

**Master Resolution Table DS478- Safety of Nuclear Fuel Cycle Facilities (revision of NS-R-5)**

COMMENTS BY REVIEWER Country/Organization: All      Date: June 2015				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
CA-N01	01.003 -	“(8) Isotope production facilities”	It would be better to clarify whether an isotope production facilities, such as for Mo-99 use irradiated HEU/LEU targets. Safety requirements are similar to re-processing fuel rods. Needs clarification whether this would be covered by this document.	Y			
CA-N02	02.013 (2) Footnote 9	“Facility state, following an anticipated operational occurrence or accident conditions, in which the nuclear fuel cycle facility’s main safety functions can be ensured and maintained stable for a long time.”	The safety functions include the reactivity control.	y			
CA-N03	02.002 -	“Fundamental safety objective is to protect people and the environment from harmful effects of radiological, chemical and conventional hazards related to processing of Nuclear Fuel”.	The introduction section clearly states that Fuel Cycle Facilities pose significant chemical and conventional hazards due to processing of nuclear fuel and are within scope of this document and there are a number of chemical hazards, human and conventional safety issues discussed subsequently (ex. 2.4). To omit them from the objective is not appropriate.	Y	Added to para 2.1: <a href="#">Restricting the likelihood of events that might lead to a loss of control over a nuclear chain reaction or any other source of radiation also requires control of chemical and</a>		

					<a href="#">other non-nuclear hazards of nuclear fuel cycle facilities.</a>		
CA-N04	02.008 -	“Such exposures and radioactive releases are required to be strictly controlled, to be measured or estimated, to be recorded and to be kept as low as reasonable . . . “	Additional clarity on measurement and estimation may be added as means of recording so that it is not assumed that all releases should be measured.	Y			
CA-N05	02.013 (4)	“This is achieved by preventing the progression of the accident and mitigating the consequences of a design extended condition”	The use of a “severe accident” is not consistent with the IAEA glossary.			N	identical to SSR 2/1 (April 2015)
CA-N06	02.013 (4) Footnote 11	Remove.	See comment 3. A severe accident may not have off site consequences (e.g. for a nuclear power plant: Three Mile Island).			N	Noted for discussion at NUSCC
CA-N07	02.013 (4)	“Sequences that would lead to early or large <sup>12</sup> radioactive or chemical releases are required to be ‘practically eliminated’”	For most of these facilities, radioactive substances are not necessarily the dominant risk.			N	Noted for discussion at NUSCC
CA-N08	02.013 (4) Footnote 12	“An early radioactive or chemical release is a release for which off-site protective measures are necessary but are unlikely to be fully effective in a timely manner. A large radioactive or chemical release is a release for which off-site protective measures limited in terms of times and areas of application are insufficient to protect people and the environment.”	See comment 5.			N	Terms are defined here because DiD appears in the document before the introduction of more detailed concepts.
CA-N09	02.014 -	“The number of barriers that will be necessary will depend upon	See comment 5.	Y	Inserted; <a href="#">the nature of any</a>		

		the initial source term in terms of amount and isotopic composition of radionuclides, the amount of chemicals and their toxicity, the effectiveness of the individual barriers, the possible internal and external hazards, and the potential consequences of barrier failures.”			<a href="#">associated chemical hazard</a>		
CA-N10	02.019 -	Fonts.		y	Font size in 2.18(e) reduced		
CA-N11	03.017 - & other areas where Ref.d	“radiological, chemical and conventional hazard”	Document must reflect all hazards typical to fuel cycle facilities. Radiological being primary but not the only significant type of hazard with these facilities.	y			
CA-N12	04.014 -	Remove : “All the relevant IAEA Safety Requirements publications identified by Member State, including those established by this publication and those on emergency preparedness and response Ref. [7] and safety assessment Ref. [12].”	The Member State regulator is the authority in position to require compliance with a document, including IAEA documents.	Y, third bullet removed			
CA-N13	06.001 Req't 7	“(a) Cooling and confining hazardous materials; (b) Protecting people against hazards;”	Unlike the first sentence of the requirement, items (a) and (b) focused only on radioactive materials, without covering the chemical hazards.	Y	a) Maintaining the sub-criticality of fissile material; b) Cooling and confining radioactive <a href="#">and other harmful</a> materials; c) Protecting		

					people against external radiation.		
CA-N14	06.020 -	“(a) Provide successive verifiable barriers to the release of radioactive material or chemicals to the environment;”	Chemical risks may be higher than the radioactive materials.	Y	“radioactive material <u>or hazardous chemicals</u> to the environment”		
CA-N15	06.100 to 06.103 Req’t 27	Add chemical discharges.	The discharges from the chemical inventory might have more impact than from the radioactive inventory.	Y			
CA-N16	06.129 -	“Where there are significant quantities of spent fuel or dispersible alpha emitting material...”	Word missing	Y added <u>emitting</u>			
CA-N17	06.164 -	“(b) Maintain concentrations of gas mixtures below flammable levels;”	“Prevent” gives another meaning to the sentence.	Y			
CA-N18	06.174 -	“The safety related I&C shall be designed to withstand events within the design basis and design extension conditions, in accordance with a graded approach.”	Only the I&C credited to cope with the events are designed accordingly, typically they’re safety related.	Y			
CA-N19	06.192 -	“The design of compressed air systems shall also ensure their required reliability and shall consider independent compressed air tanks where needed for items important to safety”	For the safety related system, independent compressed air feed should be considered to avoid common cause failure.	Y	<u>The provision of auxiliary compressed air tanks shall be considered for items important to safety.</u>		
CA-N20	07.001 Req’t 55	Spacing.		Y			
CA-N21	09.006 -		Sentence unclear.	Y	Deleted <del>preparation- and</del>		

CA-N22	09.069 -	“The operating organization shall ensure that the records to be retained and their retention periods comply with the Member State’s regulatory requirements.”	The records to be retained as well as their retention period are established by the regulatory body.	Y, this is IAEA guidance (not requirements )	The operating organization shall specify ensure <del>that</del> <u>are</u> records <del>to</del> <u>are</u> retained <del>and</del> <u>for</u> their <u>specified</u> retention periods. GSR pt 1 requirement: <i>“The requirement for the regulatory body to maintain records cannot diminish the responsibility of authorized parties to keep their own records”.</i>		
CA-N23	09.089 - a	“The balance of process shall be verified and controlled.”	The fissile material that remains in the equipment must be calculated and removed when necessary to prevent criticality.	Y			
CA-N24	09.089 - b	“The balance of process shall be verified and controlled.”	See comment 20.	Y			
CA-N25	09.089 - a		Must differentiate between bulk processing of natural uranium and batch processing with varying enrichment quantities.	Y			
CA-N26	09.087 Req’t 69	Existing text: “...and <b>design basis conditions (or</b>	Term “design basis conditions (or equivalent)” is	Y			

		<p>equivalent).”  Proposed New text: “<b>and conditions that are referred to as credible abnormal conditions, or conditions included in the design basis</b>”</p>	<p>vague and does not reflect the wording of a fundamental requirement which is followed by many Members States (i.e. by U.K., USA, Canada, India, China, etc.). Proposed re-wording is consistent with the terminology used in other parts of the NS-R-5 (DS478)</p>				
DE-NW01	01.003 -	<p>Bullet (6):  Please assign a new footnote No. 2 to the term ‘interim waste storage’ with the following text of the footnote:  “<a href="#">2 Interim waste storage provides functions for retrieval of the radioactive waste for later, permanent disposal.</a>”</p>	<p>2 - The term ‘interim (waste) storage’ is introduced in Para 1.3 while its meaning is explained much later in Section 6; see Footnote No. 47 to Para 6.97. Therefore, we recommend to move this footnote to Para 1.3, with minor modifications in wording as proposed at the left.</p>	Y			
DE-NW02	01.014 -	<p>Last sentence:  “Terms in this publication are to be understood as defined and explained in the IAEA Safety Glossary (Ref. [2]), unless otherwise stated (see “<a href="#">Note on Definitions</a>”).”</p>	<p>3 - Citation of the correct title of the related subsection.</p>	Y			
DE-NW03	02.013 -	<p>Bullet (1):  “... This leads to requirements that the plant be soundly and conservatively sited, designed, constructed, maintained, operated and modified in accordance with <a href="#">the quality management system</a> and appropriate and proven engineering practices ...”</p>	<p>2 - The valid IAEA Safety Standards use the term ‘management system’ rather than ‘quality management’. The concept of ‘management system’ reflects and includes the initial concept of ‘quality control’ (controlling the quality of products) and its evolution through ‘quality</p>	Y			

			assurance' (the system to ensure the quality of products) and 'quality management' (the system to manage quality).				
DE-NW04	03.001 -	2 <sup>nd</sup> sentence: "These principles are established in <del>(Section 3 Principles 2 and 3 of</del> Ref. [1] <del>:- Principles 2, 3).</del> "	3 - Editorial.	Y			
DE-NW05	04.014 -	3 <sup>rd</sup> bullet: "All the relevant IAEA Safety Requirements publications, including those established by this publication and those on emergency preparedness and response (Ref. [7]) and safety assessment (Ref. <del>[12]</del> [9])."	2 - Wrong reference is cited in this bullet. Requirements for safety assessment are established in GSR Part 4 (Rev. 1).			N	Entire bullet deleted following feedback from other NUSCC members
DE-NW06	04.031 Req't 6	"A safety committee (or an advisory group) that is independent from the <u>operating organization of</u> the nuclear fuel cycle <u>facility</u> shall be established to advise the operating organization facility manager on all safety aspects of the facility."	2 - Clarification.	Y	An <u>independent</u> safety committee (or an advisory group) <del>that is independent from the nuclear fuel cycle facility</del> shall be established to advise the operating organization facility manager on all safety aspects of the facility.  4.32..... <u>The committee</u>		

					<a href="#">shall be independent of the regulatory body and its membership shall, to the extent necessary, be independent of the operations management raising the safety matter..</a>		
DE-NW07	04.033 - i	“Reports to be provided to <a href="#">the regulatory body</a> ;”	3 - Wording.	y			
DE-NW08	05.004 -	1 <sup>st</sup> sentence: “... required for a medium or high risk facility (e.g. <a href="#">LWR light water reactor</a> fuel manufacture or a reprocessing facility).”	3 - The abbreviation ‘LWR’ is not introduced in the document. Thus, its usage should be avoided here.	Y			
DE-NW09	06.071 -	1 <sup>st</sup> sentence: “An analysis of design extension conditions ( <del>Ref. [9]</del> ) shall be performed.”	3 - The Safety Requirements GSR Part 4 (Rev. 1) do not specifically address the analysis of design extension conditions. Thus, the reference is to be deleted or replaced appropriately.	Y ref. deleted			
DE-NW10	06.091 - after	Please add two new paragraphs with the following text:  <a href="#">“6.92 The principle of redundancy shall be applied as an important design principle for improving the reliability of items important to safety. The design shall be such as to ensure that no single failure could result in a loss of the capability of a system to perform its intended safety</a>	1 - Under Requirement 25, the insertion of two new paragraphs is proposed for the purpose of explaining 1.) the principle of redundancy to cope with single failure events; 2.) the principle of diversity.	Y	Inserted: <a href="#">The principles of redundancy and independence shall be applied as important design principles for improving the reliability of functions important to safety. The design shall be such as to ensure that no single failure could result in a loss of the capability of a</a>		

