DS449 Step 7a: Format and Content of the Safety Analysis Report for NPPs

Resolutions provided to the comments received from the review Committees

Comments received (*order of arrival*). Members: Germany-1 (RASSC), Japan, Czech Republic, Finland, South Africa, Canada, USA, Korea, Egypt, Pakistan, Brazil, France (NSGC) and Germany-2 (NUSSC); Russia. Observers: EC-JRC and ENISS

COMMENTS BY REVIEWER Reviewer: Country/Organization:			Page…. of…. Date:	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
South Africa 1	Contents: (page iii) Sect. 1 (SCOPE)	Shift "1" further to the right to indicate a page number.	Editorial: "1" should be a page number	X			
South Africa 2	Table of Contents (page iii), Section 2	Delete "SAR" in "~~SAR~~SAFETY ANALYSIS REPORT"	Editorial: "SARSAFETY" does not make sense	X	*Title above 2.3 was corrected (five comments below)*		
South Africa 3	Section 2 (page 3)	Delete "SAR" in "~~SAR~~SAFETY ANALYSIS REPORT"	Editorial: "SARSAFETY" does not make sense	X			
Korea 22	Page viii, Page 51, Page 63, Page 64, Page 65, Page 66, Page 75, Page 107	"…human factors engineering"	It is necessary that "human factor engineering" is replaced with "human factor**s** engineering" for consistency with other paragraphs.	X			
Observer EC-JRC 2	Contents. Pages iv, v, vi	*Write in bold, (in Chap 3)* 'Protection against external hazards', *(in Chap 7)* , 'Information systems important to safety' *and headlines of chapter 11*	Some more headlines in the table of content should be written in bold	X	*Titles of Chapter 3 will be corrected. It applies also to Chap 7 (1st); Chap 8 (1st); Chap 11 (all); Chap 18 (4th)*		
Observer ENISS 1	Table of contents/	**Equipment qualification** **In-service monitoring, tests,**	This subsection appears in the text but is not	X			

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	Chapter 3	**maintenance and inspections** **Compliance with national and international standards**	reported in the table of content.				
Czech 1	General	In the text are used terms "emergency/accident, emergency conditions/ accident conditions" should be defined – it is not clear, if they mean the same as emergency or not. If they mean the same, one term should be used. If they do not mean the same, they should be defined and whole the text should be controlled if they are used).	The text is not clear and can cause confusion and misunderstandings.		*Changes made in: 3.2.35 / 3.6.10 / 3.8.13 (2nd) / 3.18.13 / 3.18.23 / 3.18.27 (1st and 3rd) / 3.18.29 (2nd) / 3.19. 6 / 3.19. 9 / 3.19.10 (a) / Annex: 14.1.6*		
Finland 1	General	Compared to GS-G-4.1, the guide is more requirement-orientated, meaning that the items (paragraphs etc.) are more specific, consistently numbered and relatively short. This is a welcome trend, as it enables tracking of the evolution of the guide in more detail.			*Drafting team is most glad knowing this comment*		
Finland 2	General	The possibility to utilize the safety standard ITC platform developed by IAEA will be very useful especially in this context.		X			
Finland 3	General	IAEA should considered making reference to safety guides under updating in a systematic manner in the document.	The information of the updating of the safety guides is important. There is variation in this guide how the reference to the safety guide is made. Sometimes the DS–number is mentioned in the text and sometimes only in the	X	*About 14 citations have been updated*		

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			reference list. Thus recently several essential safety guides have been under revision it would be good to indicate this in the body text.				
Finland 4	General	The relation in between the operational programs and processes should be clarified. And as appropriate IAEA should consider harmonization of the terminology within the safety standards.	Within IAEA safety standards there is variation in the terminology related to the management systems and the operation of the nuclear power plant. In the chapter 13 (Conduct of operations) the management system processes are presented as programs and in the chapter 17 (management system) discusses about processes.		*Corresponding wording from chapters 13 and 17 has been reviewed*		
Finland 5	General	IAEA should consider adding instructions for the vendors and licensees conformity assessment and safety evaluation at the end of each chapter.	The conformance with the applied regulations, codes and standards as well as the safety evaluation of the systems are descried as sub-topic of the typical table of content of a safety analysis report. However there are no paragraphs in the main text describing these assessments made by the vendor or licensee.		*A new para will be added in the Appendix II:* “II.12 This section should describe the conformity assessment with the applied regulations, codes and standards”		

Section 1

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Canada 1	1.1	No change requested	CNSC recognizes that this document will also encompass new reactor technologies such as SMRs given that they are officially recognized by the IAEA as being nuclear power plants in pedigree.	n/a	*(Note: Scope of this Safety Guide is determined by the existing Safety Requirements and indicated in paras 1.7 to 1.9)*	n/a	n/a
Japan 1	1.2/ L4	"…paras ~~4.65~~ 4.62 through ~~4.68~~ 4.65…"	Editorial.	X	*Comment Japan-1, SAfrica-41, Korea-1*		
South Africa 41	Section1. 2; Line 4; Page 1	"… are given in Requirement 20 from GSR Part 4 (Rev. 1), paras ~~4.65~~ 4.62 through ~~4.68~~ 4.65"	Requirement 20 in GSR Part 4 spans through paragraphs 4.62 to 4.65	X	*Comment Japan-1, SAfrica-41, Korea-1*		
Korea 1	1.2	"…are given in Requirement 20 from GSR Part 4 (Rev. 1), paras ~~4.65~~ 4.62 through 4.68 4.65[2].	For editorial correction	X	*Comment Japan-1, SAfrica-41, Korea-1*		
Germany 2 Comment 1	1.2	"…Further requirements on documentation of the safety assessment in the form of a safety analysis report, its objectives, the scope, level of detail and updating are given in Requirement 20 from GSR Part 4 (Rev. 1), paras 4.65 through 4.68 [2]."	Indeed, GSR Part 4 uses the term *safety report*. However, within in DS449 as well as in SSG-10 the term *safety analysis report* is used. For consistency, also here the term *safety analysis report* shall be used. In addition, in some countries the *safety report* is an excerpt and shorter summary of the safety analysis report. The safety report is	X			

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			usually used for public consultations.				
South Africa 43	Para 1.3; Line 2; Page 1	"…The update reflects experience from the safety analysis reports for newly built nuclear power plants and good practices used by major nuclear power plant ~~suppliers~~ applicants…"	Correction change suppliers to applicants.		"…The update reflects good practices and experience from the SARs for newly built NPPs ~~and good practices used by major NPP suppliers in developing their SAR for~~ used in different States		As in many cases the SARs are developed by plant suppliers it seems convenient to use general wording
Canada 2	1.5	Please add the following Canadian reference to this document: CNSC Regulatory Document RD/GD-369, *Licence Application Guide, Licence to Construct a Nuclear Power Plant*, August 2011, Published by the Canadian Nuclear Safety Commission © Minister of Public Works and Government Services Canada 2011 Catalogue number: ISBN 978-1-100-18919-2	The document was developed specifically for the purposes of defining the format of a SAR in Canada for NPPs.		"… were taken into account (e.g. [5-9]).		*Addition of this and other document should not cause harm, although it seems preferable not to put a long list of reference regarding this para.*
Japan 2	1.5./ L2	"…In addition, applicable national or ~~international~~ multinational guidance documents [5-9] were taken into account."	Refference [5] – [7] are domestic standareds of some member states. Reffeences [8] and [9] are regional documents.	X			
Japan 3	1.7./ L1	1.7. This Safety Guide is intended mainly for the use in applying authorization of nuclear power plants, but it may, in parts, have a wider	Clarification of the objectives of this standards. As state para. 1.6., this			X	*See last part of second sentence of para 1.6. Additionally, the*

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		applicability to other nuclear installations or facilities.	document provides guidance on the contents and structure of SAR in support of a request to the regulatory body for authorization. This description should be reflected in this paragraph.				*authorization is used according to the Safety Glossary*
Germany 2 Comment 2	1.9/2	Although intended mainly for use with new nuclear power plants, the guidance presented in this Safety Guide ~~may also~~ should also be used, as far as reasonably practicable, for existing nuclear power plants when operating organizations review their existing safety analysis reports to identify any areas in which improvements of the safety analysis report may be appropriate.	Since the SAR is a living document and should be updated also after commissioning, during the plant operation, using this Safety Guide should be clearly recommended for existing nuclear power plants.	X	"…in this Safety Guide ~~may~~ should also be used, as far as…"		
Observer EC-JRC 3	1.11 Bullet 1	"..and safety rules of different ~~the~~ origins…"	..and safety rules of the different origins (different origins is used with and without article in the text)	X			
Germany 2 Comment 3	1.11 Bullet 2	• Framework ~~Structure~~ of the safety analysis report for various stages of the nuclear power plant life time;	Wording. Bullet point might cause confusion in relation to the following one.		• "Structure and outline of the safety …	X	Para 2.4 refers to the structure
Japan 4	1.12	1.12. The specific part of this Safety Guide, treated in Section 3, covers the structure and contents of each of the chapters of the safety analysis report	The contents of licensing document are not such rigid as described in this proposed appendix. The			X	*There are two appendices supporting the main body of the Safety Guide and also one annex*

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		and is further supported by two ~~appendices~~ supplemental documents. ~~Appendix~~ Annex I indicates the most relevant information provided in each chapter of the safety analysis report in course of the licensing process. Appendix ~~II~~ I presents the unified content and structure of …”	structure of “chapter” varies among member states as described in contents. Moreover, this is already written as the annex in the DPP				
Germany 2 Comment 4	1.14	~~The structure proposed in this Safety Guide, including the subdivision of the safety analysis report into the different chapters, should not be interpreted as strict guidance to be followed verbatim. In each specific case, the operating organization should agree with the regulatory body on the content, structure, form of the presentation, storage and use of the safety analysis report.~~	This para is not needed, because a safety guide is not mandatory in contrast to a safety requirement. Usually, member states can deviate from recommendations in safety guides. Moreover, a standardized format of a SAR is worthwhile for designer, utilities, regulators and external experts for developing and reviewing the provided information.		“… followed verbatim. In each specific case, the operating organization typically ~~should~~ agrees with the regulatory body on the content, structure, form of the …”	X	*It seems more convenient to keep this para in the Safety Guide*
Section 2							
Germany 2 Comment 17	General remark on Section 2	A description of a common strategy on how to develop a SAR chapter, especially for technical chapters of the SAR is considered worthwhile. A top-down approach from the		n/a	*Remark noted. It could be taken into account in a further review of this Safety Guide. In the present version, paras 2.17*	n/a	

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		fundamental safety functions, to the safety functions, design basis, design and design evaluation is considered as a good approach to guide the vendor/operating organization to develop a safety oriented SAR document containing the information needed by the regulator to assess the achieved level of safety in a traceable manner. Unfortunately, such a strategy on how to develop and later on to review a SAR is missing. However, many vendors already apply such a standardized strategy.			*to 2.20 provide guidance to prepare the SAR and paras 2.11-12, supplemented by Appendix II, a unified description of the design of SS&Cs*		
South Africa 5	Section 2.1; Line 3	"… ~~life time~~ lifetime …"	Editorial: Consistency of usage	X			
South Africa 6	Section 2.1; Line 3	"…~~report either compiled as~~" "… report, compiled either as …"	Editorial: Grammatical	X			
Germany 2 Comment 5	2.1 Line 3	"…The safety analysis report either preferably compiled as a single document or as an integrated set of documents constituting the licensing basis of the plant, should provide adequate justification to demonstrate that a nuclear power plant meets all appropriate safety requirements.	For a reviewer, it is preferred to have the information in a single self-contained document. This is an important aspect for an efficient review process. See also para. 4.2 in GS-G-1.4, last sentence.		*See S. Africa-6.* "… The safety analysis report ~~either~~ compiled either as a single document (preferably) or as an integrated set.." *At the end of 2.1 it will be added:*		

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					" material for the safe operation. While it may not be feasible to present the relevant information completely in the SAR, it should be presented in such a way that the regulatory body can conduct the review and assessment process with limited need of additional documentation.		
Egypt 1	Para 2.1 line 5 page 3	"…Should provide adequate justification to demonstrate that a nuclear power plant satisfy design basis and meets all appropriate safety requirements…."	R.B. reviews both design and safety issues.			X	*The demonstration is that the plant meets the safety requirements. The design basis are included in the SAR.*
South Africa 7	Section 2.1; Line 9	"… factors ~~has~~ have been duly …"	Editorial: Grammatical	X	*Comment S.Africa-7 and EC-JRC-4*		
Observer EC-JRC 4	2.1 Line 9	…human and organizational factors ~~has~~ have been duly considered throughout the report…"	…human and organizational factors has been duly considered throughout the report.	X	*Comment S.Africa-7 and EC-JRC-4*		
Germany 2 Comment 6	2.1 Line 10	"…In addition to providing a documented justification that the plant has been designed to appropriate safety standards, the	Already at the design stage, before granting a construction licence, it must be clearly seen from			X	*This Safety Guide will be used to develop the submission of various SARs before the beginning of operation.*

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		safety analysis report should be also able to demonstrate that the plant ~~will~~ can be operated safely and to provide reference material for the safe operation.	the SAR that the plant can be operated safely due to its design. To emphasized this aspect we propose to replace *will* by *can*.				*The term "will" is adequate.*
Observer EC-JRC 5	2.1 Line 11	"…should ~~also be~~ be also able to demonstrate that the plant will be operated safely and ~~to~~ provide related reference material …"	…should *be also* able to demonstrate that the plant will be operated safely and *to* provide reference material …	X	*First part is written in 2.1 (line 11) as proposed.* *Second change is accepted*		
Germany 2 Comment 7	2.2 Line 6	"…systems and components (SSCs), fire protection, radiation protection, ~~safety of labour~~ ~~and~~ civil construction and occupational health and safety.	In safety engineering the term *occupational health and safety* is usually applied.	X			
Russia 1	General to para 2.2	Exclude the whole para.	Exclude the para since it uses undefined term "safety rules". Also the para mentions safety of labor rules. Such rules are not directly connected with nuclear and radiation safety, so the justification of compliance with such rules is out of SAR scope		*See resolution to comment 7 of Germany 2* *The term* "safety rules" *used in 2.2 will be replaced by* "applicable rules"	X	
Observer EC-JRC 6	2.2 Line 5	Establish the right link.	Among these areas, there are standards on the classification… The link of 'Among these areas' is not clear.		"…various rules. Among these rules~~areas~~, there are standards…"		

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USA 2	Heading before 2.3	STRUCTURE OF THE ~~SAR~~ SAFETY ANALYSIS	typo	X			
Egypt 2	Title before 2.3	Structure of the ~~SAR~~Safety Analysis Report for Various stages of the Nuclear Power Plant Life time	The Word " SARSAFETY " Should be disconnected to SAR Safety or Safety .	X			
Korea 2	2.3~2.7 (title)	STRUCTURE OF THE ~~SAR~~SAFETY ANALYSIS REPORT FOR VARIOUS STAGES OF THE NUCLEAR POWER PLANT LIFE TIME	Editorial error	X			
Russia 2	2.3 Title	Exclude letters “SAR”	misprint	X			
Germany 2 Comment 8	Headline before 2.3	FRAMEWORK ~~STRUCTURE~~ OF THE ~~SAR~~SAFETY ANALYSIS REPORT FOR VARIOUS STAGES OF THE NUCLEAR POWER PLANT LIFE TIME	See comment no. 3			X	*See the other comments about this title*
Japan 5	2.3./l1	2.3. Common practice in many States indicates that several issues of the safety analysis report are developed for different nuclear power plant licensing stages.	Clarification. Not all States do not always follow these steps.		2.3. Common practice in many States includes the development of ~~indicates that~~ several versions ~~issues~~ of the safety analysis report ~~are developed~~ for different NPP…”		
Japan 6	2.3./l2	“…Although approaches, ~~and~~ titles, contents and structures of the safety analysis report for different licensing stages vary among the States, it is typically developed ~~at least~~ for the three following stages: …”	Clarification. Structures and contents of SAR also vary among the States.	X			

