			Y	Covered by the requirements in the main text of NS-R-5.
49.		Create a new chapter “MODIFICATION CONTROL” And add: “The operating organization and/or maintenance organization of a reprocessing facility shall use a modification control form (MCF) or an equivalent tool for managing the	The proposal is to put this as a requirement and to only a recommendation. because of the frequency of changes and the potential			Y	Covered by the requirements in the main text of NS-R-5.

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		modifications process. MCFs shall be reviewed and authorized by qualified and experienced persons to verify that safety arrangements are suitably robust”	source term of reprocessing facilities				
		Chapter “CRITICALITY PREVENTION”					
50.	After IV.58	Add : “A sufficient number of qualified criticality staff, knowledgeable about the criticality aspects of the design, operation and hazards of the facility shall be appointed at the reprocessing site to support criticality safety	Specific requirement linked to the diversity of duties of criticality staff on reprocessing sites		See response to France comment no 30.		
51.	After IV.59	Add: “A rigorous surveillance programme shall be developed and implemented to assure that uncontrolled accumulation of fissile material is detected and further accumulation is prevented.”	Specific requirement valid for both liquid and powder processes. Could supersede IV 67 and IV70 which are only related to liquid.			Y	Already covered in Appendix IV.
52.	After IV.69	Add: “The radiation protection programme shall define the type of local and individual monitoring equipment .Monitoring efforts shall be commensurate with the objective of				Y	Covered by the requirements in the main text of NS-R-5.

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		having no airborne activity or contamination of work places.”					
		Chapter “ RADIOACTIVE WASTE AND EFFLUENT MANAGEMENT					
53.		Add: “Where a decision is made to store waste pending provisions of disposal routes, all the available information characterizing waste shall be held in secure and recoverable archives (this applies to the full range of design, technical and operational records).”	Conservative requirement		See response to France comment no 33.		
54.		Add: “As far as reasonably achievable, decontamination shall be implemented further re-use of equipment, minimization of waste and the environmental impact and nuclear material recovery. Decontamination of alpha contaminated (Pu) waste shall be as complete as economically practicable to minimize impact of long lived emitters to the environment”.				Y	Covered by the requirements in the main text of NS-R-5.
55.		Add: “The operation organization shall establish an appropriate organization to				Y	The requirements relating to the discharges are covered by the requirements in the main text of

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		operate and control each discharge point”.					NS-R-5. The reflects one means of complying with the requirements and will therefore be considered in the development of the Safety Guide DS360.
56.		Add: “Liquid discharges shall be monitored, and when possible, before transfer or in real time. When used, sampling devices and procedures shall lead to representative and timely results of the real flows or batch released into the environment”.				Y	Covered by the requirements in the main text of NS-R-5.
57.		Add: “Periodic estimate of the impact to the public (critical group) shall be made with use of data on effluent releases”.				Y	Covered by the requirements in the main text of NS-R-5.

**DS439 “Addendum to NS-R-5: Appendix IV – Reprocessing Facilities; Appendix V – Fuel Cycle research and Development Facilities
(Version 5, August 2012)”**

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.		After IV.2, add a new paragraph: <u>“The design of the reprocessing facility shall implement the defence in depth concept. Appropriate redundancy, physical separation, diversity and independence shall be incorporated in the design.”</u>	To make a clear link with defence in depth and the need for redundancy, diversity, separation and independence			Y	Covered by the general safety requirements in Chapter 2 and in Annex II.
2.	IV.3	The design shall take into account feedback from operating experience at similar facilities <u>and relevant operating experience at other industrial facilities.</u>	Limiting operating experience feedback to similar facilities is too restrictive. For example, TEPCO Fukushima accident lessons learned should also be considered.... It is also true for major accidents at chemical plants...	Y			
3.	IV.4	Cooling systems, including any support features, shall have adequate capacity, availability and reliability to remove heat from radioactive decay <u>and chemical reactions.</u>		Y			