		<p><a href="#">function.</a>”</p> <p>“<a href="#">6.93 The principle of diversity shall be considered in the design of the facility to enhance reliability of items important to safety and to reduce the potential for common cause failures.</a>”</p>			<p><a href="#">system to perform as intended.</a></p> <p><a href="#">The principles of segregation and diversity shall be considered in the design of the facility to enhance the reliability of functions important to safety and to reduce the potential for common cause failures.</a></p>		
DE-NW11	06.096 -	<p>2<sup>nd</sup> sentence: “The requirements on the generation, processing and storage of radioactive waste established <a href="#">in</a> Ref. [12] shall be applied.”</p>	3 - Missing word.	Y Inserted <a href="#">in</a>			
DE-NW12	06.097 Footnote 47	<p><del>“Interim storage provides functions for retrieval of the waste for later, permanent disposal.”</del></p>	2 - For justification, see our related comment on Para 1.3.	Y			
DE-NW13	06.129 -	<p>1<sup>st</sup> sentence: “Where there are significant quantities of spent fuel or dispersible alpha material (<a href="#">e.g. in MOX fuel fabrication facilities or reprocessing facilities</a>), two static barriers shall be required (<del>e.g. MOx or reprocessing</del>) so that, during normal operations, radioactive material is confined inside the first static barrier.”</p>	2 - The examples given in brackets should be moved to the first part of the sentence.	Y			
DE-NW14	06.187 -	<p>“The emergency centre shall provide means of communication with on-site and <del>offsite</del> <a href="#">off-site</a> emergency response organizations and with appropriate control locations on the site.”</p>	3 - Editorial (uniform spelling throughout the document).	Y, dash inserted			

DE-NW15	06.191 -	1 <sup>st</sup> sentence: “For facilities with potentially <del>high-hazards</del> <u>high hazards</u> (e.g. processing, handling and storing spent fuels), ...”	3 - Editorial.	Y dash replaced by space			
DE-NW16	08.012 -	“... (a) Before active commissioning: – Demonstration of the availability of criticality detection and alarm systems; – Demonstration of the performance of emergency shutdown systems; – <del>EPR</del> <u>Emergency preparedness and response</u> training, verification, validation and exercises (Ref. [7]). <del>(b)</del> (a) During active commissioning (and the early years of operation, as practicable): ...”	3 - The abbreviation ‘EPR’ is not introduced in the document. Thus, its usage should be avoided here.  Wrong numbering of a single bullet.	Y  Y			
DE-NW17	09.023 -	1 <sup>st</sup> sentence: “The senior facility manager shall periodically review the operation of the <u>nuclear</u> fuel cycle facility and shall take appropriate corrective actions in regard of any problems identified.”	3 - Wording.	Y			
DE-NW18	09.126 - a	“Identification of people most affected in a criticality <u>accident</u> .”	2 - Clarification.	Y			
DE-NW19	09.127 - c	1 <sup>st</sup> bullet: “The chemical toxicity of <del>any</del> UF <sub>6</sub> and its reaction products (HF and UO <sub>2</sub> F <sub>2</sub> ), which is	3 - Wording.	Y			

		predominant over uranium's radio-toxicity;"					
DE-NW20	Ref. [03]	"... Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (in preparation) (2014)."	3 - GSR Part 3 was published in July 2014.	Y	All references will be reviewed and updated, closer to publication		
DE-NW21	Ref. [09]	"INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Assessment for Facilities and Activities, IAEA Safety Standards Series No. GSR Part 4 (Rev. 1), IAEA, Vienna (in preparation 2009)."	3 - Editorial. GSR Part 4 (Rev. 1) will be published this year.	Y	All references will be reviewed and updated, closer to publication		
DE-NW22	Ref. [17]	"INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Material, 2012 Edition, <a href="#">IAEA Safety Standards Series No. SSR-6</a> , IAEA, Vienna (2012)."	3 - For the sake of completeness, the Safety Standards Series No. should be added.	Y	All references will be reviewed and updated, closer to publication		
EN-N01-1	General	ENISS proposal is to simplify DS478 in the way that first more general requirements that are valid for any facility will be formulated and then in the following chapters detailed requirements for specific facilities, which have to be named, will be formulated. An example for this kind of structure is SSR6, which starts with general requirements for packages and then a kind of stepwise requirements follow for	This document is not mature and ENISS recommends not to submit this version to Member States for comments: It is sized for complex facilities and as a consequence is not friendly for users of other facilities. The "graded approach" is introduced in §1.9, defined in section 2 (§ 2.16 to 2.20) and is the subject of a dedicated design requirements (Requirement 11, §6.26 to 6.28) but by far it is still "grey" for			N	The DPP contained the following text approved by SSCs;  <i>Following feedback from users, discussion within the Division of Nuclear Installation Safety and advice from NUSSC it is a</i>

		IP, Type A, B and C.	users and not as clear as a document that defines the safety requirements to be fulfilled by facility types.				<i>goal of the revised NS-R-5 to incorporate, to the maximum extent possible consistent with the statements in the preceding paragraph, and accessibility for users, the content of the current Appendices of NS-R-5 in the main text (body) of the revised NS-R-5.</i>
EN-N01-2	General	As EN-N01-1	Section 6 Design is especially complex with 48 requirements. However Annex III of the existing NS-R-5 "Safety in the design of a fuel cycle facility" is not kept although it matches safety as it is implemented during FCF design			N	The number of requirements is in line with equivalent publications being produced by IAEA
EN-N01-3	General	As EN-N01-1	The DEC which is a post Fukushima concept shall be clearly dealing with severe accident of external origin as it was implemented for reactors (European stress tests			N	SSR 2 does not distinguish internal / external causes of DEC.
EN-N01-4	General	As EN-N01-1	The "items important to safety" (previously named "Structures, systems and Components important to safety") is one layer of the "Plant equipment" pyramid			N	The definition of item is correct and complete, regardless of the prevalence of

			defined in the IAEA safety Glossary. Lower layers and especially “safety systems” as defined and implemented in NPPs are not needed in most of FCFs.				safety systems in NFCF. The existing NS-R-5 refers to safety systems. If the NUSSC wishes, could revert to SSC
EN-N01-5	General	As EN-N01-1	A complete check is to be done to verify that all the requirements that are in the current NS-R-5 are captured in the draft	Y	The requirements will be checked again, taking account of feedback		
EN-N02	01.007 -	including facilities for processing, refining, conversion, enrichment, fabrication of fuel (including MOX fuel <sup>3</sup> ), storage of fuel materials (including <u>re</u> processed uranium), spent fuel reprocessing, and fuel cycle research and development facilities	Clarity	Y			
EN-N03	02.002 - b	To restrict the likelihood of events that might lead to a loss of control <u>over the safety of the facility</u> . <del>refining, enriching, fuel-manufacturing, processing, reprocessing, handling, storing or otherwise treating any form of nuclear material, wastes and effluents, radioactive source any other source of radiation;</del>	Simplification for avoiding the list of relevant parts	Y	Replaced by: <u>the safety of the facility and its activities</u>		
EN-N04	02.010 -	In addition to automatic control many nuclear fuel cycle facilities rely on operator actions to maintain and control the safety of nuclear <u>radioactive</u> material	Clarity	Y			

		throughout the facility					
EN-N05	04.002 - a	Delete <del>Establish and implement safety policies and ensure that safety matters are given the highest priority;</del>	This is exactly Requirement 3	Y			
EN-N06	04.014 -	Delete <del>All the relevant IAEA Safety Requirements publications, including those established by this publication and those on emergency preparedness and response Ref. [7] and safety assessment Ref. [12].</del>	These requirements are already covered by the first bullet: Regulatory requirements of the Member-State	Y, third bullet removed			
EN-N07	04.028 -	In accordance with the national regulatory <u>requirements</u> , <u>the operating organization shall carry</u> out systematic periodic safety reviews throughout the operational lifetime of the facility, with account taken of ageing, modifications, operating experience, technical developments, and new siting and <u>other information related to safety from other sources</u> . The operating organization shall verify by analysis, surveillance, testing and inspection that the physical state of the facility is as described in the safety analysis report and other safety documents, including any- <del>approved</del> modifications, -	Active form to clearly identify the main actor of PSR  The SAR shall be updated as necessary to match the current description of the facility whatever approved or not approved were the previous modifications	Y  Y			
EN-N08	04.029 -	<u>The periodic safety review shall</u> <del>Activities for systematic periodic assessments include, among</del>	The delete part is relevant to a guide	Y			

		<p>others, periodic reviews relevant to safety such as self-assessment reviews and peer reviews<sup>27</sup> to confirm that the safety analysis report and other documents (such as documentation for operational limits and conditions, maintenance and training) for the facility remain valid in view of current regulatory requirements; or, if necessary, to make improvements. In such reviews, changes in the site characteristics, changes in the utilization programme (particularly for research and development facilities), cumulative effects of ageing and modifications, changes to procedures, the use of feedback from operating experience and technical developments shall be considered and it needs to be verified that systems, structures and components and software important to safety comply with the design requirements.</p>					
EN-N09	04.031 Req't 6	<p>A safety committee (or an advisory group) that is independent from the nuclear fuel cycle <u>operational line</u> shall be established to advise the operating organization facility manager on all safety aspects of the facility.</p>	Precision	Y	<p>An <u>independent</u> safety committee (or an advisory group) <del>that is independent from the nuclear fuel cycle facility</del> shall be</p>		

					<p>established to advise the operating organization facility manager on all safety aspects of the facility.</p> <p>4.32. ....<u>The committee shall be independent of the regulatory body and its membership shall, to the extent necessary, be independent of the operations management raising the safety matter..</u></p>		
EN-N10	04.032 -	<p><u>The operating organization shall establish one or more internal safety committees to advise the management of the operating organization on safety issues related to the commissioning, operation and modification of the facility. Such committees shall have among their membership the necessary breadth of knowledge and experience to provide appropriate advice. The membership shall, to the extent necessary, be independent of the operations management</u></p>	<p>This text is added in red is § 9.15 of the current NS-R-5. It defines the role, composition and independence of its members. This should be kept.</p>	Y	<p>4.32. ....<u>The committee shall be independent of the regulatory body and its membership shall, to the extent necessary, be independent of the operations management raising the safety matter..</u></p>		