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South Africa 8	2.3 Line 2	(Different font sizes)	Formatting	X			
France-1 To NSGC	2.2 Line 3 *(page 3)*	2.2. A nuclear power plant is a strictly regulated nuclear installation, subject to a number of safety rules of different origin, including international conventions, national laws and regulations, international or regional safety standards and security guidance ~~standards~~, country of origin's regulations, quality standards, technical norms and other applicable rules.	There is no security standard	X			
South Africa 44	2.3 Bullet 2	Preliminary Safety Analysis Report (PSAR), which includes the basis for the authorization of the design and construction;	Suggestion to include design for more clarity			X	*Authorization of the design implies that the design is approved. PSAR is for the authorization of construction. The FSAR includes the authorization of the design.*
Germany 2 Comment 9	2.3/ Bullet 3	"… • Pre-operational Safety Analysis Report (POSAR), which includes the basis for the authorization of the nuclear power plant commissioning and operation. ~~During the nuclear power plant operation, the POSAR can be further complemented by additional information, leading to issuance of the Operational Safety Analysis Report (OSAR) or Final Safety Analysis Report (FSAR).~~	It is important to verify the POSAR by the first entry into routine operation of the as-built nuclear power plant. FSAR should be clearly recommended and not only left like a voluntary option.		"… During the nuclear power plant operation, the POSAR should ~~can~~ be further complemented by additional information, leading to…"	X	*The terms POSAR, OSAR, and FSAR are used to varying degree by different regulatory bodies. Their commonality is its use to obtain a facility operating license.*

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		• A Final Safety Analysis Report (FSAR) or an Operational Safety Analysis Report (OSAR) that incorporates the revisions to the intermediate report prior to the plant entering first routine operation. …”					
Germany 2 Comment 10	FRAME WORK ~~STRUCTURE~~ OF THE ~~SAR~~SAFETY ANALYSIS REPORT FOR VARIOUS STAGES OF THE NUCLEAR POWER PLANT LIFE TIME	The final (FSAR) or operational (OSAR) report incorporates any necessary revisions to the intermediate report (POSAR) following the commissioning and licensing process for the first entry into routine operation of the as-built nuclear power plant. The final report should clearly demonstrate that the plant meets its design intent. Systematic updating of the SAR would then become a requirement for the operating organization during the remaining lifetime of the plant. This would usually be done periodically so as to reflect any feedback of operating experience, plant modifications and improvements, new regulatory requirements or changes to the licensing basis.	Add new paragraph on FSAR (s. comment 9).			X	*See resolution to Germany 2, Comment 9 and paras 2.13-2.16. This subsection focuses the SAR developed for each of the stages*
Observer EC-JRC 7	2.4 Line 5	“…As a guiding principle, any new version ~~issue~~ of the safety analysis report should provide …”	The use of the word issue may cause confusion. Could it be replaced by version, revision or update?	X			

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Canada 3	2.5 Line 3	"…Although the future reactor design may ~~could~~ not have been selected…"	The use of the word 'may' is more grammatically appropriate.			X	*The term "may" was previously replaced by "could" taking into account other requests*
South Africa 9	2.5 Line 8	"… are often not developed ~~elaborated~~ in much detail …"	Editorial		"…and these requirements are typically not ~~often~~ described in ~~elaborated in much~~ detail, it may be…"		
South Africa 10	2.5 Line 10	"… into one encompassing ~~overwhelming~~ section…"	Editorial		*See Canada 4* *"..integrated… "*		
Canada 4	2.5 Line 10	*Replace word '~~overwhelming~~' with* integrated	More appropriate terminology	X			
Brazil 1	2.6 (first sentence)	2.6 The preliminary safety analysis report should contain sufficiently detailed information, requirements, specifications and ~~supporting~~ methods and computational codes for calculations needed for assessing ~~and demonstrating~~ that the plant has acceptable assurance that it will comply with safety rules and objectives ~~can be constructed and operated in a manner that is acceptably safe~~ throughout its lifetime.	To get a Construction Permit the PSAR shall describe the systems and associated safety requirements, including their functions and performance in normal operation and accident conditions. Although it is desired, it is not necessary to have all the calculations done. Only FSAR has to have all support calculations and demonstrations. The complete calculations before the Construction Permit is necessary only for Combined Licence not used			X	*Sentence is consistent with Appendix I, which includes demonstration as part of the PSAR review. Approval of the PSAR is to authorize construction.*

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			in many MS. Additionaly, in the App I of DS 449 usually for PSAR the following statement is present: "Description of SSC and requirements on operation of systems" and from it can be understood that "Description of SSC" is not "Design of SSC"				
Germany 2 Comment 11	2.6	2.6. The preliminary safety analysis report should contain sufficiently detailed information, specifications and supporting calculations needed for assessing and demonstrating that the plant can be constructed, commissioned, ~~and~~ operated and decommissioned in a manner that is acceptably safe throughout its lifetime.	To emphasize that commissioning is an important step in the transition from construction to operation. For new plants it is expected, that already the design takes the later safe decommissioning into account.	X			
South Africa 11	2.7 Line 1	"… report should ~~contain revisions~~ be revised when necessary …"	Editorial: Rewording of sentence			X	*The POSAR is used as the application for the operating license, therefore the report will be a revised PSAR. Hence, the sentence is correct as written.*
Japan 7	2.7 At the end	Add the followings after para. 2.7. The Operational Safety Analysis Report	Clarification. There is no explanation in		See Germany 2, Comment 9. The following sentence		

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		or Final Safety Analysis Report (FSAR) should contain revision of POSAR.	relationship between OSAR and FASR here.		will be added: "…basis for the plant. The ~~Operational Safety Analysis Report or~~ Final Safety Analysis Report (FSAR) should contain revision of POSAR."		
Germany 2 Comment 12	After 2.7	The operational safety analysis report respectively the final safety analysis report should reflect latest insights from commissioning. Any deviations from the pre-operational safety analysis report should be justified. As the safety analysis report is considered as a living document, the OSAR / FSAR should be updated in case of plant modifications.	Only the POSAR is addressed. It is recommended to add a paragraph on the OSAR / FSAR. This is important to reflect plant modifications after granting an operating licence.			X	*See Japan 7*
Observer EC-JRC 8	Page 4, footnote	[2] The bounding approach includes identification of important physical and chemical parameters that may affect the environment for the considered NPP and requires the use of the parameters with the highest impact value.	The bounding approach includes identification of important physical and chemical parameters that may affect the environment for the considered NPP and use of the parameters with the highest impact value.		[2] The bounding approach includes the identification of important physical and chemical parameters that may affect the environment for the NPP considered ~~NPP~~ and ~~requires~~		

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					the use of those ~~the~~ parameters with the highest impact value.”		
Korea 3	2.10 Line 3	2.10. The proposed safety analysis report structure incorporates into the safety analysis report several new chapters, which were traditionally either missing in the safety analysis report or covered by separate documents. Examples of such chapters are “operational limits and conditions”, “management systems”, ~~“probabilistic safety assessment”,~~ “emergency preparedness”, “environmental aspects” and “decommissioning and end of life aspects”.	Operational limits and condition are covered by a separate document called technical specification in some states. "Probabilistic safety assessment" is not presented in the proposed SAR structure.	X	*(See Finland 8)*		
Finland 8	2.10 Line 3	2.10. The proposed safety analysis report structure … .Examples of such chapters are “management systems”, ~~“probabilistic safety assessment”,~~ “emergency preparedness”, “environmental aspects” and “decommissioning and end of life aspects”. Also in the safety analysis both aspects deterministic analysis and probabilistic safety assessment are included. While in general it is acceptable to complement …	Clarification Chapter 15 covers both deterministic and probabilistic analysis. There is no new chapter added for the PSA.		*(See Korea 3)* “…and end of life aspects”. Also, the chapter “safety analysis” includes both deterministic and probabilistic safety analysis. While in general…”		
Canada 5	2.10 Line 3	Remove PSA: “…Examples of such chapters are “management systems”, ~~“probabilistic~~	No separate chapter for PSA (only “safety analysis” in chapter 15)	X	*(See Korea 3 and Finland 8)*		

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		~~safety assessment”~~, “emergency preparedness”…”					
South Africa 12	2.10 Line 6	“… documents, ~~in view of~~ to ensure sufficient …”	Editorial	X			
Observer EC-JRC 9	2.10 Line 8	Extend link if appropriate	(see para 3.13.28). 3.13.28 is on security aspects. Could there be also other confidential information which should be linked here?		*As there may be additional confidential information, such as vendor proprietary information, the sentence is changed as follows*: “…or to make references to them (e.g., see para 3.13.28 for a discussion on information related to security)…”		
Germany 2 Comment 13.	2.10 last sentence		The example does not reflect the complete picture. It is expected in Chapter 2 the impacts due to external hazards should be derived as well as the site conditions, especially meteorological and population density. Later are important for calculating the dispersion of radioactive releases and to determine the radiological impact and			X	*The example seems accurate as described. In this section it is only intended to describe the difference between the versions of the SAR.*

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			the possibility of plant external emergency responses. The calculation of the doses shall be described in chapter 15 and the impact on the environment in Chapter 20. It is important, that the interfaced within the SAR are correctly described.				
Germany 2 Comment 14	2.11	2.11. In general, all systems that have the potential to affect safety should be described in the safety analysis report. The information to be included in the safety analysis report on various plant systems will depend on the particular type and design of the reactor selected for construction. For some types of reactors, many of the sections discussed below will be entirely relevant, while for other reactor types those sections may not apply directly. ~~However, as a general rule, all systems that have the potential to affect safety should be described in the safety analysis report.~~	First, the general rule should be presented, followed by possible excerptions.	X			
USA 1	2.14 /bullet 5	Periodic safety reviews, or alternative arrangements (as documented in SSG-	Not all Member States conduct PSR. Please	X			

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		25, Paragraph 2.8).	update this bullet to maintain consistency with the guidance in SSG-25.				
Observer EC-JRC 10	2.14 Bullet 6	Analysis and lessons learned from operational events;	Analysis of operational events; is analysis enough?			X	*Analysis of operational events may, but not necessarily include, lessons learned.*
Observer EC-JRC 11	2.14 Bullet 7	Analysis of applicable experience from other nuclear power plants and other industries;	Analysis of applicable experience from other nuclear power plants;		"…from other nuclear power plants and other industries, as appropriate;"		
Japan 8	2.15./ L1	2.15. Ideally, the safety analysis report should correspond to the current plant status at all times. Since such ideal situation is difficult to achieve, it is considered a good practice to update the safety analysis report ~~once a year~~ periodically, e.g. by replacing affected parts of the safety analysis report by the corresponding new versions…	Practically, updating the SAR in "once a year" is too short in some States because typical operating cycle length is one or two years. "Periodically" could be practical way.			X	*While it is recognized that some States update safety analysis reports at different frequencies, once a year is a typical update interval.*
Germany 2 Comment 15.	2.15 Line 8	"…~~Between the updates of the safety analysis report, the~~ The full impact of any modification on the safety of the nuclear power plant should be evaluated and submitted to the regulatory body for approval before being implemented. The safety analysis report should be updated in a timely manner after the modification has been implemented to reflect the current state of the	A modification of the NPP should be reflected in the SAR and may be considered as an initiator for updating the SAR.	X First part	*Second part:* "… being implemented. The safety analysis report should be updated in timely manner ~~after the modification has been implemented~~ to reflect the current state of the plant configuration."		

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		plant configuration.”					
South Africa 13	2.16 Line 2	“… and all ~~be~~ easily traceable …”	Editorial		‘…and ~~all~~ be easily traceable…”		
South Africa 14	2.16 Line 3	“… these ~~this~~ include those incorporated …“	Editorial	X			
South Africa 15	2.18 Line 1	2.18. In view of the primary ~~prime~~ responsibility …	Editorial	X			
Korea 4	2.18	“…it should contain either itself or in complementary documents sufficient and sufficiently detailed information to allow for an independent verification performed either directly by the operating organization or by any other qualified organization on its behalf (see GSR Part 4 (Rev. 1), para 4.64, 4.66, 4.67 [2]).”	Para. 4.66 and 4.77 also describe the independent verification which is performed by the operating organization or any other qualified organization.	X	*Complementary changes:* “…(e.g. the NPP vendor), it should contain sufficient and sufficiently detailed information, either in the report itself or in documents referenced, to allow for the operating organization to conduct an independent verification. This verification should be conducted ~~either itself or in complementary documents sufficient and sufficiently detailed information to allow for an independent verification~~		

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					~~performed either~~ directly by the operating organization …”		
South Africa 16	2.20 Line 2	“… should be supplemented ~~supplemental~~ to the safety …”	Editorial		“…supporting materials should be referenced in ~~supplemented to~~ the safety analysis report…”		
Germany 2 Comment 16	2.20 Line 3	“…These materials serve to enhance the review process and the later usability of the safety analysis report and should be easily accessible for the regulatory body to obtain information needed for its review and assessment work….”	For an efficient review process it is important that the supplementary information is easily accessible to the regulator to prevent unnecessary delays in obtaining the required information.		“… for the regulatory body to use ~~obtain~~ the information needed for its review and assessment ~~work~~.”		
Observer EC-JRC 12	2.21 Line 2	“…Therefore the safety analysis report made available should include an electronic ~~form~~ format…”	Therefore the safety analysis report made available should include an electronic form (x2)	X			
Japan 9	2.21./last	Add the reference for SAMG as DS483 (“Accident management guide for *Nuclear Power Plants”, draft Safety Guide, revision of NS-G-2.15*). Otherwise, add the information into the reference.	Add revision information.	X	*See combined resolution in Russia 3*		
Russia 3	2.21, last sentences	Exclude last sentence ~~“…References to lower level documents are also useful (e. g. operational procedures, emergency operating procedures (EOPs) and~~	It is impossible to make reference in SAR to operational procedures, EOPs and SAMG, because these procedures are		*Combined with Japan-9. The following changes will be incorporated:* “…Discussions		

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		~~severe accident management guidelines (SAMG))".~~	developed on SAR basis.		regarding lower level documents, as appropriate, are also useful (e.g. operational…guidelines (SAMG)); see NS-G-2.15 *(DS483, Step 10)* [39].		
South Africa 17	2.22 Line 5	"… needs to be incorporated in parallel …" "…~~needs to be in parallel incorporated~~…"	Editorial	X			
Canada 6	2.22 Add new sentence at the end of 1st sentence	Reword to: 2.22. In addition to the safety analysis report, there are other documents used in the licensing process. Typical examples are the reports on Environmental Impact Assessment, probabilistic safety assessment studies and emergency preparedness or decommissioning plans. In some countries, these documents can also form part of the safety analysis report	To reflect differing national practices.		"…preparedness or decommissioning plans; in some States, information from these reports is part of the safety analysis report. Some of the information…"		
Observer ENISS 2	2.22	2~~.22. In addition to the safety analysis report, there are other documents used in the licensing process. Typical examples are the reports on Environmental Impact Assessment, probabilistic safety assessment studies and emergency preparedness or decommissioning plans. Some of the information contained in the safety~~	In order to avoid inconsistency between documents, information in the SAR should not be duplicated from other documents. The SAR should only refer to them. Indeed what is addressed			X	*It seems preferable to keep this paragraph to highlight the potential for overlap of the information. The examples given seem sufficient although there are others.*

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		~~analysis report may be the same as required for other licensing documents. In such cases, the required information needs to be in parallel incorporated in several relevant documents to the appropriate extent. The reason is that these documents may be responsive to different legislative requirements and each of them should be essentially self-contained.~~	here in chapter 2.22 is not consistent with what is written in chapter 2.1 ("The safety analysis report either compiled as a single document or as an integrated set of documents constituting the licensing basis of the plant").				
South Africa 45	2.24	However such intellectual property rights should in no way impede the need for a safety review by the regulatory body. The regulatory body should have access to all information it deems necessary to perform a safety review of the safety analysis report.	New sentence included under Section 2.24	X	"…property rights. At the same time, it is also understood that intellectual property rights should not impede a comprehensive review of the safety analysis report by the regulatory body, who should have access to all the information deemed necessary to perform its function."		
Korea 5	2.24 Line	"…It is understood that certain parts of the safety relevant information ~~maybe~~ may be of sensitive or confidential nature…"	Editorial error	X			
Russia 4	2.25	Exclude the whole para	Nuclear fuel cycle facilities are different story from			X	*During the consideration of*

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			NPP – so the structure and depth of SARs of FCF can be so different from NPP SAR that usage of DS449 as a reference for FCF SAR structure can be inappropriate.				*approval of the DPP by NUSSC it was agreed to include this kind of para in the Safety Guide. (Initially, the planned scope of the DPP was covering all nuclear installations).*
Chapter 1							
Finland 9	3.1.1	3.1.1. The safety analysis report should start with an introduction, which includes: (a) A statement of the main purpose of the safety analysis report; (b) The main information about the process of preparation of the safety analysis report; (c) A description of the structure of the safety analysis report, the objectives and scope of each of its chapters and the connections between them. (d) The reference to the national and international guidance which has been applied while preparing this Safety Analysis Report and justification of the possible deviations from the guidance.	Add: (d) The reference to the national and international guidance which has been applied while preparing this Safety Analysis Report and justification of the possible deviations from the guidance. It would be useful to know the reference for the safety Analysis Report and how this reference has been applied.		(d) A description of the national and multinational guidance applied in the preparation of the Safety Analysis Report with justification of the possible deviations. *(The term "multinational" is used instead of "international" based on Japan-2 about para 1.5)*		
Canada 7	3.1.3/1	Add sentence to follow existing paragraph:	Other stakeholders should be included in the safety		*The heading will be completed:*	X	*The para focuses the split of responsibilities*