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4.		Before IV.6, add a new paragraph: <u>“IV.# Specific attention should be paid to pools where spent fuel is stored. The pool shall be designed to ensure an adequate level of water and adequate cooling can be ensured in normal operation and accident conditions (including those arising from external hazards). Spent fuel pool and associated cooling systems shall be designed to minimize the risk of siphoning water out of the pool.”</u>	TEPCO Fukushima lesson learned.			Y	Agreed. However, spent fuel storage is out of scope of the document, see DPP DS360.
5.	IV.9+IV.8	Replace IV.8 and IV.9 by: <u>“IV.8. Criticality safety shall be ensured by means of preventive measures. The priorities for choosing the methods ensuring criticality safety in any process shall be:</u> 1. <u>Passive engineered control measures involving equipment design;</u> 2. <u>Active engineered control measures involving the use of process instrumentation and control;</u> 3. <u>Administrative control involving compliance with operating procedures and the management system”</u>	IV.8 and IV.9 deals with prevention. New wording is clearer and explicit hierarchy in preventive measures (and is consistent with 6.6 of NS-R-5). If proposition not taken into account, at least, merge IV.9 and IV.8			Y	Covered by the general safety requirements in Chapter 6
6.	IV.10	Add: at the end, add: <u>“Reflection and interaction shall be taken into account during the design of the facility”</u>	Important parameters			Y	Covered by the general safety requirements in Chapter 6