		<p><u>raising the safety matter.</u>  <del>Members of such a group shall be experts in different fields associated with the operation and design of nuclear fuel cycle facilities. It may be advisable to include external experts (i.e. from outside the operating organization) in such committee</del>  The functions, authority, composition and terms of reference of such committees shall be documented, based on graded approach and, if required, submitted to the regulatory body.</p>					
EN-N11	04.034 -	<p>The list of items that the safety committee is required to review shall also be established. Such a list shall include, as a minimum, the following items:</p> <p>(a) <u>Proposed modification (temporary or permanent) of process, equipment, systems that may have significance to safety</u></p> <p>(b) Violations of the operational limits and conditions, of the licence, and of procedures that are significant to safety;</p> <p>(c) Events that are required to be reported or that have been reported to the</p>	<p>This is even probably too detailed</p>	Y			

		<p>regulatory body;</p> <p>(d) Periodic reviews of the operational performance and safety performance of the facility;</p> <p>(e) Reports on routine releases of radioactive material to the environment, on radiation doses to the personnel at the facility and to the public;</p> <p>(f) Reports on regulatory inspections and reports to be provided to regulatory body;</p>					
EN-N12	05.001 -	Information shall be collected in sufficient detail to support the safety analysis to demonstrate that the facility can be safely operated at the proposed site, <del>using a graded approach.</del>	No need for a graded approach here	y			
EN-N13	05.002 - b	The characteristics of the site and its environment that could influence the transfer to persons and the environment <u>from radioactive releases</u>	Clarity	Y			
EN-N14	05.004 -	The evaluation shall be graded so the amount of detail required for facilities where the unmitigated hazard is low (e.g. a natural uranium fuel fabrication	Typo			N	LWR facility intended to illustrate "medium risk"

		facility) can be substantially reduced below that required for a medium or high risk facility (e.g. <u>MOX</u> LWR fuel manufacture or a reprocessing facility).					
EN-N15	06.001 Req't 7: Main safety functions	The design shall ensure the fulfilment of the following main safety functions for all plant states of the nuclear fuel cycle facility, the loss of which may lead to significant radiological or chemical consequences to the workforce, the public or the environment: (a) Confining <u>hazardous</u> nuclear materials;  (b) Protecting people against external radiation;  (c) Maintaining the sub-criticality of fissile material	Precision	Y	a) Maintaining the sub-criticality of fissile material; b) Cooling and confining radioactive <u>and other harmful</u> materials; (c) Protecting people against external radiation.		
EN-N16	06.001 -	Delete: <del>They are not intended as primary functions for normal control</del>	Unclear and wrong for confinement	Y Moved later in section and clarified	Inserted: <u>Unless they are inherently safe, the systems that provide these functions</u> and footnote		
EN-N17	06.002 -	<u>According to the facility type, secondary safety functions associated with confinement includes the removal of decay heat (cooling) and prevention of hazardous accumulation of gases from radiolysis and other explosive or flammable</u>	A safety function has not the same nature than "the integrity of items important to safety". Logical introduction related to cooling (e.g. for spent fuel pools, storage of fission products or Pu storage at			N	Whilst other sub-divisions are possible, the current definition seems the most widely acceptable

		<p><u>materials</u>  Confinement can depend on the cooling of <u>radioactive</u> materials where a loss of cooling could eventually result in the dispersion of radioactive material. Confinement shall prevent any unplanned release of nuclear materials with radioactive or hazardous chemical properties. Planned releases of nuclear materials shall be controlled to within authorized limits and shall be as low as reasonably achievable. Any accidental releases shall be limited.</p>	<p>reprocessing sites), H2 from radiolysis (generating hydrogen) but also (e.g from reprocessing, pyrophoric metals - U or Zr fines, chemicals, and by-products (red oils, HN3);</p>				
EN-N18	06.012 - a/	<p>A postulated initiating event would produce no safety significant effects and would result in change towards a more safe and stable condition by means of inherent safety characteristics of the facility <u>(i.e. the selection of the process which eliminate the hazard linked to the PIE);</u></p>	<p>In fact the complete §6.6 of the current NS-R-5 is more simple and should replace the whole §6.12:  “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>			N	<p>This hierarchy of components appears under R21 (para 6.63 and following) in DS478 and it is recommended not to repeat it here under “General design considerations” (which is long enough) or weaken R21.</p>
EN-N19	06.013 -	<p>Where prompt and reliable action would be necessary in response to a postulated initiating event, provision shall be made in the design of automatic <u>safety actions</u> <del>for the actuation of safety systems</del>, to prevent progression to more</p>	<p>“Safety system” are not currently used in FCFs. For most FCFs, the level of independence between I&amp;C used for safety and I&amp;C used for normal operation is not as stringent than for nuclear reactors</p>				<p>Existing NS-R-5 refers to “Safety systems” in many places.</p>

		severe facility conditions					
EN-N20	06.020 - d	<del>safety actions</del> for the actuation of safety systems	See above			N	Old NS-R-5 6.24 “Where prompt, reliable action would be required in response to postulated initiating events, the design of the facility shall include the means to actuate automatically the necessary safety systems”
EN-N21	06.025 -	Delete	See above.			N	See above
EN-N22	06.026 Req't 11:	Use of the graded approach for a nuclear fuel cycle facility Use of the graded approach in application of the safety requirements for a nuclear fuel cycle facility shall be commensurate with the potential risk of the facility and shall be based on a safety analysis, <u>engineering judgment and</u> regulatory requirements.	Precision	Y			
EN-N23	06.034 -	Acceptance criteria shall be established for all plant states. For the design of items important to safety acceptance criteria in the form of engineering design rules may be used. These rules may include requirements in relevant codes	This is not realistic for each item important to safety	Y	The acceptance criteria shall be <u>provided to the</u> regulatory body for review, Ref. [4] (GSR pt 1).		Added Ref. [4] to GSR part 1 “Safety assessments carried out for facilities and activities demonstrate that an adequate level of safety has been

		and standards established in the State or internationally. <del>The acceptance criteria shall be reviewed by the regulatory body.</del>					achieved, and that the objectives and criteria for safety established by the designer, the authorized party and the regulatory body have been met”
EN-N24	06.036 - c	<p>The method for classifying the safety significance of items important to safety shall be based primarily on deterministic methods complemented, where appropriate, by probabilistic methods (if available), with due account taken of factors such as:</p> <p>(a) The safety function(s) to be performed by the item;</p> <p>(b) The consequences of failure to perform a safety function;</p> <p><del>(c) The frequency with which the item will be called upon to perform a safety function;</del></p> <p>(d) The time following a postulated initiating event at which, or the period for which, the item will be called upon to perform a safety function.</p>	This is not a pertinent criterion as some items important to safety are only called upon very rarely although are requiring a high level of classification			N	This statement allows the provision of items for significant rare events and the omission of items that would be excessive for incredible events, e.g. shielding of fuel fabrication for criticality.
EN-N25	06.053 Req't 18	Design criteria and rules Design criteria corresponding to all physical parameters shall be specified for each operational state of the facility and for each design basis accident or equivalent. Engineering design	Precision	Y			

		rules shall be applied to provide for safety margins such that no significant consequences would occur even if the operational limits were exceeded <u>within these margins</u>					
EN-N26	06.063 Req't 21	Design basis accidents A comprehensive safety analysis shall be carried out during the design process for a nuclear fuel cycle facility. Systematic and recognised methods of deterministic analysis shall be used, complemented by probabilistic assessments where <u>appropriate possible</u> , with use of a graded approach. The purpose of the analysis shall be to ensure that the design provides an adequate level of safety and meets required design acceptance criteria.	Precision	Y			
EN-N27	06.071 Req't 22:	Design extension conditions A set of design extension conditions shall be derived on the basis of deterministic analysis and engineering judgment using a graded approach with complementary probabilistic assessments ( <u>as appropriate</u> <del>if available</del> ) to further improve the safety of the nuclear fuel cycle facility by enhancing its capabilities to	In line with the European stress tests			N	DS478 is aligned with wording in SSR 2/1 (2015)

		withstand, without <u>large and early releases of hazardous materials</u> unacceptable-consequences, accidents that are either more severe than design basis accidents or that involve additional failures. The design extension conditions shall be used to identify the additional accident scenarios to be addressed in the design and to plan practicable provisions for the prevention or mitigation <u>of such severe accidents of external origin.</u>					
EN-N28	06.071 -	This might require additional safety features for design extension conditions, or extension of the capability of safety systems to prevent or mitigate, the consequences of a severe <u>accidents of external origin.</u>	See above			N	Aligned wording in SSR 2/1 (2015), where no such qualification appears
EN-N29	06.092 Req't 26	Features to facilitate radioactive waste management The incorporation of features to facilitate radioactive waste management <del>and the future decommissioning</del> of the nuclear fuel cycle facility shall be considered at the design stage.	Waste arising from the decommissioning should be discussed in Requirement 36 "Design provision for decommissioning"	Y			
EN-N30	06.128 -	Containment shall be the primary method for confinement against the spreading of contamination, ensuring that it is kept within limits and for keeping levels of airborne contamination <u>in work areas</u> as low as reasonably achievable	Precision			N	Optimization also applies to the environment, "work areas" could be guidance.

EN-N31	06.127 Req't 38	Means of confinement The design shall include means for the dynamic and static confinement of radioactive and hazardous materials. Leak detection shall implemented as appropriate for the control of contamination		Y			
EN-N32	06.129 -	Where there are significant quantities of spent fuel or dispersible alpha material, <u>at least</u> two static barriers shall be required (e.g. MOx or reprocessing) so that, during normal operations, radioactive material is confined inside the first static barrier	This wording is used for MOX facilities (NS-R-5 §II;9 (a)	Y			
EN-N33	06.139 Req't 40:	Radiation monitoring systems Equipment shall be provided at the nuclear fuel cycle facility to ensure that there is adequate radiation monitoring in operational states, design basis accident conditions and, as far as is practicable, in design extension conditions.				N	Please clarify, no comment provided
EN-N34	06.139 -	Delete the text and replace: The requirements are defined in Ref [3]	BSS defines what shall be done				
EN-N35	06.147 - d	Concentration, density and form of materials: a conservative approach shall be taken. Where applicable, a range of <u>fissile materials</u> concentrations for solutions shall be considered in the analysis to determine the most reactive conditions that could occur. Unless the homogeneity of the solution can	Uranium is not the only fissile material in solution!	Y			

		be guaranteed, the worst case concentration of <u>fissile materials</u> in the processing and storage parts of the facility shall be considered.					
EN-N36	06.194 not 06.094 or 06.095	Delete	No link with requirement 52	Y	Paras <b>6.194</b> and <b>6.195</b> moved to Requirement 40.		
EN-N37	09.089 - d	Add IV.70, 71, 73, 74, 76 of NS-R-5	These requirements are missing.	Y included			
FR-S01	General	A generic paragraph of awareness about security should be introduced in the document. Emphasize the need of interface between safety and security during all phases of the life time of a facility		Y	Added sentences to 1.6, 5.2 and 11.2.		
FR-S02	General	Add in the references the NSS 20		Y	Replaces existing Ref. [15]		
JP-N01	01.005 / 2	... <u>site evaluation</u> , design, construction, commissioning...	Siting process should be included as stated in the DPP.	Y, Added to para 1.5			
JP-N02	02.014 surasshu 4-5	The number of barriers that will be necessary will depend upon the initial source term in terms of amount, <b>and</b> isotopic composition, <u>chemical and physical states</u> of radionuclides,	The number of barriers depends on not only “amount and isotopic composition” but also “chemical and physical states” of radionuclides.	Y	Inserted; <u>the nature of any associated chemical hazard</u>		
JP-N03	03.016 -	<u>Requirement 30 of Ref [4]</u> states that “The regulatory body shall establish and implement an enforcement policy within the legal framework	Clarification	y			