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		In some member states, the list of interested parties may be considerably broader and may include but not be limited to the public, indigenous groups, and nearby municipalities as appropriate.	analysis report.		**"Identification of interested parties regarding design, construction and operation"**		*among these interested parties.*
Japan 10	3.1.8 Line 5	3.1.8. The section should briefly present (e.g. in a table) the principal elements of the plant, including the number of units, where appropriate, the type of the reactor, the principal characteristics of the plant, the type of nuclear steam supply system, the type of nuclear fuel, the type of containment structure and systems, the thermal power levels in the core, the corresponding net electrical power output for each thermal power level, the type of ultimate heat sink and any other characteristics necessary for understanding the main technological processes included in the design.	The type of UHS is an important thing to be described as a general plant description.	X		--	--
South Africa 18	3.1.9 Line 4	… such as ~~the~~ use of redundant …	Editorial		"…the use of…"		
Egypt 3	Para 3.1.9, page 8	This chapter also includes information about the reference plant (location and brief data)	Reference plant is plant similar to the current plant and concise information about it may be included in this chapter		Two changes will be incorporated: 3.1.9. If applicable, this chapter includes information about		

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					the reference plant (location and brief data). In case the plant is "first of a kind" it is recommended to compare …" *Also, a heading will be added before 3.1.9:* **"Comparison with other plant designs"**		
Japan 11	3.1.11. Line 2	"…. ~~shutting down~~, shutdown, …."	Duplication.			X	*It refers to the "shutting down" process and to the state of "shutdown" conditions.*
Chapter 2							
Germany 2 Comment 18	3.2.2 Line 2	"…Information provided in chapter 2 should be periodically updated, typically every ten years, taking into account the latest information and knowledge as a basis for evaluation of safety implications of the changes."	To achieve consistency with para 5.1A of NS-R-3 Rev.1.	X			
Germany 2 Comment 19	General to Chapter	**General comment on "CHAPTER 2. SITE CHARACTERISTICS", paras. 3.2.1 – 3.2.40:** The chapter could be improved by a clearer structure:				X	*The comment is noted and it could be taken into account in a*

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	2	(1) General description of the proposed site and its suitability to host a nuclear power plant (2) General description of hazard assessment (screening, evaluation, definition of design basis events, hazards exceeding design basis events) (3) Hazard specific description (seismic, flooding, external fire and explosions, etc.) with clearer separation between natural and human induced hazards. (4) Description of site specific conditions affecting the dispersion of radioactive releases (5) Description of the suitability of the site for emergency preparedness and response This will further guide the developer in preparing the SAR and helps the reviewer to assess the provided information.					*further review of this Safety Guide. The present structure is mainly based on current practices*
Observer EC-JRC 13	3.2.3	and SSG-35 [~~13~~18].	and SSG-35 [13]. 13→18	X			
Germany 2 Comment 20	3.2.5	~~A discussion of considerations concerning the site exclusion and/or acceptance criteria applied for the purposes of preliminary screening of the site for suitability after the site survey stage should be provided in this section of the safety analysis report.~~	Site exclusion is a step before drafting the SAR. It is expected that the operating organization will submit a SAR after site selection is done. It is the task of the regulator to assess whether the proposed site meets the national requirements on siting.		3.2.5. A discussion of considerations carried out after the site survey stage, concerning the site exclusion and/or acceptance criteria applied for the purposes of preliminary screening of the site for suitability ~~after the site survey~~ stage should be …”	X	*The discussion is referring to considerations after the site survey stage. It seems preferable to include in the SAR a summary of the rationale about the site selection.*
Germany 2	3.2.11		Move after 3.2.16	X			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Comment 22							
Germany 2 Comment 21	3.2.12	3.2.11. … for their enforcement. Hazards identified as potentially affecting the site can be screened out on the basis of being incapable of posing a physical threat or being extremely unlikely with a high degree of confidence. The arguments in support of the screening process should be justified and described in the safety analysis report. ~~3.2.12. The screening criteria used for each hazard (including the envelope, probability thresholds and credibility of events) and the expected impact of each hazard in terms of the originating source, the potential propagation mechanisms and the predicted effects at the site should be discussed in this section.~~	Usually, screening means that a certain hazard can be excluded from the evaluation because due to the screening criteria applied the hazard will not have a serious impact on the plant. We propose to move 3.2.12 before 3.2.11.		*According to Germ 2 (com 22), ~~3.2.11~~ will be 3.2.16A and current para ~~3.2.12~~ will be the new 3.2.11.* *A new para 3.2.12 will be added:* 3.2.12. Hazards identified as potentially affecting the site can be screened out on the basis of being incapable of posing a physical threat or being extremely unlikely with a high degree of confidence. The arguments in support of the screening process should be justified and		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					described in this section of the SAR.		
Germany 2 Comment 23	before 3.2.13	Results of the hazard assessment, preferably in form the relation of probability and severity should be provided in the safety analysis report. If the maximum credible hazard severity is provided, a justification should be given.	An important aspect of hazard assessment is the so called hazard curve. This will be the basis for estimation of the impact on SSCs and thus mandatory for defining the design basis.			X	*It seems to contradict Germany-2 (comment 22) and it would incorporate confusion*
Japan 12	3.2.17	**Proximity of industrial, transportation, and ~~military~~ other facilities** 3.2.17 This section should present identification of locations and routes representing potential risks for the plant and the results of a detailed evaluation of the effects of potential accidents at industrial, transport or other installations in the vicinity of the site….“	Clarification. There is no clear definition or description for military facilities herein after.	X			
South Africa 19	3.2.22 Line 2	… such as abnormal ~~abnormally~~ ice effects …	Editorial	X			
South Africa 20	3.2.23 Line 1	"… allowing it to be used …"	Editorial	X	"… be prepared to allow the assessment …"		
Pakistan 1	3.2.23. at the end	3.2.23. The information given in this section should be prepared in a way allowing to be used in the assessment of the transport of radioactive material to and from the site and the dispersion	This may be added. If the site is located over an aquifer which is a source of well water, the groundwater aquifer(s) beneath the site,	X	"… and measures ~~be~~ taken…"		

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		of radionuclides to the environment and measures be taken to preclude the transport of radioactive materials to the environment through subsurface characteristics.	the associated hydrologic units, and their recharge and discharge areas should be described.				
Czech 2	3.2.34 page 13	3.2.34. The feasibility of emergency preparedness including a severe accident, in terms of access to the plant and of transport in an emergency, should be discussed in this section of the safety analysis report, taking into account all reactor units or other nuclear installations on the given site.	The original wordig: „The feasibility of emergency preparedness in terms of access to the plant and of transport in an emergency, including a severe accident, should be discussed in this section of the safety analysis report, taking into account all reactor units or other nuclear installations on the given site.“ is not correct – severe accident cannot happen during the transport		:… in terms of plant accessibility ~~to the plant~~ and of transport in case of an emergency, including a severe accident, should be discussed in this section ~~of the SAR~~, taking into account all reactor units and ~~or~~ other nuclear and non-nuclear installations on the given site, as applicable. Information provided…”		
Observer EC-JRC 14	3.2.40	To place 3.2.40 before 3.2.37	3.2.40 speaks about strategy and should be the first statement.	X	*(It will be 3.2.36A)*		

Chapter 3

Russia 5	3.3.3	Exclude last sentence	SF-1 are wider that SAR		"…These should		

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			scope (e.g. safety principle 2 of SF-1 implies existence of independent regulatory body, but this issue is not discussed in SAR).		be based on the relevant Safety Principles set out in the …”		
Germany 2 Comment 33	3.~~3~~.4 (See in Chapter 4, it is 3.4.4)	The justification for the design bases of the fuel should include a description of the design limits for the fuel and the functional characteristics in terms of the desired performance under all ~~relevant~~ plant states.	All plant states should be relevant for justification of the design bases of the fuel.	n/a	n/a	n/a	*The wording corresponds to 3.**4**.4, not to 3.3.4*
Germany 2 Comment 24	3.3.6	3.3.6. This subsection should …limits and as low as reasonably achievable (ALARA)~~, economic and social factors being taken into account~~.	Economic and social factors need not to be addressed because it is already implicitly covered by the ALARA principle.	X			
Germany 2 Comment 25	3.3.6 - 3.3.7	General remark with respect to paras. 3.3.6 and 3.3.7: Here, only the radiological objective is addressed. For the design of a nuclear power plant Principle 8 “Prevention of accidents” of SF-1 is very important and should be reflected in this chapter of the SAR. The applicant should describe by which means this principle will be achieved (like application of DiD, single failure criterion, etc.)	General remark with respect to paras. 3.3.6 and 3.3.7:		*A new subsection will be added after 3.3.9:* *„Prevention and mitigation of accidents* 3.3.9b. This subsection should describe the measures taken to prevent and mitigate nuclear or radiation accidents and to ensure that the likelihood of an accident having harmful consequences is extremely low. (see		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					SF-1, para 3.30-31 [19])"		
Germany 2 Comment 26	Before 3.3.8	The general approach to define the design basis should be described taking operational states, accident conditions and impacts from internal and external hazards into account. Information should in which operational states and accident conditions a certain SSC will be demanded.	Here, it is expected that the general approach to define the design basis will be described. In other chapters the design basis for individual SSCs should be described. (see also discussion in TECDOC 1791)		3.3.7A. The general approach to define the design basis should be described, taking into account operational states, accident conditions and also impacts from both external and internal hazards. Information provided should include the operational states and accident conditions under which a given structure, system or component will be demanded.		
South Africa 21	3.3.8; Line 4	"… anticipated operational occurrences, ~~(anticipated operational occurrences),~~ design basis accidents, design extension conditions ~~(design extension conditions)~~ without significant fuel degradation …"	Editorial	X			
Germany 2 Comment 27	3.3.8 Line 4	"… anticipated operational occurrences ~~(anticipated operational occurrences)~~, design basis accidents-, design	Editorial.	X			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		extension conditions ~~(design extension conditions)~~ without significant fuel degradation …”					
Germany 2 Comment 28	3.3.10 To add at the end	3.3.10. This subsection should describe …accordance with SSR-2/1 (Rev.1), §2.12-§2.18 [3]. It should also be demonstrated that measures are taken for adequate independence of levels. Particular emphasis should be placed on robustness and independence of safety systems and safety features provided for design extension conditions with core melting.	At last two sentences form 3.3.11 to 3.3.10 to emphasize independence of DiD.		3.3.10. This subsection should describe … with SSR-2/1 (Rev.1), §2.12-§2.18 [3]. It should also be demonstrated that measures are taken for adequate robustness and independence of levels. Particular emphasis should be placed on ~~robustness and~~ independence of safety systems and safety features ~~provided~~ for DECs with core melting.		
Germany 2 Comment 29	3.3.11	*Barrier concept* 3.3.11. It should be demonstrated that there are physical barriers to the release of radioactivity and systems to protect integrity of the barriers and measures are taken to ensure robustness of provisions at each level of defence in depth. ~~It should also be demonstrated that measures~~	Para 3.3.11 addresses more the barrier concept to prevent radioactive releases. This should be highlighted by a headline in italic style. The last two sentences are addressing independence of DiD and can be	X	*See Germany 2, comment 28*		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		~~are taken for adequate independence of levels. Particular emphasis should be placed on robustness and independence of safety systems and safety features provided for design extension conditions with core melting.~~	deleted (see previous comment).				
Canada 8	3.3.12	Please introduce additional text from the NEA Green Book on Defence in Depth that speaks to overall Human Factors and human performance efforts beyond envisaged operator actions.	Please refer to the recent NEA green book on post-Fukushima enhancement of defence-in-depth ... for additional human factors/human performance aspects that strengthen defence-in-depth. These items would be useful to mention in this section			X	*The comment is noted. DS449 is mainly based on current practices taking into account applicable IAEA Safety Standards and the recommendations are given in a general manner and .*
Finland 10	3.3.12a To add a new para	Where appropriate, any envisaged support need outside the plant site should be described.	Add: Where appropriate, any envisaged support need outside the plant site should be described. Some of the DEC strategies rely on the support outside the NPP site for mobile equipment etc.	X	*A new para will be added:* 3.3.12a. Where appropriate, any envisaged support needed outside the plant site should be described.		
Germany 2 Comment 30	3.3.12		Para. 3.3.12 is more related to DiD. It is proposed to move this para. between 3.3.10 and 3.3.11.			X	*Placement of paras 3.3.10 – 3.3.12a will be reconsidered. Importance of barriers seems not lower than operator actions.*

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Japan 13	3.3.14. Line 2	3.3.14. The scope of implementation of the single failure criterion and how compliance with this criterion is achieved should be described here, as part of the envelope considered in the design ~~basis~~.	Clarification for the scope considered in design.	X			
Germany 2 Comment 31	Before 3.3.18	This section should describe the approach to identify and list those conditions which could lead to an early radioactive release or a large radioactive release.	A list of scenarios which have to be practically eliminated should be provided at a prominent location in the SAR before describing the approach to achieve practical elimination.		3.3.18. This subsection should describe the approach used to identify the conditions which could lead to an early radioactive release or to a large radioactive release and to summarize the design and operational …”		*The list is not part of this chapter*
Russia 6	3.3.18	PSA should be mentioned	It is impossible to show practical elimination of certain scenarios without PSA. But PSA is out of SAR scope.			X	*PSA is implicitly used for practical elimination and is addressed in 3.15.55-63. Para 3.3.19 is referring explicitly to Chapter 15.*
Finland 11	3.3.22. Line 3	3.3.22. The subsection should also describe … beyond design envelope ~~basis~~ external events, see requirement 17 from SSR-2/1 (Rev. 1) [3].	Clarity, If in the IAEA terminology design basis is reserved for the BDA conditions the		3.3.22. The subsection … safety margins are ensured for events initiated by		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			design envelope should be used in this context.		external hazards exceeding the limits considered in the design, see requirement 17 from SSR-2/1 (Rev. 1) [3].		
South Africa 36	3.3.24 Line 3	It should be confirmed that Requirement 33 from SSR-2/1 (Rev. 1) [3] is adhered to ~~respected~~.	Editorial	X	"… Req 33 from SSR-2/1 (Rev. 1) [3] is met"		
USA 3	3.3.35 Line 5	"…Unless their probability is ~~very low"~~."	"Very low" is subjective and has no meaning unless defined by a quantifiable metric		"… described here, ~~unless their probability is very low~~"."		
Japan 14	3.3.44. Line 3	Chapter ~~2~~ 3	Editorial.			X	*The aspects mentioned are covered in Chapter 2.*
Germany 2 Comment 32	3.3.56 Bullet 5	• Other major internal structures, … storage tank, intermediate storage pool for spent fuel, the operating floor, intermediate floors, …"	Completion.		"…storage tank, spent fuel intermediate storage pool, operating floor, …"		
Finland 12	3.3.57. At the end	3.3.57. The general information to be provided for the safety classified buildings, civil engineering structures, containment and containment internal structures listed should include the following: • Applicable Codes, Standards, and Specifications, Loads and Load Combinations; • Structural Acceptance Criteria;	Add: As appropriate the treatment of the design extinction conditions should be discussed. At the time of writing this safety guide the civil engineering standards for the design of the design extension conditions are	X	*A 4th bullet will be added:* • Treatment of design extension conditions, as appropriate		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		• Testing and In-service Inspection Requirements As appropriate the treatment of the design extinction conditions should be discussed.	under development.				
Japan 15	3.3.58./ Bullet 2	Safety related building	Clarification for the definition.			X	*"Safety building" is for the safety systems*
Japan 16	3.3.63. Line 1	3.3.63 This section should describe the approach and engineering design rules for the design.	Clarification.	X			
Finland 13	3.3.66a	• The design basis should identify functions, conditions and requirements for the overall electrical systems and each individual electrical system. This information is then used to categorize the functions and assign them to systems of the appropriate safety class; see SSG-30 [21].			3.3.66A. The design basis functions, conditions and requirements for the overall electrical systems and for each individual electrical system should be also described and how this information is used to categorize the functions and to assign them to systems of the appropriate safety class in accordance		