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
7.	IV.17	Add at the end: <u>“When criticality control of fissile liquid is achieved by geometry; loss of containment shall be anticipated by the use of criticality safe drip trays”</u>	Of particular importance for the chemical cycles	Y			
8.	IV.20	Confinement shall be provided by two complementary containment systems — static and dynamic. <u>Static containment shall be the primary method for protection against the spread of contamination.</u>	Basic specific requirement			Y	Covered by the general safety requirements in Chapter 6
9.		After IV.20, add a new paragraph: <u>“IV.# The dynamic containment shall be designed to create a pressure differential to induce airflow toward areas that are more contaminated. The static containment shall be designed such that its effectiveness is maintained as far as achievable in case of loss of dynamic confinement.”</u>	Basic specific requirements	Y			
10.	IV.22	At the end of IV.22, add <u>“The ventilation system design in relation to filter shall accommodate testing requirements.”</u>	To allow for periodic testing		The ventilation system design, including filters, shall facilitate testing.		
11.	IV.25	At the end of IV.25, add <u>“Specific attention shall be paid on design of equipment installed in hot cells (High active units).”</u>	To stress on equipment installed in hot cells.	Y			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
12.	IV.29	aerial and liquid radioactive discharges from the reprocessing facility site are collected, <u>appropriately treated (for example filtered)</u> and confirmed	Clarification	Y			
13.	IV.29	prior to their discharge, <u>through appropriate means,</u> to the environment.	Clarification	Y			
14.	IV.31	In areas with potentially explosive atmospheres, the electrical network and equipment shall be <u>adequately protected in accordance with national requirements.</u>	IAEA requirements should not “delegate” to national requirements It is obvious (and most of the time implicit) that national requirement are to be complied with...	Y			
15.	IV.32	A detection and/or suppression system shall be installed that is commensurate with the risks of fires and explosions and is in compliance with national requirements.	Superfluous. It is obvious (and most of the time implicit) that national requirement are to be complied with...	Y			
16.		After IV.32, add a paragraph: <u>“In order to prevent the propagation of a fire through ventilation ducts and to maintain the integrity of firewalls, ventilation systems shall be equipped with fire dampers at appropriate locations”</u>	Requirement valid to any FCF but of specific safety significance for reprocessing facilities	Y			
17.	IV.33	non-nuclear-designed equipment installed in glove boxes or hot cells (e.g. mechanical guards, fuses, seals, insulation) shall be adapted to the nuclear environment <u>if necessary.</u>	It may not always be necessary...	Y			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
18.	IV.36	In the design of a reprocessing facility, the potential for a loss of <u>support systems services</u> , such as cooling and electrical power supplies, that support <u>service</u> a safety function	To be more consistent with the title of the section		In the design of a reprocessing facility, the potential for a loss of support system support features, such as cooling and electrical power supplies, that are required by a safety system shall be considered and the impact of such a loss on safety shall be assessed		
19.	IV.36	In the design of a reprocessing facility, the potential for a <u>long term</u> loss of services, such as cooling and electrical power supplies,	Fukushima lesson learned	Y			
20.	IV.37	In the event of a loss of normal power, <u>even for a significant period (several days)</u> , an emergency electrical supply	Fukushima lesson learned	Y			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
21.		Before IV.39, add a new paragraph: “IV.# <u>“Considering seismic hazards, an adequately conservative ground motion shall be selected to ensure:</u> - <u>the stability of buildings and transfer canals between buildings and to assure the ultimate barrier of confinement in case of an earthquake, taking into consideration the consequences to the workers, the public, and the environment.,</u> - <u>relevant SSCs availability during and after the earthquake”.</u> ”	TEPCO Fukushima lesson learned	Y			
22.	IV.41	• For detecting and managing accident conditions, such as criticality or effects due to <u>external hazards (such as an earthquake or flooding).</u>	Fukushima lesson learned	Y			
23.		After IV.41, add a new paragraph: “ <u>When used, safety automated control systems shall be designed to be highly reliable, consistent with their role in the safety of the facility.</u> ”	To insist on high reliability goal	Y			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
24.	IV.42	After IV.42, add a new paragraph: <u>“IV.# The design of reprocessing facilities shall endeavor, as far as practicable, to ensure that all wastes anticipated to be produced during the life cycle of the facility have designated disposal routes. Where these routes do not exist at the design stage of the reprocessing facility, provisions shall be made to facilitate envisioned future options”</u>	To anticipate for waste management.	Y			
25.	IV.43	If such verification is carried out at later stage, the probability of problems occurring and the time needed for and cost of corrective action may increase.	It is an explanation, not a requirement	Y			
26.	IV.47	Transform IV.47 into a footnote	Explanatory note (not a requirement)	Y			
27.		After IV.48, add a new paragraph: <u>“IV.## During commissioning, operational limits and normal values for safety significant parameters shall be confirmed as well as acceptable variation values due to facility transients and other small perturbations”</u>	Missing topic	Y			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
28.	IV.51	Delete IV.51	Very general and unpecific to a reprocessing facility. GS-R-3 is enough			Y	MS wanted to emphasise the importance of cross communication particularly if the reprocessing facility was located on a site with many facilities.
29.		After IV.57, add a new paragraph: <u>“IV.## The analytical activities shall be managed and operated so as to minimize doses to workers. The waste resulting from these activities shall be managed according to established procedures.”</u>	Compared with other FCF, the analytical activities in reprocessing facilities are a core part of the operation.	Y			
30.		Before IV.58, add a new paragraph: <u>“IV.## A sufficient number of qualified criticality staff, knowledgeable about the criticality aspects of the design, operation and hazards of the facility shall be appointed at the reprocessing site to support criticality safety”</u>	Specific requirement linked to the diversity of duties of criticality staff on reprocessing sites. Is more restrictive than 9.52 in NS-R-5	Y			
31.	IV.67	If addition of either the wrong composition or the wrong quantity of a chemical reagent could pose a criticality hazard, then this shall be monitored and controlled as appropriate.	It is not an option...	Y			

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32.	IV.72	High level waste shall be stored in facilities that maintain a suitably reliable heat removal function, <u>in addition to adequate confinement and shielding.</u>	To cover other fundamental safety functions.	Y			
33.		After IV.72, add a new requirement: “IV.## Where a decision is made to store radioactive waste pending provisions of disposal routes, all the available information characterizing waste shall be held in secure and recoverable archives (this applies to the full range of design, technical and operational records)”	To clarify cases where disposal route is unknown and avoid later problems in knowing characteristics of “temporary” stored wastes	Y			
34.	Appendix V introduction	Transfer “Fuel cycle research and development facilities can be used to investigate various fuel manufacturing techniques, reprocessing and waste handling techniques and processes, as well as to investigate material properties of fuel before and after irradiation in the reactor, and to develop equipment, the use of which is envisaged later at an industrial scale.” into a footnote	Explanation only (and not relevant to the risks to be managed)	Y			
35.	V.4	In the criticality safety assessment, the choice of fire extinguishing media, (e.g. water, inert gas or powder), and the safety of their use shall be addressed.	Editorial	Y			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
36.	V.7	A detection and/or suppression system shall be installed that is commensurate with the risks of fires and explosions and is in compliance with national requirements.	Superfluous. It is obvious (and most of the time implicit) that national requirement are to be complied with...	Y			
37.	V.8	In areas with potentially explosive atmospheres, the electrical network and equipment shall be <u>adequately</u> protected in accordance with national requirements.	IAEA requirements should not “delegate” to national requirements It is obvious (and most of the time implicit) that national requirement are to be complied with...	Y			
38.	V.10	<u>Operators and researchers</u> shall be qualified and trained	In a research facility, researcher/experimenter training/qualification (on safety matters) is an issue to address	Y			
39.	V.12	<u>As</u> Criticality hazards may be encountered in any research and development activity, including maintenance work, <u>a criticality hazard assessment shall be performed.</u>	To establish the requirement for a criticality hazard assessment	Y			