JP-N04	04.013/2 , 4.29/8, 6.20 (e), Footnote 38, 6.39/3, 6.171/3, 8.1/6, Req.63/4 , 9.59/2, 9.79/2, 9.84/1, 10.1/3, 10.2/6	The integrated management system shall include all the elements of management so that <u>structures, systems,</u> <del> structures,</del> and components, processes and activities important to safety are established and conducted coherently with other requirements, including those in respect of leadership, human .....	Words order 'structures, systems and components' should be consisted with SSR-2/1.	Y, re-ordered throughout			
JP-N05	04.031 Req't 6	<b>Safety committee <u>in the operating organization</u> of a nuclear fuel cycle facility</b> <b>A safety committee (or an advisory group) that is <u>established in the operating organization and independent from operating activities of nuclear fuel cycle of facility</u>—<del>the nuclear fuel cycle</del> shall be established</b>	Clarification  "Safety committee" is the organization of the operating organization, it is necessary to specify that does not belong to the regulatory body.  In this sentence, safety committee is represented as the singular. However, in para.9.5, it is represented as the plural (safety committee(s)). The reason these difference should be explained.	Y	An <u>independent</u> safety committee (or an advisory group) <del>that is independent from the nuclear fuel cycle facility</del> shall be established to advise the operating organization facility manager on all safety aspects of the facility.  4.32. .... <u>The committee</u>		

					<a href="#">shall be independent of the regulatory body and its membership shall, to the extent necessary, be independent of the operations management raising the safety matter..</a>		
JP-N06a	04.031 Footnote 29	<p>The safety committee (or facility advisory group<sup>28</sup>) shall be fully functioning before active commissioning of the facility commences and shall advise the <b>operating organization facility manager</b><sup>29</sup> on:</p> <p>Footnote 29; The <b>operating organization nuclear fuel cycle</b>-facility manager is the member of the facility management to whom the overall direct responsibility and authority</p>	<p>Para.4.31.: operating organization facility manager、</p> <p>Footnote 29: nuclear fuel cycle facility manager, should be consistent with 9.16</p>	Y, footnote changed			
JP-N06b	09.016 -	<p>9.16; The operating organization shall assign direct responsibility and authority for the safe operation of the nuclear fuel cycle facility to the <b>operating organization facility manager-senior facility manager</b>.</p>	<p>Consistency with 4.31. Para 9.16: senior facility manager</p> <p>Is there any difference among these managers?</p> <p>If they have the same meaning, “operating organization facility manager” should be adopted.</p>	Y	Standardized on “senior management” throughout in line with GSR part 1		

JP-N07	05.001 /2-3	... against the radiological <u>and chemical</u> consequences of normal and accidental releases of radioactive <u>and other hazardous</u> material (for additional requirements see Ref. [6]).	Protection against chemical and other hazardous material is also important.	Y			
JP-N08a	06.001 Req't 7 (a)	<b>a) Maintaining the sub-criticality of fissile material;</b> <b><u>b) Confining nuclear materials</u> for Protecting people against external radiation;</b>	Prioritize the order and consolidate three main functions .	Y	a) Maintaining the sub-criticality of fissile material; (c) Protecting people against external radiation.		
JP-N08b	06.001 Req't 7 (c)	<b><u>c) Cooling and Confining nuclear materials</u></b>	Cooling and Confinement are quite different safety function		b) Cooling and confining radioactive <u>and other harmful</u> materials;	N	Cooling is not a function of every fuel cycle facility. Whilst other sub-divisions are possible, the current definition seems the most widely acceptable
JP-N09	06.018 /2-3	and the environment, ensure that appropriate measures are taken and to mitigate the harmful consequences <u>should in the event that</u> prevention fails.	Clarification	Y			
JP-N10	06.033 /4	or the examination of operating experience from other relevant applications <del>35</del> .	This '35' seems to be incorrect.	Y	Footnote 40 refers		
JP-N11	06.038 -	Equipment that performs multiple safety functions shall be classified in a safety class that is assigned to those functions <u>performed by the</u>	Unnecessary description	Y			

		<del>equipment</del> having the highest safety significance.					
JP-N12	06.042 -	The goal of the safety assessment shall be to demonstrate that the risks to the workers and public from the <del>nuclear radioactive and chemical</del> materials in the facility are acceptable in all plant states, when account is taken of the capabilities of the facility and the safety of operations.	Clarification  Chemical effects should be also considered.	Y			
JP-N13	06.045 -	The potential for internal hazards such as fire, flooding, missile generation, pipe whip, jet impact, corrosion, erosion, vibration, thermal or pressure cycling or the release of fluid from failed systems or from other installations on the site shall be taken into account in the design of the facility. Appropriate preventive and mitigation measures shall be taken to ensure that nuclear safety is not compromised. Some external events could initiate also internal fires or floods or lead to the generation of missiles. Such interrelation or interaction of external events with internal hazards shall also be considered in the design where appropriate. <u>See also APPENDIX.</u>	Appendix shows many examples of internal or external events as initiating events. They should be referred.	Y			
JP-N14	06.047 -	The design basis for natural and human induced external events shall be determined. The events to be considered shall include	Appendix shows many examples of internal or external events as initiating events. They should be	Y			

		those that have been identified in the site evaluation. <u>See also APPENDIX.</u>	referred.				
JP-N15	06.059/4	The safety analysis shall demonstrate the <u>resilience</u> of the design to combinations of abnormal operating occurrences.  Definition of “resilience” should be added.	Resilience should be clearly explained because it has complex meaning.	Y, reworded	The safety analysis shall demonstrate the <u>ability of the design to withstand</u> combinations of abnormal operating occurrences.		
JP-N16	<b>06.063 Req't 21</b>	<b>A comprehensive safety analysis shall be carried out during the design process for a nuclear fuel cycle facility. Systematic and recognised methods of deterministic analysis shall be used, complemented by probabilistic assessments where possible <u>based upon postulated initiating events</u>, with use of a graded approach. The purpose of the analysis shall be to ensure that the design provides an adequate level of safety and meets required design acceptance criteria.</b>	Clarify the interface between PIE in requirement 20 and DBA analysis.	Y clarified para 6.64 on event scenarios	6.64..... The analysis shall confirm that the possible consequences of design basis accidents are acceptable and that the <del>risks from</del> <u>likelihood of</u> accidents <u>has</u> been appropriately minimized.		
JP-N17	06.067 /6	Limits shall be set on the radiological consequences and associated chemical consequences for the workforce and the public, from direct and indirect exposures to radiation,	Editorial	Y	Deleted <del>and postulated consequences of all plant states</del>		



		<p><del>protective measures, the postulated initiating events that lead to design extension conditions shall also be analysed for their capability to compromise the ability to provide emergency protective measures. Only those protective measures that can be reliably initiated within sufficient time at the location shall be considered available. The design shall be such that for design extension conditions, protective measures that are limited in terms of times and areas of application shall be sufficient for the protection of the public, and sufficient time shall be available to take such measures.</del></p>			<p>postulated initiating events that lead to design extension conditions shall also be analysed for their capability to compromise the ability to provide emergency protective measures. Only those protective measures that can be reliably initiated within sufficient time at the location shall be considered available.”</p>		
JP-N20	06.076 Req't 23	<p><b>Requirement 23: Analysis of fires and explosion</b></p> <p><b>The potential for external and internal fires and explosion shall be analyzed and potential initiating events shall be identified for the safety analysis.</b></p>	Clarification	Y			
JP-N21	06.084 -	<p>If any of these conditions <u>(6.83(a)~(d))</u> may not be met, the safety systems shall be such as to ensure that the facility attains a safe state.</p>	Clarification	Y	<p>If any of the <u>above</u> conditions</p>		

JP-N22	06.090 - 6.89	<p>6.89 Items important to safety either shall be capable of functioning after loss of support systems, e.g. compressed air or shall be designed to fail to a safe <b>configuration</b>.</p> <p>6.90 The design organization shall ensure that the knowledge of the design and its <b>configuration</b> that are needed for safe operation, maintenance (including adequate intervals for testing) and modification is available to the operating <del>organisation</del> <b>organization</b>.</p>	<p>Clarification</p> <p>What is the meaning of "configuration"?</p> <p>Editorial</p>	<p>Y</p> <p>Y</p>	<p>Inserted: <a href="#">with acceptable positions, settings and signals (or indicating their failed status clearly)</a>.</p>		
JP-N23	06.092 Req't 26	<p><b>The incorporation of features to facilitate radioactive waste management and the future decommissioning of the nuclear fuel cycle facility shall be considered at the design stage.</b></p>	<p>This requirement should be focused on radioactive waste management in design. Decommissioning is already stated in requirement 36.</p>	<p>Y</p>			
JP-N24	06.100 Req't 27	<p><b>Requirement 27: Design for the management of <del>gaseous atmospheric</del> and liquid radioactive <del>and hazardous chemical</del> discharges</b></p> <p><b>Design provisions shall be established for ensuring that <del>gaseous and</del> liquid, <del>gaseous and particulate</del> radioactive discharges to the environment are...</b></p> <p>Following explanation should be amended in accordance with</p>	<p>Editorial.</p> <p>Hazardous chemical discharge should be referred.</p>	<p>Y</p>			

		above requirement.					
JP-N25	06.101 /1	Systems shall be provided for the treatment of <u>gaseous and liquid and gaseous</u> radioactive effluents to keep...	Editorial	Y	Word order changed		
JP-N26	06.102 /2	The safety and environmental assessment shall consider the need for monitoring, collecting potentially contaminated <del>liquid</del> effluents and appropriately treating (e.g. filtering) them prior to <u>discharge</u> <del>release</del> to the environment.	Effluents include gaseous and liquid radioactive substances. "Discharge" is correct according with IAEA safety glossary, instead of "release".	Y			
JP-N27	06.112 /2	Appropriate <u>Instrumentation and Control (I&amp;C)</u> , isolation and sampling shall be providing, in accordance with a graded approach.	Clarification  It should be shown that I&C means Instrumentation and Control.	Y			
JP-N28	<b>06.119 Req't 34/4</b>	<b>..... throughout their design life, with due account taken of conditions during maintenance and testing.</b> <u>Footnote: See also requirement 28.</u>	Both Requirement 28 and 34 describe maintenance and testing. Therefore both requirements should refer each other as a footnote.	Y			
JP-N29	06.123 - e	(e) Shall consider the amenability to <u>processing treatment</u> , storage, transport and disposal of the waste to...	Consistency with IAEA safety glossary. Processing include pretreatment, treatment and conditioning	Y			
JP-N30	06.124 /8 06.127 /3	-Means of monitoring and appropriate alarm systems for atmospheric contamination shall be installed. Mobile or personal air-monitoring systems shall be	Should not be restricted within alpha emitters. $\beta$ - and $\gamma$ - emitters are also important.	Y			

		provided at locations of work with significant quantities of <del>alpha active radioactive</del> material.					
JP-N31	06.129 /3-6	The second static barrier shall be designed with features for the control of airborne contamination to minimize the radiation exposures of workers in operational states for the entire lifetime of the plant, and <del>and</del> to limit contamination within the facility to the extent practicable	Editorial	Y			
JP-N32	06.130 -	6.130. Dynamic containment systems in nuclear fuel cycle facilities shall be designed with an appropriately sized ventilation system in areas that have been identified as having significant potential for concentrations of airborne hazardous material in <del>all normal or accident conditions</del> <u>plant states</u> .	Clarification  Are there any differences between “accident conditions” in 6.130 and “all accident conditions”?  If it’s yes, the same words should be used.  If “accident conditions” is not equal to “all accident conditions”, it’s not necessary to change described above but some examples or explanations should be added.	Y			
JP-N33	06.133 Req’t 39	<del>The design shall ensure external doses to the workers and the public in all accident conditions.</del>  <u>Provision shall be made for ensuring that doses to</u>	Be consisted with SSR-2/1 (Rev.1) Requirement 81.	Y			