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					with SSG-30 [21].		
Japan 17	3.3.71. Line1	3.3.71. A list of items important to safety ~~equipment items,~~ together with their qualification, should be established and provided or referenced here.	Use glossary wording,	X			
Chapter 4							
Japan 18	3.4.1./last	"… recommendations to meet the requirements applicable to this chapter are provided in ~~NS-G-1.12~~ DS488[25] *("Design of the Reactor Core for Nuclear Power Plants", draft Safety Guide, revision of NS-G-1.12)*." Otherwise, add the information into the reference.	Add revision information.		"… are provided in NS-G-1.12 *(DS488, Step 8)* [25]."		
Germany 2 Comment 33	3.~~3~~4.4 Line 4	The justification for the design bases of the fuel should include a description of the design limits for the fuel and the functional characteristics in terms of the desired performance under all ~~relevant~~ plant states.	All plant states should be relevant for justification of the design bases of the fuel.	X			
Japan 19	3.4.4. last	3.4.4. A description should be provided of the main fuel elements with safety substantiation for the selected design bases. The justification for the design bases of the fuel should include a description of the design limits and the materials for the fuel and the functional characteristics in	Material of cladding tube is one of the important materials to confine radioactive materials.	Am	3.4.4. A description should be provided of the main ~~fuel~~ elements of the fuel taking into account Appendix II, as applicable, with		*Description of the main elements of the fuel, including its materials, is part of the first sentence*

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		terms of the desired performance under all relevant plant states.			safety substantiation for the selected design bases. The justification for the design bases of the fuel should include a description of the design limits for the fuel and the functional characteristics in terms of the desired performance under all relevant plant states.		
Japan 20	3.4.5. (i)	(i) The nuclear design bases, including ~~nuclear and~~ reactivity control limits such as....”	Editorial Reactivity control is already included in nuclear characteristics. The words "nuclear and" may be dispensable.		(i) The nuclear design bases, including nuclear and reactivity control limits such as limits on excess reactivity, fuel burnup, reactivity coefficients, neutron flux distribution, power distribution control and reactivity insertion rates;		
Egypt 4	Para 3.4.5 (iv)	(iv) the design bases of neutron flux and power distributions within fuel	The flux distributions is also required and it is	Am	*(See resolution to Japan 20.)*		~~To keep a consistency with SSR-2/1 (Rev.~~

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		elements,…..	important to include it.		*The following changes will be incorporated:* (ii) The nuclear characteristics of the lattice, …, burnup distributions, boron reactivity coefficient and boron concentrations, control rods type and locations, shutdown margin specification and refueling schemes; (iv) Further nuclear safety parameters of the reactor core like radial and axial power peaking factors and maximum linear heat generation rate;		~~1) requ. 45, using neutron flux distributions are better.~~
Japan 21	3.4.7. Line 2	3.4.7 All reactivity control systems should be described. A demonstration should be provided that the reactivity control systems, including any essential ~~ancillary~~ auxiliary equipment…	To keep consistency with SSR-2/1 (Rev. 1).	X			

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Korea 6	3.4.7 Last sentence	"…In addition, the physical and chemical properties of the materials used for the reactivity control system, as well as structural and mechanical characteristics, the design limits or design evaluation of reactivity control systems should be provided."	The materials and structural characteristics of reactivity control systems should be also described in Chap.4 of SAR.			X	*Description should take into account Appendix II. (Structural and mechanical characteristics are indicated in II.5)*
Japan 22	3.4.10.	Fuel and Core components (Title) (ii) The physical and chemical properties of the materials used for the fuel and core components, as well as nuclear physics, thermal-hydraulic, structural and mechanical characteristics of the components;	Completeness. Should be included fuel components such as fuel cladding, spacer/grids, tie-plate/nozzle,…			X	*Description of all the elements of the fuel is covered in 3.4.4. This subsection is devoted to the so called "core components".*
Chapter 5							
Japan 23	3.5.1./last	"…Specific guidance for the design of these systems is provided in ~~NS-G-1.9~~ DS481 [26] *("Design of the Reactor Coolant System and Associated Systems in Nuclear Power Plants", draft Safety Guide, revision of NS-G-1.9)*." Otherwise, add the information into the reference.	Add revision information.		*See Japan 18* "… is provided in NS-G-1.9 *(DS481, Step 5)* [25]."		
Canada 9	3.5.5 Line 3	"…the reactor coolant systems meet the safety requirements for design. For example, this should include, …"	For a technology neutral document, any mention of PWR/BWR should be by example only.	X			

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Canada 10	3.5.7 Line 4	"…Information should be provided on the corresponding material specifications, including chemical, physical and mechanical properties, resistance to corrosion, irradiation of components (waste and dose considerations)…:	Must consider irradiation of components which leads to increased waste burden in the facility and potential dose to workers either during operation, maintenance or during decommissioning	X	"…resistance to corrosion, irradiation considerations (e.g. waste management and dose), dimensional stability,…"		
Observer EC-JCR 15	3.5.10		The description of the reactor vessel design should be provided in this section …; Would that also include a complete set of documents by the manufacturer? This is important as Doel and Tihange have shown.		*A new para will be incorporated to the Appendix II:* "II.4A Summary information regarding manufacturing documentation and records of main components should be described, indicating supporting documents available."		
Korea 7	3.5.12 At the end	Reactor coolant pumps 3.5.12 A description and justification---- station black-out conditions. Pump and motor oil lubrication system failures such as oil leak or loss of cooling should be evaluated to prevent bearing stuck of pump and motor.	Pump and motor oil lubrication system is one part of RCP design, but it's failure doesn't described in the text		"… SBO conditions. The evaluation of pump and motor lubrication system failures (e.g. leaks of lubricant or loss of cooling) to prevent bearing stuck of pump and		

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					motor should be included.”		
Observer ENISS 3	3.5.21 Bullet 1	Accessibility (including radiation protection matters, temperature and hygrometry conditions and operability of systems);	Accessibility has not been defined in the guide: either provide a definition earlier in the text or describe what is expected here.	X	• “Accessibility, including radiation protection aspects, working conditions (e.g. temperature and hygrometry) and systems operability;”		
Chapter 6							
Russia 7	3.6.1	AOO should be added to supplement mentioning DBAs and DBCs	Safety systems also intended to cope AOOs.		3.6.1 Chapter 6 should present … adequately in case of design basis accidents, ~~and~~ design extension conditions including core melt accidents and for some AOOs.		
South Africa 22	Section 3.6.5 Line 1	“…The engineered safety features explicitly discussed …”	Editorial	X			
NEW	3.6.8	ECCS is not only for Residual heat removal but also for core cooling and preventing core melt …			*Para. 3.6.8. will be modified, see comment Russia 8.*		
Russia 8	3.6.8	Residual heat removal systems	To provide consistency		*1) Changes in*		*Remark: It is pending*

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		(examples of such systems in VVER design is SG passive heat removal system or SG cooldown system) should also be mentioned in the para	between header and text.		*headlines* “Emergency core cooling systems ~~/~~and ~~R~~residual heat removal systems” *deleting* “~~Emergency feedwater systems”~~ *and* “~~Steam dump systems”~~: *Changes in para:* 3.6.8. This section should present … core cooling systems, residual heat removal systems and associated systems. The description should cover both engineered safety features: ~~emergency core cooling~~ safety systems designed ~~for heat removal following~~ to cope with design basis accidents and safety features for- ~~residual heat removal in case of~~ design extension		*to decide if safety systems for depressurization of the primary loop should be added in chapter 6 (e.g. in PWR via the relief tank and in BWR using the wet well to condense steam and to depressurize the RCS).*

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					conditions, including core melt accidents. These systems can be related to the primary or secondary circuits or to the containment depending on the reactor design (e.g. safety injection, feedwater, steam dump and passive systems). ~~Additionally, i~~It should provide relevant information on all ~~the high and low pressure~~ engineered safety features ~~injection systems and the~~ either active or passive ~~safety injection systems~~ in accordance with the general design aspects …”		
Canada 11	3.6.11	Replace title with: • Emergency Borating System	For a technology neutral document, this section should be treated as an		“Emergency ~~borating~~ reactivity control		*Clarification: According to “Scope” (para 1.7) DS449 is primarily written to*

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		(LWR specific)	exception rather than as guidance under all conditions.		system" 3.6.11 "This section should … ensuring reactor shutdown (e.g. by injecting concentrated boron) in addition to those …"		*water cooled reactors, especially LWRs. In other chapters the design of SGs is addressed. This subsection, for example, is not applicable to BWRs but to PWRs.*
Canada 12	3.6.12	Replace "~~corium localization system~~" with "measures to stabilize corium"	In some designs, alternatives to specifically designed systems exist to manage corium interactions with reactor components and civil structures. It is therefore more appropriate to refer to this section by a technology neutral concept.		Headline will be changed by: "~~Corium localization system~~ Safety features for corium stabilization" 3.6.12. This section should provide relevant information on safety features to stabilize the corium ~~localization system~~ as a necessary means for molten …"		
Canada 13	3.6.14 Bullet 4	Reword to: "…The systems for protection of the containment against overpressure and underpressure	System should be pluralized as there are various provisions for dealing with combustible gases, and protecting against overpressure	X			
Germany 2 Comment 34	3.6.14 Bullet 5	"… • The system for control of hydrogen and other combustible gases in the	Explicit mention of hydrogen due to its nature.	X			

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		containment. …”					
Pakistan 2	3.6.19 (New)	In-service inspection of class 2 and class 3 components	Chapter-6 mainly deals with safety class 2 and safety class 3 components. So in-service inspection contents should be included.			X	*According to Appendix II, a description of the in-service inspections is expected for all descriptions of SSCs. Classification of a certain SSC is the result of a structured method described in SSG-30 and is expected in paras 3.3.30 and 3.3.72. This Safety Guide shall not propose any classification of SSCs. But to indicate that the derived safety class is justified by the applicant and traceable by the reviewer.*
Chapter 7							
Japan 24	Chapter 7 Order of sub sections	Order of sections within Chapter 7 shoud be changed as follows; • Instrumentation and control system description • Instrumentation and control system design bases, overall architecture, and functional allocation • General design considerations for instrumentation and control systems • ~~Control systems important to safety~~ • Reactor protection system • Actuation systems for engineered	Clarify the orders in chapter 7. “Control systems important to safety” is described before the reactor protection system and engineered safety features.. The para. 3.7.13. of “Hazard analysis for I&C systems” should be		*Changes done in chapter’s headings:* “… • Actuation systems for ESRs • ~~Diverse actuation system~~ • ~~Hazard analysis for I&C systems~~ • Information systems ITS • Interlock systems		*It seems adequate to keep the subsection on “Control systems important to safety” before the other systems.*

<table>
<tr><td colspan="4">COMMENTS BY REVIEWER
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Country/Organization: Date:</td><td colspan="4">RESOLUTION</td></tr>
<tr><td>Comment No.</td><td>Para/Line No.</td><td>Proposed new text</td><td>Reason</td><td>Accepted</td><td>Accepted, but modified as follows</td><td>Rejected</td><td>Reason for modification/rejection</td></tr>
<tr><td></td><td></td><td>safety features
Control systems important to safety
Diverse actuation system
~~Hazard analysis for instrumentation and control systems~~
Information systems important to safety
Interlock systems important to safety
Automatic control systems not important to safety
Data communication systems
Instrumentation and control in the main control room
Instrumentation and control in a supplementary control room
Emergency response facilities
Digital instrumentation and control systems application guidance
Hazard analysis for instrumentation and control systems</td><td>desctribed after all of design descriptions.</td><td></td><td>ITS
~~Automatic control systems not ITS~~
Diverse actuation system
Data communication systems
I&C in the MCR
I&C in a supplementary control room
Emergency response facilities
Automatic control systems not ITS
Digital I&C systems application guidance
Hazard analysis for I&C systems”</td><td></td><td></td></tr>
<tr><td>Korea 9</td><td>CHAPTER 7</td><td>(General Comment)
In the main text of Chapter 7, ANNEX content 7.4 “Systems Required for Safe Shutdown” is not addressed at all. Thus, Clause of “Systems Required for Safe Shutdown” should be included.</td><td>“Systems Required for Safe Shutdown” should be included.</td><td></td><td></td><td>X</td><td>*The change would not be consistent with SSG-39, para 1.15. Chapter 7 of Safety Guide is about I&C systems. Examples to which it applies include:*
— Reactor protection systems;
— Reactor control systems, reactivity control systems and their monitoring</td></tr>
</table>

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							systems; — *Systems for monitoring and controlling reactor cooling; (idem for emergency power supplies; containment isolation and effluents);* — *Instrumentation for accident monitoring;* — *I&C systems for fuel handling.* *I&C systems required for safety shutdown are protection and monitoring systems.*
Finland 14	3.7.4a New para just above 3.7.5, in same subsection	• The overall architecture of the instrumentation and control should be described. How the provisions for normal operation and the accident conditions including design basis accident conditions and design extension conditions without core melt and with core melt are considered in the I&C design.	Add: In line with the heading the overall architecture should be descried. The overall description is needed to support the paragraphs 3.7.8 – 3.7.32.		*Two bullets added in 3.7.5:* • Overall architecture of the I&C • Provisions for NO and accident conditions *Para 3.7.4 will be deleted and para 3.7.2 will be reformulated as follows:* “3.7.2. This chapter should identify those instruments and their associated equipment		

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					that constitute provisions for plant normal operation, for design basis accident conditions and for design extension conditions. Both safety important and non-safety important I&C components intended to fulfill the functions mentioned above should be described in this section.		
Canada 14	3.7.4	Delete 3.7.4 wording and replace with: This chapter should provide information on instrumentation and control systems used to control the plant in normal operating states including the safety classifications assigned.	The wording of this clause needs to be consistent with IAEA SSG-30, *Safety Classification of Structures, Systems and Components in Nuclear Power Plants*. Not all member states refer to control systems used to control the plant in normal operating states as *not important to safety*.	OK (CH, CT)	*See resolution to Finland 14*		
Japan 25	3.7.5.	3.7.5. This section should identify all instrumentation, control, and supporting systems ~~that are important to safety~~, including alarm, communication, and display instrumentation and should specify functions allocated to individual	Completeness. This chapter should provide information on all I&C systems including not important to safety as described in Section 3.7.4.	X	*See resolution to Finland 14*		See also answer to comment on p.3.7.2

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		systems.					
South Africa 23	3.7.5 Line 4	"…Furthermore, ~~on~~ this sub-section…"	Editorial	X			
Japan 26	3.7.6. All the para	The some items described in Section 3.7.6 should be revised and added as follows; • Software quality and life cycle process; • System calibration, testing and surveillances; • ~~Status of the data communication systems in the d~~Design of bypass and inoperable status indications; • Defence in depth and diversity analyses for each potential failure mode including software common cause failure (CCF), exposure of the system to ~~seismic~~ internal/external hazards; • Human-machine interface; • Qualification and equipment protection; • Setpoint determination; • Use of digital Instrumentation and control systems.	Completeness. Some important items are missing and the description should be clearer.	X	*Following changes will be incorporated:* • System calibration, testing and surveillances; • Design of bypass and inoperable status indications; • Defence in depth and diversity analyses for each potential failure mode, including software common cause failure and exposure of the system to ~~seismic~~ both-internal and external hazards; • Human-machine interface; • Qualification and equipment protection; • Set points;		*1st bullet on "software quality": Combined with comment S.Africa-46 (see below).* *8th bullet: "Use of digital I&C systems" seems excessive, since protection from CCF in software is already indicated in 4th bullet.*
Korea 8	3.7.6 To add	• Software classification • Single failure criteria application • Equipment qualification • Commercial Grade Item Dedication	The added item should be included in this clause to clarify general design consideration for I&C systems.		*Following changes will be incorporated:* • Hardware and Software classification; • Equipment qualification;		*2nd bullet: Single failure criteria are applicable to safety groups, so no need to indicate application of this criteria to each I&C component.*

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							4th bullet: It seems preferable not to include it.
South Africa 46	Section 3.7.6 Bullet 2	Software quality including its verification and validation process;	More clarity		• Software quality, including its verification, validation and life cycle processes, as applicable, together with the related safety system;		
Finland 15	3.7.6. Bullet 5	3.7.6 This section should describe how the applicable criteria according to the importance to safety of the system are addressed, including: • (…) • Unauthorized access control and other security aspects; • (…)	Add, <u>Other security aspects</u> Also other security aspects in addition to access control is needed and should be considered from the beginning.		*Combined with S.Africa 47:* • Unauthorized access control, cybersecurity and other aspects regarding security;		
South Africa 47	Section 3.7.6 Bullet 5	• Unauthorized access control including cyber security;	More clarity		*Combined with Finland 15*		Cyber security is not part of unauthorized access control.
South Africa 37	Section 3.7.8 (b); Page 31	(b) The specification of reactor trip system set points, time delays in system operation and uncertainties in measurement, and how these relate to the assumptions made in the chapter of the report on safety analysis;	Editorial	X			
Japan 27	3.7.8. (d)	(d) Any interfaces with items not	To keep consistency with			X	*Para deals with items*