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Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS) Country/Organization: Germany					Page 1 of 4 Date: 2012-10-11			
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3	1	introductory text	1 st paragraph, last sentence: "... including removal of solvents from aqueous solutions, treatment and rework <u>reconditioning</u> of solvents ..."	More precise terminology.	Y			
3	2	introductory text	3 rd paragraph, 1 st sentence: "... and waste conditioning facilities, e.g. facilities for vitrification of high level waste ..."	Editorial (missing comma).	Y			
3	3	introductory text	3 rd paragraph, 2 nd sentence: "... are provided in Ref. [2]."	Editorial (missing dot after "Ref").	Y			
2	4	IV.4	"Cooling systems, including any support features, shall have adequate capacity, availability and reliability to remove heat from radioactive decay <u>or from chemical reactions.</u> "	The main purpose of a cooling system is to remove heat, whether it originates from radioactive decay or from (uncontrolled) chemical reactions. See also our comment to para IV.5.	Y			
2	5	IV.5	"Cooling systems, including any support features, for removing heat due to chemical reactions shall have adequate capacity, availability and reliability to remove heat and prevent an uncontrolled increase in temperature, e.g. from a fire	To avoid a tautology. The purpose of a cooling system is already mentioned in the first part of the sentence ("Cooling systems ... for removing heat due to ..."). Prevention of an uncontrolled increase in temperature is another important purpose of a cooling	Y			

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Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS) Country/Organization: Germany					Page 1 of 4 Date: 2012-10-11			
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			during the dissolution of metal spent fuel in nitric acid.”	system. This should be addressed in this paragraph whereas the issue of heat removal should be emphasized in para IV.4. General note: The dissolver has a heating system because the spent fuel is dissolved in nitric acid under high temperature. Therefore, a cooling system for removing heat due to chemical reactions during the dissolution process is not required. However, the dissolution process might have a system which can be used to reduce the temperature of the solution in a controlled manner, if necessary.				
3	6	IV.13	Footnote No. 3: “... process vessels, sub-facilities or rooms.”	Editorial.	Y			
1	7	IV.19	“In the criticality safety assessment, the potential use of neutron poisons, such as gadolinium or barium boron, shall be addressed, in normal operation (e.g. to increase the safe mass of fissile material in a dissolver),	1. In contrast to gadolinium, barium does not act as a neutron absorber. It must be replaced by boron. Note: Para IV.19 was introduced as a result of the Member States comments (see UK comment No.	Y			

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Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			during deviations from normal operation (e.g. dilutions of soluble neutron poisons below a specified limit of concentration) and in accident conditions.”	<p>17). In the Sellafield THORP Head End plant, the low-energy beta emitter ¹⁴C (in the form of carbon dioxide) is scrubbed from the dissolver off-gas with sodium hydroxide to form a solution of sodium carbonate. Subsequent addition of barium nitrate to the spent solution leads to the precipitation of a barium carbonate slurry. The product is routed to the Wastes Encapsulation Plant (WEP) for cementation. In summary, separation of ¹⁴C via barium nitrate is a pure chemical process which has no direct relation to criticality safety aspects.</p> <p>2. Deviations from normal operation occur only if the dilution of soluble neutron poisons falls below a specified minimum value of concentration. This should be stated in the para for clarification purposes.</p>				
3	8	IV.30	1 st bullet point: “The use of explosive gases,	The word “as” is missing.	Y			