		<u>workers will be maintained below the dose limits and will be kept as low as reasonably achievable, and that the relevant dose constraints will be taken into consideration.</u>					
JP-N34	06.144 /L1	A rigorous proven method of safety analysis shall be used and defence in depth <u>shall be</u> considered for the prevention of criticality accidents.	Clarification  To clarify the requirement by inserting “shall be”.	Y			
JP-N35	06.147 (h)/1-3	Neutron absorbers: when taken into account in the safety analysis, and if there is a risk of degradation, the presence and the integrity of neutron absorbers shall be verifiable during periodic <del>testing</del> <u>inspection</u> .	Clarification  It seems “periodic inspection” is appropriate.	Y			
JP-N36	06.149 - b	The potential for leaks to evaporate, leading to an increase in concentrations, particularly if there is a potential for fissile material to leak onto a <del>hot surface</del> ;	Clarification  Does it mean what specifically “hot surface” ?	Y clarified	particularly <del>if</del> where there is a potential for <del>fissile material</del> <u>to evaporation to occur before</u> the leak is detected <del>onto a hot surface</del>		
JP-N37	06.159 - 6.158	6.158 The safety of the design for a MOX fuel fabrication facility shall be demonstrated by means of a specific criticality analysis in which the following important factor is considered:  <del>6.159</del> Plutonium isotopic composition, PuO2 content and uranium enrichment (if 235U >	Clarification  Para 6.158 and 6.159 should be combined because para 6.159 is the factor described in para 6.158.	Y			

		1%):					
JP-N38	06.163 -	The loss of off-site power is covered by Requirement 51 <del>and 52.</del>	Clarification  The loss of off-site power supply can be covered only in Req. 51	Y	Deleted reference to "off-site"		
JP-N39	<b>06.167 Req't 44</b>	<b>The design shall include features to prevent hazardous exothermic reactions of mixtures and materials used or produced in processing.</b>  <u>Footnote: See also requirement 23.</u>	Both requirement 23 and 44 describe 'fire and explosion'.  Therefore both requirements should refer each other as a footnote.	Y			
JP-N40	06.169 /3	..... would not significantly impair the capability of <del>items</del> important to safety,.....	Editorial	Y			
JP-N41	<b>06.183 Req't 47</b>	<b>All I&amp;C based items important to safety shall be designed and arranged so that their safety functions can be adequately inspected and tested, and the systems important to safety can be maintained.</b>  <u>Footnote: See also requirement 28.</u>	Clarification  Both requirement 28 and 47 describe closely related subject.  Therefore both requirements should refer each other as a footnote.	Y			
JP-N42	06.187 -	The emergency centre shall provide means of communication with on-site and off-site emergency response organizations and with appropriate control locations on the site.	Editorial	Y, dash inserted			
JP-N43	06.193 -	As required, the instruments <u>for compressed air system</u> mentioned above shall be used	Clarification  Word "mentioned above"	Y			

		to provide an indication in an appropriate control positions in all plant states.	should be clearly defined as “compressed air system”				
JP-N44	06.195 - 6.194	Para 6.194 and 6.195 should be moved under Requirement 40.	Editorial  It should be appropriate for both requirements to classify not for “Compressed air” but “Radiation monitoring (Requirement 40).”	Y			
JP-N45	06.197 - a	To prevent criticality by a specified margin, by physical means <del>or by means of physical processes</del> , and preferably by use of geometrically safe configurations, even under conditions of optimum moderation;	Are “Means of physical processes” included in “physical means”? If it’s yes, it can be deleted.	Y			
JP-N46	07.001 /2	..... the main safety issues in the design have been resolved and after the satisfaction <u>of conformity with</u> the relevant regulatory requirements.	Clarification	Y	and <del>after the satisfaction of</del> <u>demonstrated conformity with</u> the relevant regulatory requirements		
JP-N47	08.002 /2	after a prolonged shutdown period, as advised by the <del>s</del> Safety <del>c</del> Committee.	Editorial	Y			
JP-N48	08.003 /2	between the operating organization and the supplier(s)/construct <del>or</del> (s) to ensure an effective	Editorial	Y			
JP-N49	08.012 /11	<u>Emergency preparedness and response</u> <del>EPR</del> training, verification, validation and exercises (Ref. [7]).	The abbreviates to “EPR” should be clarified.	Y			

JP-N50	08.012 /13	<del>(b) (a)</del> During active commissioning	Editorial	Y	Active <del>hot</del>		
JP-N51	08.012 /19	performance of discharge reduction <del>and</del> control systems.	Clarification	Y			
JP-N52	08.019 /3, 5	Line 3 For the <del>workers workforce,</del> the safety culture Line 5 ..... and the <del>workers workforce,</del> are fully ready .....	Are “workers”, “workforce” and “personnel” the same?  If it’s yes, the same word should be used.  If no, the definition for each word should be added.	Y	<del>Workforce</del> replaced by <del>workers.</del> These are personnel exposed to radiation and other hazards because of their role.  ‘Personnel’ is a broader term including specialists, managers and anyone else authorized to be in the facility regardless of their role.		
JP-N53	09.002 -	The operating organization shall establish an appropriate management structure for the nuclear fuel cycle facility and shall provide <del>for</del> all necessary infrastructures for operations to be conducted safely.	Editorial	Y	provide <del>for</del> all <del>the</del> necessary infrastructures <del>s</del> for operations		
JP-N54	09.006 -	In collaboration with designers and <del>suppliers vendors,</del> the operating organization shall	In para 9.1, ‘suppliers’ is used.	Y	Deleted <del>preparation-</del>		

		have overall			<del>and</del>		
JP-N55	09.008 - k	Information on events with safety significance are appropriately reported to the <del>workers workforce</del> and to the regulatory body, including any investigation of such events and the corrective actions intended, is submitted to the regulatory body and shared with the <del>workers workforce</del> ;	See comment No.52	Y	<del>Workforce</del> replaced by <a href="#">workers</a> throughout		
JP-N56	09.008 (n) Footnote 60	Including training of the <del>workers workforce</del> , as necessary.	See comment No.52	Y	<del>Workforce</del> replaced by <a href="#">workers</a> throughout		
JP-N57	09.012 /5	lines of authority and communications between the facility management, the <del>safety committee(s)</del> ,	See comment No.5	Y	Footnote added		
JP-N58	09.016 -	The operating organization shall assign direct responsibility and authority for the safe operation of the nuclear fuel cycle facility to the <del>operating organization facility manager</del> . The <del>operating organization facility manager</del> shall have overall responsibility for the safety of all aspects of operation, .....	See comment No.5. Are “senior facility manager” and “operating organization facility manager” the same?  If it’s yes, the same word should be used.  If no, explanations for each manager should be added.	Y	Standardized on “senior management” throughout in line with GSR part 1		
JP-N59	09.050 -	Specific training and drills for operating personnel, <del>and</del> external fire <del>fighters</del> and rescue staff (emergency response) shall	Clarification  Expression should be the	Y			

		be provided	same as para 9.114.				
JP-N60	09.062 - d	..... These may include the requirement to obtain the approval of the regulatory body- <del>before proceeding or the establishment of formal licensing process ;-</del>	Unnecessary description	Y, deleted			
JP-N61	09.064 -	Modification projects having major safety significance shall be subjected to safety analyses and to procedures for design, construction and commissioning that are equivalent to those described in <u>Sections 6,7 and 8</u> for the facility itself.	Clarification  Drafted "Section 9" is wrong and should be corrected to "Sections 6, 7 and 8" instead.	Y			
JP-N62	09.070 /2	The document management system shall be designed to ensure that obsolete documents are archived and that <del>workers personnel</del> use only the latest version of each document.	See comment No.52			N	Some of the personnel needing documents are not occupationally exposed workers.
JP-N63	09.088 /2	Deviations from procedures and unforeseen changes in process conditions that affect nuclear criticality safety shall be reported to the <u>operating organization facility manager management</u> and shall be investigated promptly.	See comment No.5.	Y	"Senior management" now used consistently		
JP-N64	09.089 (c) /11	(1) <u>Non-destructive monitoring(y-ray or n-ray from 235U) or</u> visually checking for uranium hold up;  (2) Proceeding to dry cleaning in the event of uranium hold-up;	Non-destructive monitoring is more useful and general method than visually checking.  Clarifying meaning of "dry cleaning" .	Y	Methods added as footnote		