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		important to safety ~~non-safety-related~~ instrumentation, control or display systems, together with provisions to ensure independence;…”	SSR-2/1 (Rev. 1).				*important to safety*
Japan 28	3.7.8. (f)	(f) Provisions for the manual actuation of the reactor protection- ~~trip~~ system from the main control room, the supplementary control room and other emergency response facilities;…”	To keep consistency with SSR-2/1 (Rev. 1).			X	*In this sentence [manual] reactor trip is understood as part of the reactor protection system*
South Africa 48	Section 3.7.8/ (g)	(g) Where the actuation logic for reactor trip is implemented by digital means, a discussion of the software life-cycle activities for digital systems, and the software verification and validation should be provided. Where cyber security tools are implemented, their functions should be fully discussed...”	New sentence proposed to be added.		(g) Where … a discussion of the activities software life-cycle, ~~activities for digital systems, and the software~~ verification and validation and functions of cyber security tools, as applicable, should be provided.”		
Japan 29	3.7.9.	3.7.9. This section should provide relevant information on the actuation systems for engineered safety feature actuation system and demonstrate that Requirement 61 from SSR 2/1 (Rev.1) [3] is met. In particular, information on the specific aspects the same as described in para. 3.7.8. should be provided.	Completeness. The same information for the reactor protection system trip is needed for the actuation systems for engineered safety features.		“3.7.9. This section should provide …from SSR 2/1 (Rev.1) [3] is met. In particular, information on the specific aspects listed in para 3.7.8 regarding the reactor protection system, as applicable, should be provided here also.		
Japan 30	3.7.12.	Following sentences should be added	Clarification.	X	*Additional changes*		

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		after this para.; 3.7.12 A. This section should provide relevant information to demonstrate that sufficient levels of diversity are provided by the diverse actuation system in all plant states.	Guide for the software CCF coping analysis should be necessary to support the effectiveness of diverse actuation system.		*will be incorporated*: *Para 3.7.11 will be supplemented by a sentence at the end:* "All plant states should be taken into account in the assessment". *Position of current paras 3.7.11 and 3.7.12 (first description, then assessment) will be shifted.*		
South Africa 24	3.7.13 Line 1	"… that the hazard analysis for instrumentation and control systems considers all plant states …"	Editorial			X	*Consistency with other paras*
Finland 16	3.7.13.	3.7.13 This section should provide relevant information to demonstrate that hazard analysis for instrumentation and control systems consider all plant states and modes of normal operation, including transitions between different modes of normal operation. ~~Degraded states should also be included~~.	Please clarify; What is meant by degraded states?		3.7.13. This section… between different modes of normal operation and failure or non-availability of instrumentation and control systems. ~~Degraded states should also be included~~		
South Africa 25	3.7.14 (b) Line 4	(b)…available to the operating organization ~~s~~ in the control room …"	Editorial	X			
South Africa 38	3.7.14 (b) Line 4	(b) … available to the operating organization s in the control room,….	Editorial: remove the "s"	X			

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DS499 Drafting Team Proposal	3.7.14 (b)	(b) A specification of the parameters monitored by the plant computer displays available ~~to the operating organization~~ in the control room, the supplementary control room and other emergency response facilities. ~~and the~~ The characteristics of any computer software (scan frequency, parameter validation, cross-channel sensor checking) used for filtering, trending, ~~the~~ generation of alarms and ~~the~~ long term storage of data ~~and displays available to the operating organization s in the control room, the supplementary control room and other emergency response facilities.~~ If data processing and storage are performed by multiple computers, the means of achieving its ~~the~~ synchronization~~. of the different computer systems should be described.~~	To reorganize and to shorten this para.		*This changes have been included in the draft*		
South Africa 26	3.7.15 Line 1	Furthermore ~~Further on~~, this section …	Editorial		3.7.15. In addition ~~Further on~~, this section…"		
Japan 31	3.7.23./l1 3.7.24./l1 3.7.28./l1	This section should provide a description of the main control room layout, with an emphasis on the presentation of information from the instrumentation and control in the	"Human-system interface" is widely used as well as DS492.			X	Consistency with other paras; also used in published SGs such as SSG-39

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		main control room and human–system ~~machine~~ interface, including:					
Germany 2 Comment 35	3.7.30 Page 33	Enumeration 3.7.30. exists twice.	Editorial.	X	*After 3.7.16 it will be 3.7.16A~~30~~*		
Japan 32	3.7.30. 16A. (P.30/l1)	3.7.~~30.~~ 16A.	Missing a paragraph number.	X	*After 3.7.16 it will be 3.7.16A~~30~~*		
Japan 33	3.7.30. (after 3.7.29) ~~16A.~~	3.7.30. The mechanisms for the transfer of control and communications from the main control room to the supplementary control room should be described so as to demonstrate how this transfer would occur under accident conditions and is protected against unauthorized access.	Completeness. Design to protect unauthorized access should be described as listed in para. 3.7.6. 5th bullet.		3.7.30. The mechanisms for the transfer … under accident conditions. Protection against security aspects, including unauthorized access, should be also described.		
South Africa 49	3.7.32 Page 34	If digital instrumentation and controls systems are used, the overall scope of the application should include information on (1) the design qualification of digital systems, (2) protection against common-cause failure, (3) functional requirements when implementing a digital protection system and (4) protection against cybersecurity and unauthorized access. The description should demonstrate that Requirement 63 of	Proposal to include cybersecurity and unauthorized access.		3.7.32.If digital instrumentation… Req 63 of SSR 2/1 (Rev. 1) [3] is met. Additionally, protection against cybersecurity, unauthorized access and other aspects regarding security should be provided.		

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		SSR 2/1 (Rev. 1) [3] is met.					
Chapter 8							
Korea 10	General to CHAPTER 8	(General Comment) In CHAPTER 8, the information on an alternate AC power supplies is addressed partially. However, the description on Station Blackout (SBO) is insufficient in understanding SBO behaviors on importance of safety. So, it is desirable to add a separate clause for SBO.	The SBO clause should be added separately.			X	*Special SBO subsection seems unnecessary since description of all AC systems is already included*
Japan 34	3.8.3.	3.8.3. Chapter 8 should provide definitions, design features and classifications of ~~preferred power supply,~~ off-site power system, on-site power system, standby power system, and alternate AC power system.	"preferred power supply" and "off-site power system" are duplicated.	X	*[Preferred power supply could be off-site or on-site Unnecessary duplication.]*		
Japan 35	3.8.3.	Following sentences should be added after this para.; 3.8.3A. In addition, prioritization of power supply from these power supply systems to the non-safety loads and the safety loads should be described during not only operational states but also accident conditions.	Prioritization of power-supplying should be discussed.		3.8.3A. In addition, prioritization of power supply from these power supply systems to the non-safety loads and the safety loads should be described, not only during ~~not only~~ operational states but also in accident conditions.		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Germany 2 Comment 36	3.8.5 (c)	"… (c) The plant's capability to maintain safety functions and to remove decay heat from spent fuel for the period for which the plant is in a station blackout condition (loss of all AC power supplies). …"	Clarification. There are different definitions available for SBO.	X			
Finland 17	3.8.5. (i)	"….. (h) A general description of the off-site power system which is composed of the transmission system (grid) and switchyard connecting the plant with the grid and its interconnection to other grids and the connection points to the on-site electrical system (or switchyard). (i) The resilience to the disturbances generated by the instability of the power production to the grid."	Add: (i) The resilience to the disturbances generated by the instability of the power production to the grid. As the power production is more and more changing to the renewables there is for example less inertia in the power production system and instability.			X	*The issue is already covered by items a) and e) of para 3.8.5 as well as by para 3.8.8.*
Japan 36	3.8.8.	Following sentences should be added after this para.; 3.8.8A. This section should describe one kind of failure mode and effects analysis of off-site power system components should be described. In addition, test requirement should be described in this section. Moreover, the stabilty analysis including the grid distubance analysis after the main generator trip should be described.	These items should be informed in order to evaluate the plant safety relevant to the off-site power systems. In addiiton, this information is one of the important inputs to the conditions of chapter 15 safety analysis.		3.8.8A. This section should describe one kind of failure mode and effects analysis of off-site power system components and test requirements. ~~should be described~~. In addition~~,~~ results of grid ~~test requirement should be described in this section. Moreover,~~		*Protection from offsite grid disturbances are described in accordance with p.3.8.8 (so no need for additional FMEA)* *Proposals for test requirements are unclear*

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					~~the~~ stabilty analysis (including ~~stability~~ ~~the grid distubance analysis~~ after the main generator trip) should be provided ~~described~~.		
Korea 11	3.8.9 On-site AC power systems	*It seems to be desirable that the following items should be included in this clause to describe electrical power system calculations and distribution system studies.* • Load flow/voltage regulation studies and under-/overvoltage protection • Short-circuit studies • Equipment sizing studies • Equipment protection and coordination studies • Power quality limits Insulation Coordination	For adding detailed calculations and studies.		*The following part will be added at the end of the paragraph:* "… design basis accidents. The following results should be included: • Selection of under-voltage (under-frequency and over-voltage) protection set points; • Selection of short circuit protection measures; • Selection of power quality limits;"		
Korea 12	3.8.9	3.8.9. This subsection should provide relevant information … (diesel or gas turbine driven systems), the generator configuration and the uninterruptible ~~non-interruptible~~ AC power system available for anticipated …"	[errata] Change "non-interruptible" to "uninterruptible"	X			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
South Africa 50	Section 3.8.11 (a); Page 35	"… (a) On-site AC power system ~~breakers are co-ordinated~~ is engineered to ensure the reliable delivery of emergency power to engineered safety features and non-interruptible AC power system loads;"	More clarity		*(See Korea-12-15). It will be modified as follows:* (a) On-site AC power system ~~breakers are co-ordinated~~ is engineered to ensure the reliable …features and ~~non-~~uninterruptible AC power system loads;		
Korea 13	3.8.11 (a)	"… (a) On-site AC power system breakers are co-ordinated to ensure the reliable delivery of emergency power to engineered safety features and uninterruptible ~~non-interruptible~~ AC power system loads;…"		X	*See South Africa 50*		
South Africa 39	3.8.11 (b)	"… (b) On ~~In~~ loss of off-site power condition,…	Editorial	X			
Korea 14	3.8.11 (d)	"…(d) uninterruptible ~~non-interruptible~~ AC power is continuously provided to essential safety systems and important to safety instrumentation and control systems while normal off-site AC power systems are available and during postulated loss of off-site power events;…"		X			
South Africa 40	3.8.11 (e);	"…(e)An alternate AC power supply ~~supplies~~ is provided at the nuclear power plant…"	Editorial	X			
Finland 18	3.8.11 (f)	"…	Add:			X	*Proposed changes seem*

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		(f) There are robust independent systems for the management of severe accidents. As appropriate there are adequately robust features to enable the safe use of non-permanent equipment to restore the necessary electrical power supply in rare events without core melt and in core melt accidents (see Requirement 68, para 6.45A from SSR-2/1 (Rev. 1) [3]).”	There are robust independent systems for the management of severe accidents. As appropriate there are adequately robust features to enable the safe use of non-permanent equipment to restore the necessary electrical power supply in rare events without core melt and in core melt accidents (see Requirement 68, para 6.45A from SSR-2/1 (Rev. 1) [3]). For new design the provisions for severe accidents should be permanent. However mobile equipment should be considered for the provisions for rare events even to prevent core melt.				*not consistent with IAEA Safety Requirements. Para 6.45A of SSR-2/1 (Rev.1) deals with safe use of non-permanent equipment, not specifically with severe or non-severe accident management equipment.*
Japan 37	After 3.8.11.	Following sentences should be added after this para.; • 3.8.11A. This section should describe the design caluculation of electric failure, including fault current and voltage drop, and the design information of such protection measures should be described.	These information should be checked in order to know the integrity of system against typical disturbances and failures.		*A new (f) bullet will be added:* (f) Protection of AC power systems		*Already covered by 3.8.9 and 3.8.10. It seems there is no reason to explicitly provide such details.*

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Korea 15	3.8.12 Bullet 2	"…Major DC loads present (including the uninterruptible ~~non-interruptible~~ AC power system inverters and any DC loads not important to safety such as the lubrication oil pumps for the turbine bearings);…"		X			
Japan 38	3.8.14.	Following sentences should be added after this para.; 3.8.14A. This section should describe he design caluculation of electric failure, including fault current and voltage drop, and the design information of such protection measures should be described.	These information should be checked in order to know the integrity of system against typical disturbances and failures.		*A new bullet will be added in para 3.8.13:* • Protection of AC power systems		*Same comment as in Japan 37*
Brazil 2	3.8.15.	3.8.15. This subsection should demonstrate that electrical equipment, cables and their raceways (including cable supports, wall and floor penetrations and fire stops) are selected, rated and qualified for their service for environmental conditions. In the justification, account should be taken of the cumulative radiation effects and thermal ageing expected over their service life. Seismic qualifications and fire resistance of electrical equipment, buses, cables, cable trays and their supports should be also described.	Include the terms "electrical equipment" and "cables" (in blue font) to be consistent with the Section Title.	X			
South Africa 51	3.8.16	3.8.16. This subsection should identify at least three classes of cables: (1) control and instrumentation cables, (2) low voltage power cables (e.g. 1000 V or less), and (3) medium voltage power	Suggestion in terms of IEC 60038, medium voltage is in the range 1kV to 33kV.	X			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		cables (e.g. ~~20~~ 33 kV or less).					
Japan 39	3.8.17.	3.8.17 This subsection should describe the environmental qualification of cables, including electric penetration, that have to withstand conditions inside the containment during and after a loss of coolant accident, a main steam line break or other adverse environmental conditions.	This information should be checked in order to keep the integrity of containment vessel.		"3.8.17 This subsection should describe the environmental qualification of cables and electric penetrations that have to withstand conditions …"		
Finland 20	3.8.17a	A description should be provided of EMC protection of the nuclear power plant.	Good overall EMC design is important and should be described.		**Grounding, ~~and~~ lighting protection and electromagnetic compatibility** 3.8.18. A description …drawings should be also included. A description of electromagnetic compatibility protection of the nuclear power plant should be also provided.		
Finland 19	Heading of 3.8.18	EMC protection, grounding and lightning protection	Add; EMC protection		*See resolution to Finland 20*		
Korea 16	3.8.18	(e.g., station grounding, system grounding, equipment safety grounding, any special grounding for sensitive instrumentation, and computer or low-signal control	[errata] ")"	X			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		systems).					
Chapter 9							
Pakistan 3	Section 9A.3	Chemical and volume control system, Boron recycle system, Containment Ventilation system, Containment purge system	Format and contents of these systems are missing.		*Convenience to include the "Boron recycling system" in the Annex (9A) will be considered*		*According to the IAEA Safety Guides, most of these systems are part of chapters 5 and 6 (e.g., for CVCS see last sentence of 3.9.10 and 3.5.23; for containment systems see 3.6.13-15). Also, not all the auxiliary systems and supporting systems are mentioned in this chapter (see Annex, 9A)*
Germany 2 Comment 37	3.9.4 Bullet 1	"… • ~~New~~ Fresh fuel storage and handling system; …"	Commonly used terms in the nuclear field are: "fresh fuel" and "spend fuel".	X	*Also changed in Annex (9A.1.1)*		
Egypt 5	Para 3.9.6 page 38	3.9.6. For reprocessed and irradiated fuel, information provided should include considerations such as appropriate provisions for radiation protection, criticality prevention, fuel integrity control, including special provisions to deal with failed fuel, fuel chemistry, fuel burnup, fuel cooling, and arrangements for fuel consignment and transport	Fuel burnup is important for reprocessed and irradiated fuel			X	The change seems not necessary. Fuel burnup is not one of the provisions indicated in this para but implicitly included in criticality prevention.