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Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			flammable liquids and chemical substances such as hydrogen or hydrogen peroxide ...”					
2	9	IV.36	“... the potential for a loss of services ... that support a safety function shall be considered and the impact of such a loss and the impact of such services on safety shall be assessed.”	Clarification. The impact of the loss of services shall be assessed, not the impact of the services itself.	Y			
2	10	IV.41	2 nd bullet point: “For detecting and managing accident conditions, such as criticality or <u>adverse</u> effects due to an earthquake (e.g. <u>fire, release of hazardous materials, loss of support systems</u>).”	Clarification. Detecting an adverse effect due to an earthquake is essential to manage accident conditions. Whilst a nuclear reactor is shutdown immediately in an automatic manner during an earthquake, the implementation of countermeasures in a reprocessing facility is less simple. Reprocessing facilities employ various chemical processes with different characteristics and parameters, some of the processes use large quantities of hazardous materials. Therefore, each process requires special safety measures that depend on the type and the degree of a potential damage due to	Y			

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Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
				an earthquake.				

Relevance: 1 – Essentials 2 – Clarification 3 – Wording/Editorial

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Country/Organization: Japan/Nuclear Regulation Authority		Date: 25 Oct. 2012					
Comment No.	Para/Line No.	Proposed new text Red parts are those to be deleted. Blue parts are those to be added.	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modify./rejection
1	General		Regarding some requirements, their original meanings/intentions were changed through the revision by TE, e.g. old IV.7 in the Version 4, IV.9, IV.22, IV.32, IV.36, IV.54, and IV.73. The concrete comments for them are shown later in this table. A revision by TE should not lead such changes of original technical meanings/intentions. From the viewpoint above, a careful examination is strongly expected just in case to make sure that the original meanings/intentions of requirements were not changed through the revision. After the examination, if questionable descriptions are found, they are expected to be made sure to keep their original meanings/intentions by specialists of reprocessing in member states.		Comment noted. The comments made have been reviewed with the TE and their resolution is recorded.		
2	Note 1 in page 1	Delete the present sentence or replace the present sentence with 1) the definition of fissile material in IAEA Safety Glossary or 2) the sentence shown below. Fissile material refers to a material	The present note may give a misunderstanding such that “material containing fissile nuclides, which are not sufficient to enable a self-sustained nuclear chain reaction, is not a fissile material.” Therefore, the present note shall be deleted or replaced as shown in		Note 1 was deleted.		

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		containing any of the fissile nuclides in sufficient proportion to enable a self sustained nuclear chain reaction with slow (thermal) neutrons.	the left column. We understand that the present note is as same as that of DS407. However, it dose not justify the appropriateness of the present sentence because the note of DS407 has the same problem as shown before.				
3	Between IV.6 and IV.7 (IV.7 in Version 4)	The following original sentence shall be kept. If Appropriate means shall be provided for measuring the parameters that are relevant to the safety of the reprocessing facility, both: in normal operation to ensure that the process is being operated within the operating limits and conditions and to monitor its environmental impact; for detecting and managing accident conditions, such as criticality.	“Sampling and analysis” and “INSTRUMENTATION AND CONTROL SYSTEMS” are not same elements for design. The IV.7 in the version 4 is a requirement for “Sampling and analysis.” On the other hand, the IV.41 is a requirement for “INSTRUMENTATION AND CONTROL SYSTEMS.” Therefore, if the IV.7 in the version 4 is eliminated, the Appendix IV loses a requirement for “Sampling and analysis.” Such loss seriously damaged the Appendix IV and shall not be occurred. The IV.7 in the version 4 shall not be deleted just by a simple reason such that there is a same kind of sentence in the document.		Paragraph reinstated and incorporating TE comments: “Appropriate means shall be provided for measuring the parameters that are relevant to the safety of the reprocessing facility, both: <ul style="list-style-type: none"> • In normal operation to ensure that all processes are being conducted within the operating limits and conditions and to monitor their environmental impact; • For detecting and managing accident conditions, such as criticality.” 		