		<del>(3) Measuring <sup>235</sup>U mass hold-up if visual inspection is not possible (further dismantling and dry cleaning shall be conducted if a significant amount of <sup>235</sup>U is measured).</del>	Depending on proposed new text (1), relating sentence is eliminated.	Y			
JP-N65	09.089 - d	Procedures for the transfer or <del>disturbance</del> <u>movement</u> of fissile material during operational states	“Movement” instead of “disturbance” is used in NS-R-5 Rev. 1 (VI.68).	Y	<del>disturbance</del> <u>temporary movement</u>		
JP-N66	09.089 (d) /10	<del>When not in use, wash-lines shall be doubly isolated from vessels and boxes containing fissile material.</del>	Too detail and should be stated in a guide. Also, this is already stated in DS360 para. 7.5(a).	Y	<del>When not in use, wash-lines</del> <u>and chemical feedlines for shall be doubly isolated from</u> vessels and boxes containing fissile material <u>shall be subject to appropriate technical and administrative controls, including</u> when not in use		
JP-N67	09.095 -	All <del>workers</del> <u>personnel</u> who may be occupationally exposed to radiation at significant levels shall have their doses measured, recorded and assessed, as required by the regulatory body or other	See comment No.52	Y			

		competent authority,.....					
JP-N68	09.101 -	In particular, where there is a likelihood of exposure that cannot be limited by design, the <del>workers workforce</del> shall be provided with.....	See comment No.52  In other descriptions, “workers” is used instead of “workforce”.	Y			
JP-N69	<b>09.102 Req't 71</b>	<b><u>Management of Operational radioactive waste and-effluents management</u></b>  <b>The operating organization shall establish and implement a programme for the management of radioactive waste and effluents.</b>	This expression is better and waste includes effluents.  Be consisted with SSR-2/2 requirement 21.	Y, R71 now like SSR2/2 with added references to effluents	<b>Management of Operational radioactive waste and effluents management</b>  .... management of radioactive waste <u>and effluents</u> .  effluents relatively more significant for NFCF		
JP-N70	09.102 /3	..., the generation of radioactive waste of all kinds in terms of both activity and volume to facilitate the management <del>and disposal</del> of <u>radioactive</u> waste, <del>and to facilitate the decommissioning of the facility.</del>	Radioactive waste management include disposal. Decommissioning is not relevant this paragraph.	Y	Also inserted “hazardous”		
JP-N71	09.103 /2,4,6	...the management of radioactive waste <del>and effluents</del> . ...and storage of radioactive <del>effluents and</del> waste and... ...radioactive and hazardous	Waste includes effluents.			N	Effluents are relatively more significant in FCF, compared to NPP

		chemical <del>effluents and</del> waste shall...					
JP-N72	09.103 /4	... waste and <del>transport transfer</del> of waste <del>to a disposal facility</del> as well as...	Transport of waste is not only to disposal facility but storage facility.	Y			
JP-N73	09.103 /7	Further requirements on <del>predisposal management of</del> radioactive waste <del>management</del> are established in Ref. [12].	Consistency with GSR Part 5.	Y			
JP-N74	09.104 /1	<del>Discharges Releases</del> of radioactive and hazardous chemical effluents shall be authorized and conducted in accordance with regulations for the protection of <del>the workers,</del> the public and the environment.	“Discharge” is correct in accordance with IAEA safety glossary. Discharge is relevant with off-site, “the workers” is not necessary.	Y			
JP-N75	09.104 /4	Records shall be maintained for generation of wastes <del>and</del> <del>effluents</del> ,...	Waste includes effluents.			N	Effluents are relatively more significant in FCF, compared to NPP
JP-N76	09.116 /3,7	Line 3: All <del>workers personnel</del> , suppliers, Line 7: ..... and assistance for the <del>workers personnel</del> in the area	See comment No.48	Y	All personnel, <u>including workers</u> , suppliers, contractors and visitors shall be appropriately trained.....		
JP-N77	09.118 -	Together with the conventional fire safety concerns associated with an industrial installation, fire safety issues relating to nuclear <del>and associated</del> materials shall be assessed (e.g. for uranium metal, <u>zircalloy powder</u> ).	Zircalloy powder should be also considered.  And para.9.118 describes fire safety issues, therefore, it is better to move it to requirement 72.	Y  Y			

		And Para.9.118 should be moved to requirement 72.					
JP-N78	<b>09.119 Req't 74</b>	<b>The operating organization shall establish an accident management programme <del>for the management of accidents.</del></b>	Unnecessary description	Y			
JP-N79	09.123 /7	Requirements for emergency preparedness and response for facilities and activities shall be based on graded approach, <del>commensurate with risks</del> involved and depending on their emergency preparedness categories established in Ref. [7].	Duplicated description	Y			
JP-N80	<b>10.001 Req't 77 /1,4</b>	<b>The operating organization shall prepare a decommissioning plan <u>(including funding arrangements)</u> and shall maintain it... ..to meet the <u>defined specified</u> end state.</b>	Funding is very important for decommissioning as stated in GSR Part 6.  "defined" is better.	N  Y		N	Funding is a generic issue not covered by DS478 or SSR 2.
JP-N81	10.001 /1	For a new facility, <u>planning for preparation of the</u> decommissioning <del>plan</del> shall begin during the design phase.	Consistency with GSR Part 6.	Y			
JP-N82	10.002 /1	For some <del>existing operating</del> nuclear fuel cycle facilities,	Better wording.	Y			
JP-N83	10.002 /3	The plan <del>shall be reviewed by the safety committee and</del> shall be submitted for review and approval <u>of</u> the regulatory body...	This part is not necessary.  Editorial.	N  Y	Inserted <u>of</u>	N	Added to list of requirements for the safety committee
JP-N84	10.007 /1	The decommissioning plan shall take into account the	Consistency with GSR part 5.	Y			

		<u>processing</u> , storage, <del>treatment</del> , transport, and disposal of the waste...					
JP-N85	10.002 /3	The plan shall be reviewed by the safety committee and shall be submitted for review and approval <u>of</u> the regulatory body before decommissioning activities are commenced.	Editorial	Y			
JP-N86	10.014 - 10.13	Para.10.14 can be deleted.	Duplicated description Para.10.14 is included in para 10.13.	Y			
JP-N87	APPENDIX (7)/9,11	Line 9 : <u>External</u> explosions Line 11: <u>External</u> fires	Clarification	Y			
JP-N88	ANNEX/5	Different diagrams may be used for the public and <u>workers</u> , <del>workforce</del> , different types of event, or for hazards of different types.	See comment No.52	Y			
JP-N89	NOTE ON DEFINITIONS	“ <b>cliff edge effect</b> ” should be stated with full sentence and with an example.	“cliff edge effect” is introduced in fuel cycle facilities at the first time. For clarification, much more detail explanation should be described here.			N	The “Note on Definitions” points to the glossary and it is preferable not to redefine the term
JP-N90	Contributors	Takanashi, M. <del>Japan Nuclear Energy Safety Organization,</del> <u>Japan Nuclear Regulation Authority</u> Ueda, Y. <del>Japan Nuclear Energy Safety Organization,</del> <u>Japan Nuclear Regulation Authority</u>	Our organization name is not the latest one.	Y			
JP-W01	06.096	Waste <u>processing pre-treatment</u>	Clarification	Y	Waste		

	/1 p 45	and where necessary storage facilities shall...			<a href="#">processing</a> and where necessary <a href="#">interim</a> storage facilities shall be considered within the scope of the overall facility design.		
JP-W02	09.103 /1 P88	Delete the first text.	This text is described in the overarching requirements.	Y			
JP-W03	09.105 /1 P88	Approved procedures shall be followed for the handling, <del>collection</del> , characterization, classification, processing, transport and storage of radioactive waste...	“Collection” is included in “processing”. See the definition of “waste management” in IAEA Safety Glossary.	Y			
KR-N01	01.013 § Page 4  Page 24	<i>General Comments on Chap.5 SITE EVALUATION FOR NUCLEAR FUEL CYCLE FACILITIES</i>  NS-R-3 (2003) is under a major revision through DS462, including re-structuring, in light of the lessons learned from the ‘Fukushima accident’. Therefore it is recommended to take a reference of the final revision of NS-R-3 (2003) and keep consistency with it.		Y	Noted		
KR-N02	06.037 § Page 34	The design shall be such as to ensure that any interference between items important to safety will be prevented, and in particular that any failure of	It is better to delete last phrase (“or to items in other levels of defence in depth”)			N	Because the classification of structures, systems and components is

		items important to safety in a system in a lower safety class will not propagate to a system in a higher safety class <del>or to items in other levels of defence in depth.</del>					simplified for NFCF, this statement catches common-cause failures where one or both systems lack classification.
KR-N03	06.086 § Page 43	A capability shall be provided for monitoring all essential processes and equipment during and following anticipated operating occurrences and accidents. If necessary, a remote monitoring and <a href="#">safe</a> shutdown capability shall be provided.	The meaning of shutdown capability is ambiguous/ It is better description to add a word of “safe” in this case (safe shutdown capability).	Y			
KR-N04	06.110 § Page 47	Safety undertaking analyses of human and organizational factors ... Operating personnel who have gained operating experience in similar facilities shall, as far as is practicable, be actively involved in the design process, in order to ensure that consideration is given to the future operation, <a href="#">including abnormal and accident conditions</a> and maintenance of equipment.	To provide clear understanding, the “future operation” should be replaced with “future operation, including abnormal and accident conditions.”	Y added in parentheses			
KR-N05	06.144 § Page 54	... Safety controls for criticality shall be <del>suitably</del> <a href="#">certainly</a> independent, diverse and robust. ...	The expression “certainly” rather than “suitably” seems to be more appropriate in this sentence.	Y	<del>Suitably</del> deleted, no need to insert a different word		
KR-N06	06.146 §	Criticality safety shall be	The expression “degrees”	Y			

	Page 55	<p>achieved by keeping one or more of the following parameters of the system within ... loss of cooling):</p> <p>...</p> <p>- <del>Degree</del><u>Degrees</u> of moderation;</p> <p>...</p>	<p>rather than “degree” seems to be more appropriate in this sentence and it is consistent with the description in paras. 6.147.</p>				
KR-N07	06.147 § Page 55	<p>The safety of the design for a facility shall be demonstrated by means of a specific criticality analysis in which the following important factors are considered both singly and in combinations:</p> <p>...</p> <p>(h) Neutron absorbers: ... the presence and the integrity of neutron absorbers shall be verifiable during periodic testing. <del>Uncertainties in absorber parameters (e.g. mass and density) shall be considered in the criticality calculations.</del></p> <p><u>(i) Uncertainties in all parameters (e.g. mass, density, and geometry) shall be considered in the criticality calculations.</u></p>	<p>Uncertainties should be considered for all parameters in the criticality calculations.</p>	Y			
KR-N08	06.174 Page 60 Req. 46	<p>Requirement 46: Design of instrumentation and control systems</p> <p>Instrumentation and control systems shall be provided for controlling the values of all the main system variables that are necessary for safe operation in all operational states. ... The</p>	<p>It is necessary that “segregation” is replaced with “separation” or “independence” so as to explain I&amp;C systems properly.</p>	Y	<p>Changed <del>segregation</del> to <u>separation</u></p>		

		reliability, <del>segregation</del> <u>separation (or independence)</u> and diversity required of I&C systems shall be based the safety analysis for the system.					
KR-N09	06.175 § Page 61	The facility shall be provided ... There shall be adequate <del>segregation</del> <u>separation (or independence)</u> between hazardous facilities and I&C used for emergency control, see Requirements 46 and 50.	It is necessary that “segregation” is replaced with “ <u>separation</u> ” or “ <del>independence</del> ” so as to explain I&C systems properly.	Y	Changed <del>segregation</del> to <u>separation</u>		
KR-N10	06.184 § Page 62	Hardware and software systems that are part of items shall be demonstrated to be highly reliable, on account of characteristics that include; ... (d) Protection shall be provided against disruption of or interference with system operation that includes isolation from data systems of lower <del>reliability</del> <u>classification</u> .	It is necessary that “reliability” is replaced with “classification” so as to maintain consistency.	Y			
KR-N11	06.186 § Page 63	On a large site with a number of facilities, an appropriately resilient emergency centre that can continue to perform its functions under design extension conditions shall be considered. The emergency centre shall be <del>segregated</del> <u>separated</u> from normal control centres.	It is necessary that “segregated” is replaced with “separated” so as to explain I&C systems properly.	Y			
KR-N12	09.087 Req’t 69	All operations with fissile materials shall be carried out to	The expression “accidents” rather than “conditions”			N	All operations with fissile