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Japan 40	3.9.16.	3.9.16 The Overhead lifting equipment ~~heavy-load handling system~~	To keep consistency with SSR-2/1 (Rev. 1).	X	*Also changed in Annex (9A.1.9)*		
Part 9B							
Japan 41	3.9.22./l3 3.9.23./last	"…~~NS-G-1.10~~ in DS482 [27] ("*Design of Reactor Contaionment Structure and Systems for Nuclear Power Plants", draft Safety Guide, revision of NS-G-1.10*)."	Add revision information.		*DS482 Step 7 has been included in both paras*		
Finland 21	3.9.22.	3.9.22 This section should describe design features of the reactor building provided to comply with the applicable safety requirements of SSR-2/1 (Rev. 1) [3], including requirements 53 to 56, in accordance with NS-G 1.10 (DS482) [27]. Specific design features of the primary …"	Add (482) It should be indicated that there is updating of the guide in progress.		*DS482 Step 7 has been included*		
Chapter 10							
Germany 2 Comment 38	3.10.1 (a)/1	"…" (a) The performance requirements for the turbine generator(s) in operational states and under accident conditions;…"	Accident conditions are also relevant for the steam and power conversion system and should be included here.			X	*A turbine trip will automatically initiate a reactor trip, so accident conditions of the turbine generator does not need to be explicitly addressed. More important is the thermal-hydraulic feedback effects of the steam generation and conversion*

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							system in order to prevent e.g. sub cooling transients. However, this aspect it addressed in Chapter 15 (see para 3.15.33)
Korea 17	3.10.1 (b)	(b)A description of the main steam … (omitted) … the steam generator blowdown system; the turbine generator system, the turbine protection system, the generator stator cooling system, the hydrogen seal oil system;…”	Adding important and indispensable systems in Steam and Power Conversion Systems.		(b) A description of the main steam line piping and the associated control valves, the main condensers, the main condenser evacuation system, the turbine generator system, the turbine gland sealing system,… *(omitted)*…applicable, the steam generator blowdown system;		*The SAR should focus on nuclear safety. As stated in 3.10.2 the information included should emphasize those aspects that could have a negative impact on the reactor and its safety features. Thus, it seems preferable not be overloaded it with other aspects.*
Germany 2 Comment 39	3.10.3/1-2	3.10.3. ~~Where appropriate, t~~This chapter should summarize the evaluation of radiological aspects of normal operation and accident conditions of the steam and power conversion system and subsystems.	Unless the evaluation of radiological aspects of normal operation and accident conditions of the steam and power conversion system and subsystems is discussed at different paragraph of the document, it should be included here. Moreover, it		*3.10.3 will be deleted.* *In general terms this is covered by Appendix II (see para II.10)*		

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			should be a clear recommendation and not only an option.				
Korea 18	3.10.11.	3.10.11 In this section, the turbine generator system, (omitted) … control systems for turbine over-speed protection and generator cooling, and control functions that … (omitted) … be described in this section….	Adding system description for the added system in the paragraph 3.10.1 (b)		3.10.11 In this section, the turbine generator system, associated equipment (including moisture separation <u>and turbine over-speed protection</u>), use of extraction steam for feedwater heating, and …".		*See observation made in Korea 17*
Germany 2 Comment 40	3.10.13/2	3.10.13. The section should describe the turbine generator system equipment design and design bases, including the performance requirements under operating and accident conditions.	Accident conditions are also relevant for the steam and power conversion system and should be included here.			X	*See Germany-2 (38). A turbine trip will automatically initiate a reactor trip, so accident conditions of the turbine generator does not need to be explicitly addressed.*
Chapter 11							
Germany 1	3.11.2 Bullet 1	"… 1. The capabilities of the plant to control, collect, handle, minimize, process and store…"	Completion, Description in a more clear way			X	*Para 3.11.1 indicates SSR-2/2, Requirement 21, which include minimization.* *Para 3.11.9 covers measures to minimize waste.*

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Germany 2	3.11.8	3.11.8. The consideration…This section should consider the options for the safe on site interim and/or predisposal management of waste….”	Completion, Description in a more clear way			X	*An aspect of pre-disposal management would be to store waste onsite for an interim period. Therefore, it seems preferable not to incorporate the change to avoid redundancy.*
Germany 2 Comment 41	3.11.10 Line 2	3.11.10. This section should describe the capabilities of the plant to control, collect, process, handle, and store liquid radioactive waste generated during operation ~~and resulting from accident conditions~~.	Radioactive waste resulting from accident conditions are according to 3.11.7 (Source terms) considered in Chapter 15.			X	*It seems there is no duplication or overlap. Para 3.11.7 refers to Chapter 15 to derive information on the radioactive waste from the safety analysis results. The text in para 3.11.10 is about describing the capabilities of the plant to control, collect process handle and store liquid radioactive waste with the information from Chapter 15.*
Germany 3	3.11.11 Bullet 3 Line 6	"…The possible need for specialized systems to deal with issues of processing, evaporating and conditioning, such as…"	Completion, Description in a more clear way		"…The possible need for specialized systems to deal with issues of processing (e.g. evaporating and conditioning), such as…"		
Germany 4	3.11.18	3.11.18 This section should describe the systems and equipment that monitor	Completion, Description in a more clear way		3.11.18 This section should		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		the process and effluent streams in order to control releases of radioactive materials and observe the operational limits generated in…			describe … streams in order to control and observe the authorized limits of releases of radioactive materials generated in…		
Chapter 12							
Germany 5	3.12.1	3.12.1 This chapter should provide information on the policy, strategy, methods and provisions for radiation protection including justification of using procedures under radiation instead of other techniques.	Completion, Description in a more clear way			X	*Extending the sentence in the proposed way seems not relevant at the stage of development of SAR. Such statement would be appropriate at the stage of the Environmental Impact Assessment.*
Germany 2 Comment 42	3.12.1 Lines 2-3	"…The expected occupational radiation exposures during operational states and anticipated operational occurrences, including measures to avoid and restrict exposures, should also be described…."	Anticipated operational occurrences should also be considered in the radiation protection.			X	*"Operational states" is used according to SSR-2/1 (Rev. 1), which include AOOs*
Germany 6	3.12.8	3.12.8 The necessity of workers' presence in certain plant areas where radiation levels are high should be investigated and justified, in order to limit working hours by means of prior dose planning and introducing dose constraints in those areas and,	Completion, Description in a more clear way		3.12.8 The necessity of workers' presence in certain plant areas where radiation levels are high should be		

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		consequently, to reduce radiation doses to workers.			~~investigated and~~ justified ~~, in order to limit~~ and working hours in those areas limited by means ~~of prior dose~~ of careful planning ~~and introducing dose constraints in those areas and, consequently,~~ to reduce radiation doses to workers.		
Germany 7	3.12.9	3.12.9 This section should provide a description of all on-site radiation sources existing both in operational states including outages for inspections, maintenance and refueling as well as in accident conditions,…	Completion, Description in a more clear way	X			
Germany 2 Comment 43	3.12.9 and 3.12.10	3.12.9. This section should provide a description of all on-site radiation sources existing both in operational states as well as in accident conditions. ~~, with account taken of both contained and immobile sources, and potential sources of airborne radioactive material. 3.12.10.~~ The sources should include contained and … (omitted)… from spent fuel pool affecting containment atmosphere; fuel building atmosphere and auxiliary building	Information contained in 3.12.9 is partially repeated in 3.12.10. It would be helpful, to put these two paragraphs together.	X	*Combination of both paras takes into account the resolutions to Germany 7 and Germany 8*		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		atmosphere).					
Germany 8	3.12.10.	3.12.10 The sources should include contained and immobile radiation sources (such as reactor core; reactor coolant; chemical and volume control system; spent fuel pool cooling system; liquid, gaseous and solid radioactive waste systems -determined consistently with chapter 11-; residual heat removal systems; spent fuel; irradiated control rods and other core internals, as well as activated components e.g. reactor vessel, bio shield etc.)…	Completion, Description in a more clear way		3.12.10 The sources should include contained and immobile radiation sources (such as reactor core, reactor vessel, reactor internals and control rods; reactor coolant; chemical and …*(omitted)*… with chapter 11-; residual heat removal systems; spent fuel; ~~irradiated control rods and other core internals,~~ and other activated components e.g. biological shield) as well as sources…"		
Germany 9	3.12.11.	3.12.11 Special source terms should be derived from the core fuel loadings and discussed for accident conditions including design extension conditions with core melting.	Completion, Description in a more clear way			X	*The change seems unnecessary (mixing up items of different nature)*
Germany 10	3.12.14 Bullets	3.12.14 Description of the means for reducing the radiation exposure should	Completion, Description in a more clear way			X	*2nd bullet: Ventilation covers more than air*

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	2 & 6	cover among others: • [2nd bullet] Reducing internal exposure by isolation, ventilation using air filters, decontamination and use of protective clothing and respiratory equipment; • [6th bullet] Establishing signs, justifying planned actions and perform dose planning prior action to avoid inadvertent access and the resulting unnecessary exposure.					*filtering* *6th bullet: Change proposed is covered in para 3.12.21 (g)*
Observer ENISS 4	3.12.14 1st bullet	• Minimizing contamination by choosing more corrosion-resistant material, using adequate water chemistry regime, enhancing the purifying capacity of the primary coolant and decontaminating the facilities, use of shielding, ~~remote control~~ and other staff actions, remote control and shortening exposure time to reduce external exposure; …”	Contamination and external exposure are two different aspects of radiation issues (contamination can cause external and internal exposure), therefore they should be addressed in two separate bullets.		*This first bullet will be split in two as follows:* • Minimizing source term … *(omitted)* …and decontaminating the facilities; *(no changes here)* • ~~u~~Use of shielding, remote control and other staff actions~~, and shortening exposure~~ to shorten time ~~to reduce~~ of external exposure;		*Only design provisions should be included in this paragraph*
Germany 11	3.12.15 (a)	(a) No person receives doses of radiation in excess of the authorized	Completion, Description in a more clear way			X	*According to GSR Part 3 Req.12, dose limits shall not be exceeded.*

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		dose limits/operational dose constaints as a result of normal plant operation;…"					*Dose constraints are an optimization tool to achieve ALARA and this is implicitly required in point (b).*
Germany12	3.12.19	Radiation dose targets, before in the text dose limits, dose constraints	Define different use and meaning or use uniformly one term		*The para will be modified as follows:* 3.12.19. ~~Radiation~~ Dose constraints ~~targets~~ for the plant staff in all plant operating states should be stated here, consistently with Chapter 3 (see para 3.3.7). The section should demonstrate that the established dose constraints ~~targets~~ are achievable in plant operational states and accident conditions.		
Germany 2 Comment 44	3.12.20	3.12.20. Dose assessment should be based on radiation monitoring (~~if already available,~~ during plant operation), on operational experience from similar plants or on appropriate computational models. Data from similar plants and description of computational models should be	During plant operation radiation monitoring system should already be in operation.	X			

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		provided in the safety analysis report or should be adequately referred to.					
Germany 13	3.12.21	(g) Limiting the number of personnel for working in the controlled areas, justification of actions of the personnel and management of work planning and work permits;…"	Completion, Description in a more clear way			X	*Justification of actions and limiting the number of personnel in controlled areas is the same idea*
Chapter 13							
South Africa 27	3.13.1 Line 1	"… takes over its primary ~~prime~~ responsibility for safety …"	Editorial	X			
South Africa 28	3.13.6 Line 1	"… allowing verification ~~verifying~~ that …"	Editorial	X			
Germany 2 Comment 45	3.13.6, 3.13.7, 3.13.8	Move paragraphs: 3.13.6, 3.13.7 and 3.13.8 to Chapter 18 Human Factors Engineering / Human-machine interface design / Training program development.	It would be helpful to put all paragraphs dealing with training program together. After in Chapter 13 the qualification requirements are identified (3.13.5), the training program could be concluded in Chapter 18, as it is partially done.			X	*See justification in Germany-2, comment 52, about 3.18.28*
South Africa 29	3.13.9 Line 3	"…The plans for establishing ~~implementation~~ such programmes in future stages of the nuclear power plant implementation."	Editorial		"… or indicate the plans for its implementation ~~such programmes~~ in future stages of the nuclear power plant life		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					time~~implementation~~"		
South Africa 30	3.13.10 Line 2	"… operating organization intends to apply intends ~~in order~~ to identify …"	Editorial		"… organization intends to apply to identify…"		
South Africa 31	3.13.15 Line 3	"… dealing with ~~defaults of~~ defects in fuel rods …"	Editorial	X			
Observer EC-JCR 16	3.13.18	"…plant procedures and process software in a permanent or temporary way…."	Changes made to the plant systems and components, operational limits and conditions, plant procedures and process software, permanent and temporary changes to the plant.			X	*Requested changes in the sentence are not sufficiently clear. The proposal seems to change the meaning of the sentence significantly. Modification control process should not be conducted on temporary way but robust and consistent*
South Africa 32	3.13.20 Line 3	"… times should be specified ~~taken~~ in accordance …"	Editorial	X			
Germany 2 Comment 46	3.13.20/1	3.13.20 Information on the management system provisions (creating, receiving, classifying, controlling, storing, retrieving, updating, revising and deleting) for the documents, records and reports relevant for the operation of the plant over its lifetime should be provided in this sub-section. The associated retention times should be taken …"	An advice on, what is meant by "the management system provisions" would be helpful.	X			
South Africa 33	Section 3.13.21;	(rephrase first sentence)	Editorial		*See EC-JRC- 17:* 3.13.21. ~~In t~~This		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	Line 1; Page 50				sub-section should provide a description ~~should be provided~~ of the relevant arrangements …”		
Germany 2 Comment 47	3.13.21	3.13.21 In this sub-section, a description should be provided of the relevant arrangements for conducting periodic shutdowns of the reactor as the operating cycle and safety or performance improvements. This should include measures to ensure the safety of the plant during the outage period, as well as measures to ensure the safety of temporary personnel working at the plant at the time. Description on how the plant configuration in accordance to OLCs and safety analysis report is maintained should be given in this section. Particular attention should be paid to measures taken to ensure safety during specific circumstances of outage, such as multiple activities, multiple actors from different fields and services, organization and planning, time pressure, management of unforeseen events, feedback of experience of outages and how this experience is analysed and used to improve the management of outages.	Description of outages should consider also temporary working personal, which is commonly hired for specific works on nuclear power plant (e.g. construction, revisions). Moreover, also the importance of specific circumstances of outage should be more emphasised at this point.		*First two sentences: See EC-JRC 17 and S.Africa 33.* 3.13.21 . ~~In t~~This sub-section should provide a description ~~should be provided~~ of the relevant arrangements for conducting periodic shutdowns of the reactor ~~as the operating cycle and safety or performance improvements~~. Description on how the plant …” *Last sentence proposed:* Particular attention should be paid to measures taken to ensure safety during specific circumstances of the outages, such		

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					as multiple activities and actors from different fields and services, organization and planning, time pressure and management of unforeseen events. Feedback of experience ~~of outages~~ and how it has been ~~this experience is~~ analysed and incorporated ~~used~~ to improve the management of outages should be also described.		
Observer EC-JCR 17	3.13.21	Incomplete sentence. Please modify	Conducting periodic shutdowns of the reactor as the operating cycle and safety or performance improvements.		*See S. Africa 33:* 3.13.21 . ~~In t~~This sub-section should provide a description ~~should be provided~~ of the relevant arrangements for conducting periodic shutdowns of the reactor ~~as the operating cycle and~~		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					~~safety or performance improvements~~. Description on how the plant …"		
Canada 15	3.13.23	Remove *"operation"* 3.13.23. This sub-section should provide a description of the system of the plant operating procedures. The information presented should be sufficient to demonstrate that the operating procedures ~~operation~~ are or will be developed to ensure that the plant is operated within the OLCs….	Typo	X			
Finland 22	3.13.24.	3.13.24. This sub-section should provide a description of the procedures that will be used by the operating organization in anticipated operational occurrences or in accident conditions (mainly in design basis accidents and design extension conditions without significant fuel degradation). A justification of the selected approach should be provided. Both event based approaches and symptom based approaches can be used and, where appropriate, linked to the results of the plant safety analyses. The required operator actions to diagnose and deal with accidental conditions should be covered appropriately. The approach used for verification and validation of	Add: <u>and design extension conditions without significant fuel degradation</u>). Generally EOPs are not limited to BDA. This should be in line with 3.15 showing also DECs without significant fuel degradation.		3.13.24. This sub-section should provide … or in accident conditions~~ (mainly in design basis accidents)~~ and other scenarios. A justification of the selected … and symptom based approaches can be used~~ and, where appropriate, linked to the results of the plant safety analyses~~. The required operator actions to diagnose and <u>to </u>deal with accidental … human factor<u>s</u> engineering		*Note: Set of EOPs should cover all representative set of accident scenarios (DBA, DEC and even other scenarios which are out of DBA+DEC sets).*