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Country/Organization: Japan/Nuclear Regulation Authority		Date: 25 Oct. 2012					
Comment No.	Para/Line No.	Proposed new text Red parts are those to be deleted. Blue parts are those to be added.	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modify./rejection
4	IV.9	Preference shall be given to achieving criticality safety by engineering design, to the extent practicable, rather than by administrative measures. (Keep the original sentence.)	The term “design” includes measures of administrative controls as shown in the 6.6 in the NS-R-5. (The 6.6 is shown below.) The original sentence has distinguished between design of administrative and other design measures in its description. However, the present sentence does not distinguish both measures. Due to this reason the present sentence contains an inconsistency such that the first “design” includes “administrative measures.” Therefore, the original sentence shall be kept because of above reason. We understand that the Appendix I, II and III have the same sentences as the present IV.9. However, it just does not justify an appropriateness of the present sentences. On the contrary, the corresponding sentences in the Appendix I, II and III shall be modified in a next opportunity.	Y			

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			<p>6.6. The following hierarchy of design measures shall be used to the extent practicable in protecting against potential hazards: (1) Selection of the process (to eliminate the hazard); (2) Passive design features; (3) Active design features; (4) Administrative controls.</p>				
5	IV.22	The efficiency of filters and the factors potentially damaging them (e.g. their resistance to high humidity, chemicals, high temperatures and high pressure of the exhaust gases, and fire conditions) shall be taken into consideration. (Keep the original description.)	In the original sentence, resistance to high humidity, chemicals, high temperatures and high pressure of the exhaust gases, and fire conditions are given as examples of “the factors potentially damaging them.” In the original sentence the general term “the factors potentially damaging them” is used because it is an essential and important concept, and the expression can indicate all such factors. On the other hand, in the present sentence, resistance to high humidity, chemicals, high temperatures and high pressure of the exhaust gases, and fire conditions are given as subjects of the sentence in a direct manner. This change makes the original point shown above be out of	Y			

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			focus. Namely, the present sentence could not provide the essential concept to be considered to readers of this document because it loses the term “the factors potentially damaging them.” Moreover, the present sentence can not cover other factors potentially damaging the efficiency of filters, e.g. vibration, dust, ageing effect.				
6	IV.27	The design and layout of shielding shall take account of its potential for degradation, e.g. alkalization of concrete.	The term “alkalization of concrete” is not an appropriate example for degradation as a technical term because the reaction of “alkalization of concrete” effects on <u>strength of structure</u> but it doesn’t effect on <u>shielding</u> . In this comment, we assume that the term “alkalization of concrete” is used to mean “Alkali aggregate reaction.”	Y			
7	IV.32	A detection <u>and alarm system</u> and/or suppression system shall be installed that is commensurate with the risks of fires and explosions and is in compliance with national requirements. (Keep the original expressions concerning this part of the sentence.)	A term “detection system” dose not includes “alarm system.” Therefore, “and alarm system” shall not be deleted. The present sentence has changed the original meaning due to the delete. Please refer the following 3 requirements in the NS-R-5. 6.39 Means of monitoring and appropriate <u>alarm systems</u> for	Y			

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Reviewer:		Page 38 of 11					
Country/Organization: Japan/Nuclear Regulation Authority		Date: 25 Oct. 2012					
Comment No.	Para/Line No.	Proposed new text Red parts are those to be deleted. Blue parts are those to be added.	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modify./rejection
			<p>atmospheric contamination shall be installed.</p> <p>6.50 (a) The installation of a criticality <u>detection and alarm system</u> to initiate immediate evacuation;</p> <p>II.19. Liquids may be used in laboratories. Their use shall be limited and controlled if necessary by means of <u>detection systems</u> to detect spillage.</p> <p>A “detection system” and an “alarm system” are used with distinction in those sentences. This is an evidence to show that a term “detection system” dose not includes “alarm system.”</p>				
8	IV.36	In the design of a reprocessing facility, the potential for a loss of services, such as cooling and electrical-power energy supplies, that support a safety function shall be considered and the impact of such a loss and the impact of such services on safety shall be assessed.	<p>“Energy supplies” include not only electrical power but also compressed air (for pulsation, agitation etc.) and steam (for steam jet) etc.</p> <p>Therefore, the term “energy supplies” can not be simply replaced by “electrical power supplies.”</p> <p>Under the loss of support systems the most important thing to be assessed is the impact of such a loss on safety. In addition to that, the content of “the impact of such services” and its</p>	Y			