	Page 84	maintain an adequate margin of sub-criticality in all operational states and design basis <del>conditions</del> <u>accidents</u> (or equivalent).	seems to be more appropriate in this sentence and it is consistent with the description in other paragraphs.				materials shall be carried out to maintain an adequate margin of sub-criticality in all operational states <u>including conditions that are referred to as credible abnormal conditions, or conditions included in the</u> <del>and</del> design basis <del>conditions</del> <del>(or equivalent)</del>
NL - N01	06.164 -	"(exothermic) chemical reaction" or "chemical reaction" in stead of "exothermic chemical reaction" in Requirement 43 and rest of document	Not only exothermic reactions may be the cause of hazardous events	Y	Yes in text of requirement in bold	N	Exothermic retained in subsequent text as this requirement concerns fire and explosion, not unexpected change generally
SA-N01	02.002 - b	, radioactive sources and any other source/s of radiation;	Grammar	Y	Phrase deleted instead		
SA-N02	03.016 -	Font size not same throughout paragraph	Recommendation	y			
SA-N03	04.021 -	Full stop at end of paragraph, not comma.	Recommendation	Y			
SA-N04	04.022 -	For research and development of nuclear fuel cycle facilities the activities of the utilization programme (....	Grammar			N	This sentence concerned the experimental programmes in R&D facilities, not trials on production plants. Reference to

							"nuclear fuel cycle facility" moved to end of sentence.
SA-N05	06.025 Footnote 36	...For instance, shielding must be designed to reduce radiation levels to acceptable levels during an extreme event and also provide shielding during normal operations.	Clarity	Y	For instance, shielding <del>may be designed to provide</del> to reduce radiation to an acceptable level....		
SA-N06	06.202 -	....Handling systems shall be designed to reduce the frequency and consequences of accidents in transit, in accordance with an analysis of their safety.	Grammar	Y			
SA-N07	08.009 -	Commissioning tests shall be arranged in functional groups and in a logical sequence, and, as far as is reasonably practicable, shall cover all planned operational aspects	Grammar	Y			
SA-N08	08.010 -	Adequate measures shall be put in place to address changes in personnel and equipment, containment, criticality safety, and radiation controls and protection arrangements which are normally expected during hot commissioning.	Grammar	Y	Tidied up as follows; "during <del>radioactive</del> or "hot <del>processing</del> " commissioning <del>stage</del> "		
SA-N09	08.012 -	The following activities shall, as a minimum, be performed during cold commissioning: <input type="checkbox"/> Verification of safety functions which cannot be verified during construction or during hot commissioning, or those which	Cold commissioning and hot commissioning are internationally accepted terminology.	Y  Y			

		are necessary to be confirmed before going to the hot commissioning stage;  ☐ Confirmation of the performance of shielding and confinement systems, including the weld quality of static containment.					
SA-N10	08.012 - a	Before hot commissioning	Cold commissioning and hot commissioning are internationally accepted terminology	Y			
SA-N11	08.012 second (a) on page 69	(b) During hot commissioning (and the early years of operation, as practicable):	Numbering and Cold commissioning and hot commissioning are internationally accepted terminology	Y			
SA-N12	08.012 Footnote 59	Cold commissioning includes all commissioning and inspection activities with and without the use of non-active solutions, before the introduction of radioactive materials. Tests carried out in the construction stage may also be included in accordance with national regulations.	Cold commissioning and hot commissioning are internationally accepted terminology	Y	Sentence 1 repeats text in the main body, and has been deleted anyway		
SA-N13	09.013 -	Documentation of the organizational structure and of the arrangements for discharging responsibilities shall be made available to the staff and to the regulatory body	The regulatory body must be aware of the organizational structure and of the arrangements for discharging responsibilities	Y			
SA-N14	09.014 -	The operating organization shall be responsible for ensuring that the necessary knowledge <sup>61</sup> , skills, attributes and safety	The operating organization cannot assure attitudes.	Y	<del>attitudes</del> replaced by <a href="#">safety culture</a>		

		expertise are sustained at the nuclear fuel cycle facility, and that long term objectives for human resources policy are developed and are met.					
SA-N15	09.018 -	.....The person with required qualifications and assigned responsibility for the direct supervision of the operation of the nuclear fuel cycle facility shall be clearly identified at all times.	Clarity.	Y	A qualified person with responsibility for the direct supervision of the operation of the nuclear fuel cycle facility shall be clearly identified by the operating organization at all times		
SA-N16	09.035 Bottom of page 76	<b>Operation outside operational limits or conditions</b>	Consistency	Y, plural			
SA-N17	09.092 -	There shall be sufficient, independent radiation protection staff and resources available to the operating organization to <u>provide</u> guidance on, and ensure compliance with radiation protection regulations, standards and procedures, and safe working practices.	Clarity	Y			
SA-N18	General see comments 19 - 38	Document was not technically edited.	Various grammatical errors	Y	See SPESS		
SA-N19	02.011 -	Change "so that if a failure were to occur" to "so that if a failure	Improve readability.	Y			

		was to occur.					
SA-N20	02.013 -	Change “If one level of protection or barrier were to fail” to “if one level of protection or barrier was to fail”.	Improve readability.	y			
SA-N21	02.014 -	Change “particularly those arising from an uncontrolled criticality” to “particularly those arising from an uncontrolled criticality event”.	Improve readability.	Y			
SA-N22	03.006 -	Change “as well any other information required” to “as well as any other information required”.	Improve readability.	y	Inserted <a href="#">as</a>		
SA-N23	05.002 - b	(b) Propose to change the text from “radioactive material that has been released” to “radioactive material that is postulated to be released”.	Improve text.	Y	.....that could influence the transfer to persons and the environment of radioactive material—that has—been released		
SA-N24	06.033 -	Relevance of reference to footnote 35 is questioned.	Clarification if correct footnote is referenced.	Y	Footnote 40 refers		
SA-N25	06.053 -	Relevance of reference to footnote 9 is questioned.	Clarification if correct footnote is referenced.	Y	Reference to footnote deleted		
SA-N26	06.067 -	Incorrect punctuation is used in second sentence.	Sentence not complete.	Y	Deleted <del>and postulated consequences of all plant states</del>		
SA-N27	06.112 -	Change “isolation and sampling shall be providing” to “isolation and sampling shall be provided”.	Improve readability.	Y			
SA-N28	06.171 -	Change “shall not prevent achievement the main safety	Improve readability.	Y inserted of			

		functions” to “shall not prevent achievement of the main safety functions”.					
SA-N29	06.174 Requirement 46	Change “I&C systems shall be based the safety analysis” to “I&C systems shall be based on the safety analysis”.	Improve readability.	Y			
SA-N30	06.175 -	Reference to Requirement 46 (from Requirement 46 itself) should not be made.	Correct text.	Y	Should read 49		
SA-N31	06.193 -	Change “in an appropriate control positions” to “in an appropriate control position”.	Improve readability.	Y	<u>at</u> an appropriate control positions		
SA-N32	06.201 - a	Change “that are of relevance self-heating materials” to “that are of relevance for self-heating materials”.		Y			
SA-N33	07.005 -	Change “shall be maintained during throughout the construction period” to “shall be maintained throughout the construction period”.	Improve readability.	Y deleted during			
SA-N34	09.024 -	Change “fuel cyclor facility” to “fuel cycle facility”.	Improve readability	Y			
SA-N35	09.026 -	Change reference to Requirement 64 to Requirement 68.	Correct text.	Y			
SA-N36	09.027 -	Change “shall be carried by authorized” to “shall be carried out by authorized”.	Improve readability.	Y			
SA-N37	09.035 -	Provide correct reference to requirement.	Correct text	Y	Req’t 65		
SA-N38	09.048 -	Footnote 62: Incorrect reference to Requirement 63 is given.	Correct text	Y	Req’t 65		
SA-N39	01.003 -	Some of the processes use hazardous chemical substances and gases, which may be toxic,	Retaining the descriptor for ‘reactive’ (as in NS-R-5) and ‘explosive’ enhances clarity	Y	New footnote: <u>Reactive chemicals give</u>		

		corrosive, combustible, reactive (i.e. give rise to exothermic reactions) or explosive, and consequently may give rise to the need for specific requirements in addition to requirements for nuclear safety.	and completeness.		<a href="#">rise</a> <a href="#">to</a> <a href="#">exothermic</a> <a href="#">reactions</a> <a href="#">that</a> <a href="#">may</a> <a href="#">need</a> <a href="#">control</a> .		
SA-N40	01.005 -	This publication provides a basis for safety and for safety assessment during all stages in the lifetime of nuclear fuel cycle facilities with particular emphasis on requirements for siting, design, construction, commissioning, operation and preparation for decommissioning that must be satisfied to ensure safety.	Include 'siting' for completeness.	Y	Included <a href="#">site</a> <a href="#">evaluation</a>		
SA-N41	01.007 -	This Safety Requirements publication applies to nuclear fuel cycle facilities of all types and sizes, including facilities for processing, refining, conversion, enrichment, fabrication of fuel (including MOX fuel <sup>3</sup> ), storage of fuel materials (including processed uranium), spent fuel storage, spent fuel reprocessing, and fuel cycle research and development facilities.	Retain 'spent fuel storage' (as in NS-R-5) for completeness.	Y			
SA-N42	02.013 (3) footnote 10	... is a combination of a "static" and a complementary "dynamic"	Editorial.	y			
SA-N43	02.013 (5)	This requires the provision of adequately equipped emergency response facilities ...	Editorial.	Y deleted "an"			
SA-N44	02.015	All planned normal operational	Editorial.	Y	Replaced <del>in</del> by		