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		the procedures should be presented, including, when it applies, human factor engineering (see chapter 18). More detailed guidance on the development and implementation of emergency operating procedures is provided in *DS483 [39] (“Severe Accident Management Programmes for Nuclear Power Plants”, draft Safety Guide step 10, revision of NS-G-2.15).*			(see chapter 18). It should be shown that procedures are applicable to the representative set of scenarios (anticipated operational occurrences, accident conditions and scenarios not covered by safety analyses regardless of their probability of occurrence); linkage to the results of the safety analysis presented in Chapter 15 of the safety analysis report or to results from other analysis performed should be also made as appropriate. More detailed guidance on the …”		
Finland 23	3.13.25 Header	Severe accident management procedures or guidelines	Add *procedures or…* It the are severe accident management systems implemented at the NPP there are also procedures. Both alternatives should be considered.		*(See Korea 19) New title of the subsection covering 3.13.24-26: ~~“Emergency operating~~ Procedures and guidelines for accident management”*		*Sub-sections on“Emergency operating procedures” and “Severe accident management guidelines” shall be combined with a new title “Procedures and guidelines for accident management”*
Korea 19	3.13.25	~~Severe~~ accident management	Many countries have		*(See Finland 23) New title of the*		*Sub-sections on“Emergency*

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	~26 Header	guidelines	developed various accident management guidelines, extensive damage mitigation guideline (EDMG), Flex support guideline (FSG), severe accident management guideline (SAMG), etc. Thus, it is necessary that "severe accident management guideline" is replaced with more general terminology of "accident management guideline".		*subsection covering 3.13.24-26: ~~"Emergency operating~~ Procedures and guidelines for accident management"*		*operating procedures" and "Severe accident management guidelines" shall be combined with a new title "Procedures and guidelines for accident management"*
Finland 24	3.13.25.	3.13.25. This sub-section should provide a description of the selected approach to plant accident management. The corresponding severe accident management procedures or guidelines (SAMG) developed to prevent severe accidents, and to mitigate their consequences if they do occur, should be presented. The information provided should make reference to the overall accident management ~~programme~~ at the plant, if appropriate. Recommendations on the development and implementation of procedures or SAMG are provided in *DS483 [39]*.	Add: Procedures Procedures are also possible. Delete: Programme Severe accident management generic.	X			

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Canada 16	3.13.25	Delete reference to DS483 "…Recommendations on the development and implementation of SAMG are provided in ~~*DS483 [39]*~~…."	This document has not yet been published and therefore cannot be referenced in this guide.			X	*The comment will be taken into account at the moment of publishing the Safety Guide; references to drafts will be excluded.*
France-2 To NSGC	Title above 3.13.27, *page 51*	"Nuclear safety and security interfaces"	Security issues are separate from safety issues. There shall not be any paragraph on nuclear security in a safety report. However, it is possible to draft a paragraph to explain how interfaces between these two areas are dealt with.	X			
France-3 To NSGC	Para 3.13.27	3.13.27. Security issues are usually dealt with separately according to special regulations, and the related documents are withheld from public disclosure. ~~Although applicant's plans for physical protection of the facility are described in a separate and confidential part of the application, this section of the safety analysis report should allow to verify that such plans have been prepared according to the applicable Nuclear Security Standards (see NSS-13 [40] and NST-023 [41]) and that can be reviewed by the regulatory body. Optionally, a short description of the~~	It is not correct to say - that safety report shall allow to verify that security plans have been prepared – The security plan, which is not part of the safety report, is the document for such an objective. Moreover a separate security license may be required in some countries that is completely separate from the safety license and reviewed by a security	X			

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		~~security programme for the site and the implementation schedule for the programme can be provided in this section~~	authority which is different from the safety authority. - That a security plan should be reviewed against IAEA guidance. A regulatory document is always reviewed against national requirements.				
South Africa 34	3.13.27 Line 4	"… should allow verification ~~to verify~~ that …"	Editorial			X	*See France-3*
South Africa 35	3.13.27 Line 5	"… and that it can be reviewed …"	Editorial			X	*See France-3*
France-4 To NSGC	3.13.28.	3.13.28. However ~~T~~this confidential section should indicate how the operating organization ensures that ~~the implementation~~ of safety requirements and security requirements ~~satisfies both safety and security objectives~~ are managed without compromising each other, in accordance with Requirement 17 from SSR-2/2 (Rev. 1) [4] ~~and with Requirement 5.13 from NSS 13 [40].~~ This includes the establishment of an effective system to address safety and security aspects in a coordinated manner and involving all interested parties, together with the identification of specific provisions important for integration of safety and security.	It is not possible in a safety report to elaborate on nuclear security measures implementation, only general explanatory information can be given on the management within the organization of safety and security interfaces. NSS13 is not a binding document, there is no obligation for a State to act "in accordance with NSS13"	X			
Pakistan 5	New subsection	Fitness for duty- operational programme	This is a new section introduced by NUREG-800			X	*This Safety Guide takes into account current practices; this part of*

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	3.13.29		(June 2013), SRP section 13.7.1				*NUREG-0800 is quite new and still not part of those practices*
Pakistan 4	New subsection 3.13.30	Fitness for duty- Construction	This is a new section introduced by NUREG-800 (June 2013), SRP section 13.7.2.			X	*This Safety Guide takes into account current practices; this part of NUREG-0800 is quite new and still not part of those practices*
Chapter 14							
Canada 17	3.14.6 Line 1	Reword to: "…qualified operating personnel at all levels will be adequately trained and directly involved…"	Operators should receive appropriate training and qualifications before participating in commissioning activities.	X			
Chapter 15							
Russia 9	3.15.1 Page 54	Add sentence: "Also analysis to justify operator action in case of accident management are provide for representative set of accident scenarios."	Two reasons: 1. Conservative analyses of DBAs are not suitable to determine necessary operator actions, so additional best estimates analyses are necessary to be basis for further EOP development for DBAs. 2. Operator should know what to do (how to manage accident) if he faces with any physical possible		*A footnote will be incorporated to the first sentence of this para:* Analyses to justify operator actions in course of accident management for the representative set of accident scenarios can be included also in this chapter. Results of these		

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			scenario (even with scenario that is out of DBA & DEC sets) – so additional best estimate analyses are necessary for representative set of accident scenarios to be able to develop comprehensive EOPs (including SAMG).		analyses are typically used as a basis in the development of emergency operating procedures		
NEW	3.15.2	Line 3 ~~a~~ **the** nuclear power plant project	editorial	X			
Finland 25	3.15.3.	3.15.3. Scope of information provided in chapter 15 should reflect the requirements on safety analysis relevant for nuclear power plant design; see SSR-2/1 (Rev. 1) [3], in particular requirements 16, 17, 19, 20 and 42, and GSR Part 4 (Rev. 1) [2], requirements 14 to 21. More specifically, guidance on deterministic safety analysis is provided in *DS491 [42]* and on probabilistic safety assessment in SSG-3 [43] and SSG-4 [44]. The engineered safety assessment complements the above mentioned analysis. More specific guidance is presented in DSXXX.	Add. Engineering and design safety assessment The engineered safety assessment complements the above mentioned analysis. More specific guidance is presented in DSXXX. The engineered safety assessment should be included. See presentation by P Huges. At NUSSC 36 SAFETY ASSESSMENT, SAFETY ANALYSIS AND INDEPENDENT VERIFICATION ENGINEERING ASPECTS IMPORTANT TO			X	*Although the statement added in the comment is correct, it is not relevant for chapter 15; engineered safety assessment should be covered by other chapters of the SAR (e.g. Chapter 5).* *[No guidance is being prepared regarding "engineering aspects important to safety]*

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			SAFETY Proven engineering practices and operational experience; Innovative design features ; Implementation of defence in depth; Radiation protection ;Safety classification of structures, systems and components; Protection against external events ; Protection against internal hazards; Conformity with applicable codes, standards and guides ; Load and load combination ; Selection of materials ; Single failure assessment and redundancy/independence ; Diversity ; In-service testing, maintenance, repair, inspections and monitoring of items important to safety equipment qualification ; Ageing and wear-out mechanisms ; Human–machine interface and the application of human factor engineering ; System interactions ; Use of computational aids in the design process				

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			SAFETY ANALYSIS General guidance ; Postulated initiating events ; Deterministic safety analysis ; Probabilistic safety analysis ; Sensitivity studies and uncertainty analysis Assessment of the computer codes used INDEPENDENT VERIFICATION				
Germany 2 Comment 48	3.15.13 Line 2	3.15.13 The basis for the categorization and grouping of postulated initiating events should be described and justified.	The basis for the categorization and grouping of PIEs should not only be described but it should also be justified.	X			
Russia 10	3.15.13	Add new sentence "All possible places where nuclear materials or radioactive materials (including RAW) are present at NPP should be addressed (reactor unit, spent fuel pool, radwaste storage facilities, nuclear fuel containers etc.)".	To ensure completeness on safety analysis.		*It seems more adequate to modify para 3.15.16:* "3.15.16. Considered failures initiated in other plant systems besides the reactor coolant system ~~itsel~~f, such as the containers or storages for fresh or irradiated fuel …".		*Guidance regarding the spent fuel pool is included in paras 3.15.47-48*
Germany 2 Comment 49	3.15.15	3.15.15 Where appropriate, considered interactions between the electric grid	It is important to consider also different plant		*It seems more adequate to modify*		

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		and the plant, and interactions between different reactor units on the same site should be described in this section. Different plant conditions, such as manual control or automatic control, should be investigated.	conditions at this place.		*para 3.15.14:* 3.15.14. The resulting list of plant specific events and accident scenarios of all types (both internal and external to the plant), ~~and~~ **for** all modes of normal operation (including operation at power or during shutdown and refuelling) and for other relevant plant conditions (such as manual or automatic plant control) that will be analysed, should be presented in this section.		
Pakistan 7	3.15.26.	If a set of codes is used, the method combining/coupling these codes should be described.	The multi-disciplinary nature of reactor transients and accidents, which include neutronic, thermal-hydraulic, structural and radiological aspects can generally be addressed in two different ways: either by code coupling or code	X			

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			integration.				
Pakistan 6	3.15.28.	It is required to determine the degree of acceptable spatial and temporal convergence (the capability of a code nodalization to produce converged results when the spatial mesh dimensions and the time steps are reduced). Demonstration of the adequacy of the code is also based the choice of an appropriate nodalization.	The plant models along with nodalization schemes used for the deterministic analyses as well as the assumptions made concerning plant parameters, the operability of systems and the operating organization's actions (if any) should be described.		*Second sentence of para 3.15.28 will be modified as follows:* "… (if any) should be described. The key validations of the plant model (including assessment on nodalization and physical models convergence) should be also summarized. Sufficient…"		*It is understood that the proposed text should be added to the end of 3.15.28. However, it seems too detailed for this Safety Guide. A statement confirming that the model validation included also assessment of nodalization convergence seems enough.*
Pakistan 8	3.15.28.	3.15.28. The plant models along with nodalization schemes used for the deterministic analyses as well as the assumptions made concerning plant parameters, the operability of systems and the operating organization's actions (if any) should be described.	It is required to determine the degree of acceptable spatial and temporal convergence (the capability of a code nodalization to produce converged results when the spatial mesh dimensions and the time steps are reduced). Demonstration of the adequacy of the code is also	OK (CH)	3.15.28. The plant models including nodalization schemes used for the deterministic analyses as well …"		*Nodalization scheme is understood as one part of the plant model*

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			based the choice of an appropriate nodalization.				
Pakistan 9	New	Deterministic evaluation of severe accident preventive features to cope with the following events may be included. • ATWS, • Mid-Loop Operations, • SBO, • Intersystem LOCA etc.	Accidents prevention is the major task of accident management. The main preventive measures, features which cope with severe accidents should be described.			X	*The proposal seems not clear enough. Prevention for these events is already mentioned in 3.15.42. The examples given in the proposal are design specific and thus not appropriate here.*
Pakistan 10	New	Description of severe accident mitigation features for the following challenges may be included. • External Reactor Vessel Cooling, • Hydrogen Generation and Control, • Core Debris Coolability, • High-Pressure Melt Ejection, • Fuel-Coolant Interactions, • Containment Bypass (including Steam Generator Tube Rupture and Intersystem LOCA) etc Above mentioned severe accident mitigation measures should also be analyzed to verify their effectiveness.	The objectives of accident mitigation are to achieve a controllable stable state and to maintain the containment integrity as long as possible to reduce offsite radioactive releases as possible			X	*See comment in Pakistan-9.* *Mitigation for these events is already mentioned in 3.15.46.*

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Pakistan 11	New	A plant-specific description of the physical and chemical processes and phenomena (both in-vessel and ex-vessel) that may occur during the progression of a severe accident and how these phenomena affect containment performance may be included.	This provides a framework for evaluating the severe accident analysis and design features incorporated for the early termination or mitigation of the consequences of these accidents.	X	*A new para will be incorporated:* 3.15.45A. Description of the physical and chemical processes and phenomena (both in-vessel and ex-vessel) that may occur during the progression of a severe accident should be described and how these phenomena affect containment performance.		
Pakistan12	New	An evaluation of potential damage to the systems important to prevent core damage and radioactivity release caused by a large explosion or fire as a result of the crash of a large aircraft or the detonation of a large explosive may be included along with development of a plan for handling the aftermath of such a terrorist attack.	Beyond design bases external events represent new challenges. September 11, 2001 attacks at the WTC identified the need to develop strategies to cope with security related BDB events.			X	*The first part of the comment (evaluation of damage) is treated in paras 3.3.42 to 3.3.45.* *The second (development of a plan) in Chapter 18, although the aspects related to should not be included in the [open] SAR but in separate [confidential] documentation.*

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Pakistan 13	New	Issues limited to passive designs may also be addressed including but not limited to Regulatory Treatment of Non-safety Systems for Passive Advanced LWRs, Role of the Passive Plant Control Room Operator etc.	To make the document more comprehensive & generic.			X	*Aspects related to safety features is already provided in the Safety Guide, including paras 3.1.9, 3.3.16, 3.6.8, 3.6.14 and 3.18.29*
Egypt 6	3.15.32 Page 56	"…, and transport ~~off-loading~~ of irradiated fuel from the reactor to the spent fuel pool…."	The word off-loading replaced by transport	X			
Egypt 7	3.15.35 57	3.15.35. The analyses presented in this section should cover events taking place in the reactor coolant systems during anticipated operational occurrences and design bases accidents ~~normal operation should be replaced~~...	Para 3.15.35 under the title "*Analysis of anticipated operational occurrences and design basis accidents"* so *by anticipated operational occurrences and design basis accidents"*			X	*The original text is correct. The PIEs are assumed to take place during normal operation, not during AOO or DBAs. Events in the spent fuel pool are treated in 3.15.47 and 48.*
Germany 2 Comment 50	3.15.37	3.15.37 Plant parameters important to the outcome of the safety analysis should be presented, including as a minimum all parameters important for assessment of the compliance with the selected acceptance criteria. These would typically include: reactor power and its distribution; core temperature; cladding oxidation and/or deformation; pressures in the primary and secondary system; containment parameters; temperatures and flows; reactivity coefficients; reactor kinetics	It would be helpful to provide a few examples on what the acceptance criteria could be.		3.15.37. Plant and environmental parameters and data important to the outcome of the safety analysis should be presented, including as a minimum all parameters and values important for assessment of	X	*Providing just a limited list of parameters could in fact be more confusing than helping. E.g., radiological criteria, PTS criteria, or SFP criteria would be ignored in this way.*

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		parameters; and the worth of reactivity devices.			the compliance with the selected acceptance criteria.		*Extending the list significantly seems not consistent with the content of the Safety Guide. Changes proposed as resolution are expected to provide some more clarity.*
Canada 18	3.15.42	Remove "…~~ie~~. for accidents taking place in the reactor coolant system…"	Not necessary	X			
Pakistan 14	Para 3.15.44	Compliance with the acceptance criteria is achieved by features implemented in the design and ~~not only by~~ implementation of severe accident management guidelines.	SAMGs normally use the design features available to mitigate the severe accident.			X	*Existing wording implies that the designer should implement specific design features and not only rely in SAMG.*
Canada 19	3.15.46	Change to: 3.15.46. Rather than presenting large number of accident scenarios, analyze the impact of the conditions of anticipated DEC with core melt to demonstrate safety objectives and release limits are met.	Existing clause is not clear as written		3.15.46. Rather than presenting a large number of accident scenarios, *the information provided should* address the impact of the conditions of anticipated DEC with core melting to demonstrate that safety objectives and release limits		

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					are met.		
Canada 20	3.15.48	No change to this clause; however, please note this text and comment at right. "The information presented should contribute to confirmation that accidents with significant fuel degradation in the pools are practically eliminated"	The highlighted text should be also be in the section on DEC with core melt, to meet the Vienna declaration, ie that accidents with core melt need to be practically eliminated		*For consistency with 3.15 48, the following change has incorporated in 2nd bullet of 3.15.44,* "The plant SSCs and components (e.g., the containment design) are capable of preventing an early radioactive release or a large radioactive release, including containment by-pass. The information presented should contribute to confirmation that the possibility of plant states arising that could lead to an early radioactive release or a large radioactive release is 'practically eliminated'		
Pakistan 15	para 3.15.51	Analysis of all relevant site specific internal and external hazards (if not already covered in other chapters) should be presented in this section for hazards specified in chapter 3.	In order to avoid repetition.			X	*The sentence in brackets applies to and is included in 3.15.52 but not in 3.15.51.*
Brazil 3	3.15.57	3.15.57. The basic data used for the assessment should be provided, including the assessment of the	To include (in red font) important information to be evaluate by the reviewers		*The following change will be made:*		*Except uncertainties, the*