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Country/Organization: Japan/Nuclear Regulation Authority		Date: 25 Oct. 2012					
Comment No.	Para/Line No.	Proposed new text Red parts are those to be deleted. Blue parts are those to be added.	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modify./rejection
			difference from “the impact of such a loss” are unclear. Therefore, the proposed expression in the left column is clearer and more appropriate than that of the present sentence.				
9	IV.54	For each reprocessing campaign, the values of control parameters shall be determined on the basis of the actual characteristics of the fuel and fuel solution to be processed (or reprocessed) in derived for the actual feed programme for that campaign, and as required by the safety assessment.	The feed programme is the planned sequence of fuel feeding to the head-end facility and the dissolver. (Please refer the note No. 7.) Accordingly, actual characteristics of the fuel and fuel solution are derived <u>from</u> the fuel to be reprocesses. (Actual characteristics of the fuel and fuel solution are not derived <u>for</u> the fuel to be reprocesses.) Therefore, the present sentence shall be revised to state a right situation shown above and to avoid such misunderstanding.	Y			
10	IV.73	In decommissioning activities of dismantling-of equipment that was used to process fissile material (e.g. vessels, gloveboxes), procedures shall be implemented to ensure that criticality control is maintained.	According to the IAEA Safety Glossary, the term “decommissioning” includes not only just dismantling but also other administrative and technical actions taken to allow the removal of some or all of the regulatory controls from a facility. Accordingly, decommissioning activities for equipment that was used to process fissile material include not only dismantling it but also other necessary		Accept comment and text added incorporating TE comments: “In applying decommissioning actions to the dismantling of equipment that was used to process fissile material (e.g. vessels, gloveboxes), procedures shall be implemented to ensure that criticality control is maintained.”		

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Reviewer: Page 38 of 11 Country/Organization: Japan/Nuclear Regulation Authority Date: 25 Oct. 2012							
Comment No.	Para/Line No.	Proposed new text Red parts are those to be deleted. Blue parts are those to be added.	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modify./rejection
			<p>activities, e.g. discharge of contents of equipment, washing equipment.</p> <p>In the original sentence, the term “decommissioning” is used in order to cover not only just dismantling but also all other activities necessary in decommissioning period. Therefore, the term “dismantling” shall not be used instead of “decommissioning.” The proposed sentence makes the point above clearer.</p> <p>Note: The definition of decommissioning in the IAEA Safety Glossary</p> <p>1. Administrative and technical actions taken to allow the removal of some or all of the <i>regulatory controls</i> from a <i>facility</i> (except for a <i>repository</i> or for certain <i>nuclear facilities</i> used for the <i>disposal</i> of residues from the mining and processing of <i>radioactive material</i>, which are ‘closed’ and not ‘decommissioned’).</p>				
11	Title between IV.70 and IV.71	MANAGEMENT OF RADIOACTIVE WASTE AND EFFLUENTS	Two requirements under the title “MANAGEMENT OF RADIOACTIVE WASTE AND EFFLUENTS”, i.e. IV.71 and IV.72, do not touch upon effluent.	Y			