	(1)	modes of the nuclear installation, and its performance;			<a href="#">during</a>		
SA-N45	04.001 -	The operating organization and all other organizations engaged in activities important to the safety of a nuclear fuel cycle facility	Editorial.	Y, deleted comma			
SA-N46	04.004 -	In a timely manner, the operating organization shall submit to the regulatory body any information that it requests.	Editorial.	Y, deleted comma			
SA-N47	04.005 -	... and here in Section 4 as well as in the relevant paragraphs of Sections 5 through 11 of this publication.	Editorial, for consistency with the usage in the document.	Y	<del>paras</del> → <a href="#">paragraphs</a>		
SA-N48	04.020 -	The use of computer codes for the justification of the safety of the facility, and their validation and verification (e.g. tests and experiments) ...	Clarity.	Y →	Inserted <a href="#">safety of the</a>		
SA-N49	05.002 - d	The presence of other nuclear or chemical facilities on or in the proximity of the same site;	Include 'in the proximity of' for completeness.	Y	Inserted: <a href="#">or near</a>		
SA-N50	06.001 -	This is one of the principal means of avoiding ...	Editorial.	Y			
SA-N51	06.075 -	Where the results of engineering judgement and deterministic safety analyses, complemented by probabilistic safety assessments (if available), indicate...	Editorial.	Y			
SA-N52	06.075 Requirement 23	The potential for external and internal fires and explosion shall be analysed ...	Editorial, for consistency with the usage in the document.	Y z→s			
SA-N53	06.076 -	A fire hazard analysis and an explosion hazard analysis shall be carried out for the nuclear fuel cycle facility to determine the necessary ratings of fire	Editorial.	Y replaced comma			

		barriers and identify means of passive protection ...					
SA-N54	06.078 -	Rupture and spurious or inadvertent operation shall be covered in the analysis, applying the graded approach.	Editorial.	Y replaced comma			
SA-N55	06.083 -	Manual operator actions shall be analysed appropriately and be sufficiently reliable to bring the process to a safe state provided that:	Editorial.	Y	Manual operator actions shall be analysed appropriately and <u>shall be</u> sufficiently reliable to bring the process to a safe state provided that:...		
SA-N56	06.090 -	The design organisation shall ensure that the knowledge of the design and its configuration that are needed for safe operation, maintenance (including adequate intervals for testing) and modification is available to the operating organisation.	Editorial, for consistency with the usage of 'organisation/organization' in the document.	Y	Organization used throughout		
SA-N57	06.096 -	The requirements on the generation, processing and storage of radioactive waste established in Ref. [12] shall be applied.	Editorial.	Y Inserted <u>in</u>			
SA-N58	06.129 -	Where there are significant quantities of spent fuel or dispersible alpha material (e.g. MOx or reprocessing), two static barriers shall be required, so that ...	Editorial, for clarity.	Y			

SA-N59	06.132 Requirement 39	The design shall ensure appropriate limits on external doses to the workers and the public in all accident conditions.	Rewording to convey intended meaning.	Y	Provision shall be made for ensuring that doses to workers will be maintained below the dose limits and will be kept as low as reasonably achievable, and that the relevant dose constraints will be taken into consideration.		
SA-N60	06.137 -	As far as practicable, equipment subject to frequent maintenance or manual operation, shall be located in areas ...	Editorial.	Y	Comma deleted not moved		
SA-N61	06.171 -	Fires and explosions shall not prevent achievement of the main safety functions ...	Editorial.	Y inserted of			
SA-N62	06.183 -	... the safety analysis shall take into account the possibility of undetected failures of such equipment.	Editorial.	Y			
SA-N63	06.201 - a	Means for monitoring and controlling the coolant temperature for all plant states that are of relevance where self-heating materials are used;	Rewording to convey intended meaning.	Y	Inserted "for" not "where....are used"		
SA-N64	09.002 -	... and shall take into account industrial provisions including, in particular, chemical safety and emergency provisions.	Editorial.	Y	Agreed word missing, inserted <u>hazards</u> not "provisions"		
SA-N65	09.032 -	... in accordance with authorized limits and principles of	Editorial.	Y			

		radioactive waste minimization.					
SA-N66	09.049 -	The scope of training on nuclear and non-nuclear hazards shall be commensurate with the hazard posed by the nuclear fuel cycle facility.	Editorial.	Y			
SA-N67	09.079 -	Maintenance, periodic testing and inspection shall be conducted to ensure that systems, structures and components important to safety are able to function in accordance with their design intent and safety requirements, in compliance with the operational limits and conditions, and support the long-term safety of the facility.	Editorial.	Y	Punctuation tidied and word order SSC revised		
US-N01	General	DS478 is a "Specific Safety Requirement" document on "Safety of Nuclear Fuel Cycle." It is at Step #7 of IAEA review process. Considering ongoing development of other safety guides pertaining to Nuclear Fuel Cycle Facilities {e.g.; DS360 (Safety of NF Reprocessing Facilities; Step #11); DS381 (Safety of Nuclear Fuel Cycle Research and Development Facilities, Step #11) and NST023 (Physical Protection of Nuclear Materials and Nuclear Facilities, Step #11)}; development of this document appears to lagging behind.	We recommend that completion of review and development of DS478 be completed before finalizing review of DS360, DS381, and NST023.			N	DS360 and DS381 complete a series of guides that was started in 2008. Their structure is known, anticipated and agreed for a long time.  This publication is not intended to be synchronized
US-N02	General	DS478 Sections mentioned monitoring aspects in several	Completeness to address environmental monitoring in				

	<p>instances. However, the document is lacking establishing an integrated environmental monitoring program to assess potential releases and risks to the environment. In this context; we recommend adding the following Para. under requirements 46, 47, or 71:</p> <p><i>“A nuclear fuel cycle facility shall have an adequate environmental monitoring program to monitor planned/unplanned releases to environmental media and associated risk or hazard. The program shall include, but not be limited to, :</i></p> <ul style="list-style-type: none"> <li>• <i>Establishing background conditions and data before operation;</i></li> <li>• <i>Establishing action levels and annual limits for effluent for protection of workers (e.g.; derived annual concentration limits) or annual effluent release limits, as well as environmental sampling.</i></li> <li>• <i>Establishing onsite/offsite environmental monitoring stations to monitor surface water, groundwater, soil, biota, and flora</i></li> <li>• <i>Establishing data record keeping; records of spills/releases, as well as audit and inspection.”</i></li> </ul>	<p>more elaboration by having an adequate integrated environmental monitoring program. Issues of environmental safety are important, particularly for nuclear fuel cycle facilities.</p>	<p>Y</p>	<p>Added to R71</p>		
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US-N03	02.015 -	<p>Comment: The safety analysis examines: (1), (2), (3) and (4).</p> <p>Would the safety analysis cover non-routine operations such as maintenance activities?</p>	<p>The majority of the accidents (especially worker exposure) occur when conducting maintenance activities. Please consider adding a statement regarding accidents for non-routine operations.</p>	Y	<p>Inserted;  <a href="#">including maintenance and shutdown</a>  Also covered by para 6.19</p>		
US-N04	03.003, pg. 12, line 4	<p>This includes the authority to review and assess safety related information submitted by the operating organization during the authorization process and <del>to apply to ensure</del> <a href="#">compliance with</a> the relevant regulations (e.g. by issuing, amending or revoking authorizations or their conditions), including carrying out compliance inspections and audits<sup>17</sup>, taking enforcement action and, providing other competent authorities or the public with information, as appropriate.</p>	clarity	Y			
US-N05	03.004, pg 13	<p>The authorization process may vary among <a href="#">Member</a> States but the major stages of the authorization process for nuclear fuel cycle facilities shall include:</p>	Clarify, Editorial	y			
US-N06	03.006 Req't 1, Pg 13	<p>The licensing documentation shall provide the basis for the safe siting, <a href="#">design</a>, construction, commissioning, operation and decommissioning of the facility, including the justification for changes</p>	Completeness	y	<p>Inserted  <a href="#">design</a></p>		
US-N07	04.014,	<del>All the relevant IAEA Safety</del>	The IAEA requirements and	Y, third bullet			

	bullet 3	Requirements publications, including those established by this publication and those on emergency preparedness and response Ref. [7] and safety assessment Ref. [12].	guidance are not binding on all Member States. Inclusion of these documents in the integrated management system of all MS should not be a requirement, rather placed in a guidance document.	removed			
US-N08	06.123 Pg. 50	Insert a new Para (g) as stated below: <i>(g) Shall make major system components and potential points of leakage/release, particularly in the facility infrastructure, readily accessible to facilitate decommissioning.</i>	Based on lessons learned, accessibility of major components as well as infrastructure is important as stated.	Y	Inserted; <u>(g) Shall make major system components and potential points of contamination, particularly in the facility structure, readily accessible to facilitate decommissioning</u>		
US-N09	06.139 Req't 40, p. 53	Equipment shall be provided at the nuclear fuel cycle facility to ensure that there is adequate radiation monitoring in operational states <u>and</u> design basis accident conditions <del>and, as far as is practicable, in design extension conditions.</del>	Equipment for monitoring radiation at fuel facilities (occupational and public dose) is unlikely to change much when taking into account accident conditions. "Design extension conditions" are more of a power reactor consideration.	Y	Replaced <del>as far as is practicable</del> by <u>if appropriate</u>		
US-N10	06.186 -	<del>The emergency centre shall be segregated from</del> <b>The</b> normal control centres <b>shall be demonstrated to be accessible during analyzed accidents, or an alternate</b>	The issue is that they should be accessible if an accident occurs, not just segregated, which could be an option if licensee cannot adequately demonstrate that normal control centre would be	Y	<u>It shall be demonstrated that</u> <del>The emergency control centres</del> <u>are accessible during</u>		

		<b>emergency centre identified.</b>	accessible. The control center may be the one facility that is most accessible during an event.		<u>analysed accidents, or an alternative emergency centre</u> shall be identified <del>segregated from normal control centres.</del>		
US-N11	09.124 -	The operating organization shall develop an emergency plan in accordance with the applicable requirements ... and shall <del>contribute to the development</del> <b>coordinate with offsite governmental organizations in the development</b> of offsite emergency procedures <b>to ensure consistency with site response actions.</b>	To account for differences in government authorities between countries, standards should more broadly state that that operating organization should "...coordinate with offsite governmental organizations in the development of offsite emergency procedures," to ensure consistency with site response actions, which would include recommended actions to be taken by offsite organizations for each accident treated in the emergency plan."	Y	shall <u>coordinate with contribute to offsite governmental organizations</u> in the development of off-site emergency procedures <u>to ensure consistency with onsite response plans.</u>		
US-N12	09.035 /line 2	"...operational limits and conditions, see Requirement <del>60</del> <b>65.</b> "	Requirement 65 describes records management.	Y			
US-N13	09.089 -	The format used in this section should be used in sections 6.154, 8.18, and 9.53, as well.	Initially thought text was missing from the paragraph describing facility specific requirements. The format used in 9.89 is easy to understand at first glance. Recommend that it be used elsewhere in the document.	Y	Noted, <b>format changes will be made later</b>		
US-N14	Refs	Reference [17] should be	Completeness	Y	All references		

		<p>modified to cite the specific IAEA Safety Standard document for transportation. The proposed action would remove the regulation title in current [17] (“INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Material, 2012 Edition, IAEA, Vienna (2012)”) and replace it with “INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. SSR-6, Vienna (2012)”.</p>			will be reviewed and updated, closer to publication		
US-N15	Refs	<p>Several of key references are designated “<i>in preparation.</i>” However most of these references were issued (e.g.; GSR Part 1, GSR Part 3; etc.). Therefore we recommend providing the issue date and deletion of “<i>in-preparation.</i>”</p>	Completeness and update of references.	Y	All references will be reviewed and updated, closer to publication		