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COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:		Page 38 of 11					
Country/Organization: Japan/Nuclear Regulation Authority		Date: 25 Oct. 2012					
Comment No.	Para/Line No.	Proposed new text Red parts are those to be deleted. Blue parts are those to be added.	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modify./rejection
		Waste management	Therefore, the proposed title is more appropriate than the present one. The subtitle “Waste management” is not necessary because Both IV.71 and IV.72 touch upon waste management and also the title “MANAGEMENT OF RADIOACTIVE WASTE” can work as their title instead of “Waste management.”				
12	IV.74	Criticality safety shall be ensured for the temporary storage of waste contaminated with fissile materials that are generated by decommissioning.	In the appendix IV, there are 20 “fissile material” (the singular form) and there is just 1 “fissile materials” (the plural form) in IV.74. The main body of the NS-R-5 has just 1 “fissile material” (the singular form) in II.7(h) and all other ones are “fissile materials” (the plural form). If there is no specific reason to describe as “fissile material” here, “fissile material” seems to be appropriate due to the above reason.		Accept comment and text added incorporating TE comments: “Criticality safety shall be ensured for the temporary storage of waste from decommissioning that is contaminated with fissile material.”		
13	IV.33	In the design of a reprocessing facility, plant equipment for use in a radiological nuclear environment shall be suitably assessed for its adequate performance or potential failure. Measures for the industrial	This requirement talks about the radiation effect of radiation on the performance of equipment. Therefore, the term “radiological environment” is clearer and more appropriate than “nuclear environment.”		Accept comment and text added incorporating TE comment and France comment no 17: “In the design of a reprocessing facility, plant equipment for use in		

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COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:		Page 38 of 11					
Country/Organization: Japan/Nuclear Regulation Authority		Date: 25 Oct. 2012					
Comment No.	Para/Line No.	Proposed new text Red parts are those to be deleted. Blue parts are those to be added.	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modify./rejection
		safety of non-nuclear-designed equipment installed in glove boxes or hot cells (e.g. mechanical guards, fuses, seals, insulation)—shall be adapted to the nuclear radiological environment.			a radiological and nuclear environment shall be suitably assessed for its adequate performance or potential failure. Measures for the industrial safety of non-nuclear-designed equipment installed in glove boxes or hot cells (e.g. mechanical guards, fuses, seals, insulation) shall be adapted to the nuclear environment if necessary.”		

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COMMENTS BY REVIEWER				RESOLUTION			
Country/Organization: PNRA, Pakistan							
Date: October 31, 2012							
Comm ent No.	Para/Line/S ection No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	After IV.38	The design of structures, systems and components important to safety shall include an analysis of internal events which may affect the safety of reprocessing plant and corresponding design provisions for protection against any such events. These events may include equipment failure, mal-operation, internally generated missile, etc.	Refer to sections on Internal Initiating Events (IV.30 and IV.38) safety requirements regarding accidents occurred due to missiles generating from rotating components may also be included.		Para 6.8 provides general requirements covering the design of SSCs and the identification of PIEs, supplemented by Annex I. Equipment failure and mal-operation are covered by these general requirements, however, reference to internally generated missiles from rotating components is not and has been added . “In the design of a reprocessing facility, the possibility of missiles generated by rotating components shall be considered and their impact on safety shall be assessed”.		

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Addendum to NS-R-5: Appendix IV – Reprocessing Facilities; Appendix V – Fuel Cycle Research & Development Facilities

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Duncan Ellis Country/Organization: United Kingdom/Sellafield Ltd Date: 9 th October 2012							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	IV.6	Cooling systems shall be designed to minimize the risk from coolant leaking into areas where this could cause a criticality hazard	Only of concern if the leaking of coolant can cause a hazard. An area might contain criticality hazards but cooling ingress irrelevant unless this can itself lead to a hazard.	Y			
2	IV.31	[1 st bullet point] ...chemical substances such as hydrogen or hydrogen peroxide...	Missing word.	Y			
3	IV.39	During the design of a reprocessing facility, the possibility of load drops shall be considered and their impact on safety shall be assessed.	Replace incorrect word 'possible'.		Comment not applicable to version 5.		
4	IV.47	[1 st sentence] ...before the introduction of radioactive materials. Tests carried out...	Missing full stop.		Comment not applicable to version 5.		
5	V.6	[Title above paragraph] PROTECTION AGAINST EXPOSURE TO RADIATION	Remove 'S' from 'RADIATIONS'.		Comment not applicable to version 5.		
6	V.11	Criticality hazards may be encountered during any research and development	Criticality hazard not possible with <i>any</i> operation,	Y			

ADDENDUM TO NS-R-5
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COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Duncan Ellis Country/Organization: United Kingdom/Sellafield Ltd Date: 9 th October 2012							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		activity involving fissile material , including maintenance work.	must involve fissile material.				
7	V17	[remove speech marks end of sentence]	Speech marks not required.		Comment not applicable to version 5.		

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