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		frequency of initiating events, component reliability, common cause failure probabilities and human error probabilities. Also basic data related to error propagation, uncertainties and precursors analysis should be provided.	and regulators		3.15.57. The basic data used for the assessment, with their uncertainties, should be provided, including the assessment …"		*other elements proposed are not part of PSA basic data.*
Finland 28	3.15.64.	3.15.64. This section should provide a summary of the overall results of the safety analyses, individually for each category of the events and covering both deterministic and probabilistic analysis as well as the engineering and design safety assessment.	Add: <u>as well as the engineering and design safety assessment.</u> <u>See. 3.15.3 and 3.15.64a-b</u>			X	*(See Finland 25). Engineered safety assessment should be covered by other chapters of the SAR (e.g. Chapter 5), not in chapter 15.*
Finland 26	3.15.64a	Engineering and design safety assessment	Add: New heading, see 3.15.3			X	*(See Finland 25). Engineered safety assessment should be covered by other chapters of the SAR (e.g. Chapter 5), not in chapter 15.*
Finland 27	3.15.64b	The related paragraphs should be added.	Add. Paragraphs describing the engineering and design assessment.			X	*(See Finland 25). Engineered safety assessment should be covered by other chapters of the SAR (e.g. Chapter 5), not in chapter 15.*

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Chapter 16							
South Africa 42	3.16.2 Line 2	"… (paras 4.6 to 4.15~~6~~) and 25 (para 6.4), that the OLCs are consistent with the design and with relevant …"	Requirement 6 in SSR-2/2 (Rev. 1) spans through paragraphs 4.6 to 4.15	X	*Title will be consistent with Req. 28 from SSR-2/1 (Rev. 1):* "OPERATIONAL LIMITS AND CONDITIONS FOR SAFE OPERATION" *In para 3.6.12, Ref [4] will be deleted:* "… Requirement 6 [3]~~, and SSR-2/2 (Rev. 1), requirements 25 (para 6.14) and 28 (para 7.10) [4]~~ and that they include all…"		
Japan 44	3.16.6.	3.16.6. The detailed OLCs for …in this section with limiting parameters ~~numerical values~~ of important parameters and operability …"	Better wording.		" … this section with limiting ~~numerical~~ values of important parameters …"		
Chapter 17							
Finland 29	Chapter 17	The quality management should be added and the relation to the other chapters of SAR.	Quality management is an important topic and it has been discussed at several	X	*A relevant revision of the chapter has been carried out*		

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		The consistence with the proposed Content of SAR chapter 17 page 106 should be ensured.	chapters. The content of the SAR is proposed in the appendix. There should be relation with the topic discussed under chapter 17 and the safety guide body text.		*(See the changes in Chapter 17)*		
Germany 2 Comment 51	3.17.10/3-4	3.17.10. This section should describe how individuals in the operating organization, from senior managers downwards, foster a strong safety culture, in accordance with Requirement 12 from GSR Part 2 [45]. ~~According to that, the information provided should describe how the management system and leadership for safety foster and sustain a strong safety culture.~~	Second sentence gives no new information, it is a repetition of the first sentence.		3.17.~~10~~13. This section should describe how ~~individuals in the operating organization, from senior managers downwards, foster a strong safety culture, in accordance with Requirement 12 from GSR Part 2 [45]. According to that, the information provided should describe how~~ the management system establishes the framework to foster and sustain a strong safety culture, in accordance with Requirement 12 from GSR Part 2 [45], with due consideration of safety culture attributes given in GS-G-3.5 [47].~~and leadership for safety~~		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					~~foster and sustain a strong safety culture.~~		
Chapter 18							
Canada 21	3.18.1 Chapter title	Remove 'Engineering' from title HUMAN FACTORS ~~ENGINEERING~~	Chapter would be better called '*Human Factors*' as the scope goes beyond engineering.			X	*While the heading above Requirement 32 in SSR 2/1 (Rev. 1) is "Human Factors", the term "Human Factors Engineering" is widely used in multiple guidance documents (see [48]).*
Korea 20	3.18.1	3.18.1. Chapter 18 of the safety analysis report should describe how human factors engineering principles are incorporated into the human-machine interface design, procedures, and training program in order to meet …	The applicable scope of human factors engineering was limited to human-machine interface design. It is necessary that "procedures, and training program" is added in the sentence.	X			
Korea 21	3.18.1	"…The same applies to all operational modes ~~and accident conditions~~ design basis accidents, and design extension conditions and to all plant locations locations where such interactions are anticipated. In particular the following should be addressed:…"	It is necessary that "accident conditions" is replaced with "design basis accidents, and design extension conditions" for clarification and consistency with SSR-2/1.		"…The same applies to all operational states ~~modes~~ and accident conditions and to all plant locations where …"		
Korea 23	3.18.1 (3)	"…(3) The characteristics, features ~~and functions~~ of the human-machine	It is necessary that "and functions" should be	X			

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		~~interfaces~~ interface design, procedures, and ~~training~~ training program…”	removed from the sentence for clarification. Moreover, “training” should be replaced with “training program” for consistency with other paragraphs.				
Korea 24	3.18.1	“… (5) Monitoring of human performance ~~at the site~~.”	It is necessary that “performance” is replaced with “human performance” for clarification. Moreover, “at the site” should be removed from the sentence to resolve ambiguity.	X			
Korea 25	3.18.2	3.18.2. This chapter should provide information how ~~human characteristics and capabilities~~ human capabilities and limitations were taken into account in the nuclear power plant design to support the ~~reliability of the operator's performance~~ task performance of the plant personnel.	It is necessary that “human characteristics and capabilities” is replaced with “human capabilities and limitations” for clarification. Moreover, the expression of “the reliability of the operator's performance” is limited to cover overall scope of human factors engineering. Thus, “reliability of the operator's performance” should be replaced with “task performance of the plant personnel”.	X			
Korea 26	3.18.3	“…including those relevant for siting (Ch. 2), instrumentation and control (Ch. 7), radiation protection (Ch. 12), operation (Ch. 13), safety analyses	It is necessary that the relevant chapters are added for clarification. Moreover, “instrumentation and	X			

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		(Ch. 15), management systems (Ch. 17), emergency preparedness (Ch. 19), and decommissioning (Ch. 21)	control" and "emergency preparedness" should be included in the sentence.				
Korea 27	3.18.4 Bullet 3	"…Human-machine interface design, procedure development, and training program development…"	It is necessary that "procedure development, and training program development" is added in the sentence to describe the target of human factors design in a comprehensive manner.	X			
Korea 28	3.18.5 Title	~~Task Analysis~~ Human factors analysis	"Task analysis" is not suitable to the title of the paragraphs. Thus, it is necessary that "Task analysis" is replaced with more general terminology of "Human factors analysis".		*Title will be changed to:* "Human factors engineering analysis" *to reflect the content of the subsection, consistency with previous title (above Section 3.18.4), and with chapter's title.*		
Germany 2 Comment 52	Subsection "*Training programme development*" (3.18.28-	Move here paragraphs: 3.13.6, 3.13.7, 3.13.8	See comment 45.			X	*While the training program is clearly referenced in Chapter 18, the application guidance provided in chapter 13 focuses training of plant staff. In addition, 3.13.8*

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	29)						*focuses on licensing of operators and not on human factors engineering.*
Korea 29	3.18.10	3.18.10. This section should describe whether specific tasks needed for accomplishment of a function in different locations (e.g. main control room, supplementary control room, field and technical support centres) are identified for all plant states, for ~~all modes of normal operation~~ full range of plant operation modes and considering all groups of operating personnel (including reactor operator, turbine operator, shift supervisor, field operator, safety engineer, and operation and maintenance staff).	Because of description of 'supplementary control room', it is necessary that "control room" is replaced with "main control room". Task analysis consider not only normal operating mode. Therefore, it is necessary that "all modes of normal operation" is replaced with "full range of plant operation modes".		"… different locations (e.g. main CR, supplementary CR, field and technical support centres) are identified for all plant states, for all plant operation- modes~~ of normal operation~~ and considering all groups of operating personnel…"		
Korea 30	3.18.11	3.18.11. Description of the scope should address how representative human important tasks (maintenance, test, inspection and surveillance) were selected, as well as the range of ~~normal~~ plant operation modes included in the analyses.	Task analysis consider not only normal operation mode but also abnormal and emergency operation mode. Therefore, it is necessary that "the range of normal operation modes" is replaced with "the range of plant operation modes"	X			
Japan 45	3.18.15. & Title	Treatment of Important Human Task- ~~Human reliability analysis~~ 3.18.15. This section should describe the treatment of important human tasks in the human factor engineering programme. This section should	To keep consistency with related para. and DS4922?~~1~~. Para. 3.18.11. addresses the same analysis and use of consistent term should be used. The draft DS492 para.		*(See Korea 31)* *"Treatment of Important Human Actions"* ~~*Task*~~ 3.18.15. This section should describe the treatment of		

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		document how the important human tasks were addressed in other activities of the human factor engineering programme such that important human tasks have been thoroughly addressed.	3.52 also uses the term "Treatment of Important Human Task"		important human actions ~~tasks~~ in the human factors engineering programme. This section should document how the important human actions ~~tasks~~ were addressed in other activities of …"		
Korea 31	3.18.15 Title	~~Human reliability analysis~~ Treatment of important human actions	The term "Human reliability analysis" usually refers to the analysis activity to support probabilistic risk assessment (PRA). Moreover, the term "treatment of important human action" was used in page 63. Thus, if IAEA want to select more general terminology for analysis activity of human actions, we recommend to use the term "treatment of important human actions"		*(See Japan 45)*		
Korea 32	Title above 3.18.16	~~Human-machine interface design~~ Human factors design	"Human-machine interface design" is not suitable to the title of the paragraphs. Thus, it is necessary that "Human-machine interface design" is replaced with more general terminology			X	*Title seems consistent with wording of paras 3.18.16-17, focusing "human-machine interface design"*

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			of "Human factors design".				
Korea 33	3.18.20	3.18.20. This section should describe how tests and evaluations of ~~concepts~~ concept design and detailed design features should be conducted during the process of developing human-machine interfaces to support design decisions.	To provide clear understanding, the "concepts and detailed design" should be replaced with "concept design and detailed design".	X			
Korea 34	3.18.29	3.18.29. The overall scope of training should be defined, and should include the following: • Categories of personnel to be trained, including the full range of positions of operational personnel; • The full range of plant conditions (normal, ~~upset~~ abnormal, and emergency);	For consistence, it is necessary that "normal, upset, and emergency" is replaced with "normal, abnormal, and emergency".		See resolution to Czech-1 (General) in page 2 of this table. • All plant operational states and accident conditions ~~The full range of plant conditions (normal, upset and emergency);~~		
Korea 35	3.18.36	3.18.36. The final safety analysis report should describe the final (as-built) human-machine interfaces, procedures and training, as well as the process for correcting any identified human engineering discrepancies.	Generally, the description of "human engineering discrepancies" is more frequently used and explicit expression than "discrepancies".		"…process for correcting any identified discrepancies in the human factors engineering design and analysis."		
Chapter 19							
Germany 2 Comment 53	3.19.6/ Bullets 10 and 11	• Mitigating ~~non-~~radiological consequences; ~~• Managing radioactive waste; and~~ …"	• The main goal of emergency management should be to mitigate possible radiological				*Change to [indicated] Bullet 1 is not consistent with Requirement 16 from GSR Part 7:*

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			consequences of nuclear accident. The responsibility for non-radiological consequences is usually in hands of other organizations. • Managing radioactive waste is covered in Chapter 11 and 15.		*[indicated] Bullet 2 will be modified as follows:* • Managing radioactive waste arising in a nuclear or radiological emergency; and …”		*“Mitigating non-radiological consequences of a nuclear or radiological emergency and of an emergency response”*
Chapter 20							
Canada 22	3.20.1	Please add a footnote that states the following: • The scope of the environmental protection aspects in the SAR should be commensurate with responsibilities of the regulator (ie, in Canada, hazardous substances are addressed under the Nuclear Safety and Control Act)	Footnote needed to express differences in regulators' mandates in different member states.		*A foot note will be added, stating the following:* “The scope of the environmental protection aspects included in the SAR should be commensurate with national regulations. ~~responsibilities of the regulator (ie, in Canada, haza rdous substances are addressed under the Nuclear Safety and Control Act)~~		
Canada 23	3.20.2/2	Remove ‘supposed’	Not necessary	X	“…. Assessment		

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					report. This chapter of the SAR is ~~supposed to make~~ a link between the….		
Chapter 21							
No comments		No comments		n/a	n/a	n/a	n/a
APPENDICES							
Japan 46	Appendix I	Should be changed to Annex I.	The same comment #4.			X	*According to para 2.3 it is part of the Safety Guide*
Canada 24	Appendix II	No change, please note question at right.	Please clarify whether this text is according to the IAEA definitions of "important to safety" per SSR 2/1? or the US NRC definitions? (since the structure follows that of NUREG-0800, more or less)	n/a	n/a	n/a	n/a
REFERENCES							
Japan 47	Ref [6] and [7]	*Describe the organization who published these standards.*	Clarification.	X	*References [5-7] completed*		
ANNEX							

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Finland 30	ANNEX 7 Pag 91	7.1 I&C system architecture, functional allocation, and design bases 7.1.1Overall architecture, I&C functions and functional allocation to individual systems 7.1.2 Classification 7.1.3 I&C system design basis 7.1.4 Defence-in-Depth and Diversity Strategy	Add: Overall architecture		*All the chapters of the Annex will be updated according to the content of the Safety Guide*		
Finland 31	Annex Page 94 8.5	8.5 EMC, grounding and lightning protection	Add: EMC See 3.8.17		8.5 EMC protection, grounding and lightning protection *(See 3.8.17-18, Finland 19-20)*		
Germany 2 Comment 54	Annex Chapter 9	9A.1.1 ~~New~~ Fresh Fuel storage and handling system	Commonly used terms in the nuclear field are: “fresh fuel” and “spend fuel”.	X			
Germany 2 Comment 55	Annex Chapt 15	~~15.3 xxx~~	It is very unclear, what “xxx” supposed to mean.	X	*See S. Africa (4). Chapter 15 has been updated*		
South Africa 4	Annex 15.3xxx (page 105)	Replace xxx with a suitable heading or remove the paragraph altogether	The paragraph does not have a heading	X	*See Germ-2 (55). Chapter 15 has been updated*		
Finland 32	Annex Page 106	Engineering and design safety assessment	Add: New sub-title Engineering and design safety assessment See. 3.15.3			X	*See resolution to Finland 25 about 3.15.3.*
Japan 48	ANNEX	**17** Management Systems	To keep consistency with		*See Finland-29*		

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	17.	17.1 General considerations 17.2 Goals, strategies, plans and objectives 17.3 Specific aspects ~~of management of safety processes~~ 17.4 Integration of the elements of the Management System 17.5 Management of processes and activities 17.6 ~~Consideration of~~ Fostering a safety culture ~~17.7 Monitoring and review of safety performance~~ ~~17.8 Quality Management~~ ~~17.8.1 Quality Management Programme requirements~~ ~~17.8.2 Quality Management Programme Implementation~~ ~~17.8.2.1 Quality Management Programme during design~~ ~~17.8.2.2 Quality Management Programme during construction~~ ~~Quality Management Programme during operations~~	the main body.		*(Chapter 17 has been modified)* 17.1 General characteristics of the MS 17.2 Specific elements of the MS 17.3 Quality Management 17.4 Measurement, assessment and improvement of the MS 17.5 Fostering a culture for safety		
Finland 33	Annex Chapt 17 (Pag 106)	The consistence of the Topics related to management system should be checked.	See. Chapter 17 comment 29.	X	*See Japan 48*		
Japan 49	ANNEX 18.6 and 18.7	18.6 ~~Human Reliability Analysis~~ Treatment of Important Human Tasks 18.7 Human-System ~~Machine~~ Interface Design	To keep consistency with the main body, para. 3.18.16. to 3.18.25.		18.6 ~~Human Reliability Analysis~~ Treatment of Important Human Actions		*See Korea-32 in Chapter 18. Title should be consistent with DS492.* 18.7 Human-machine

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<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>interface design</td></tr>
<tr><td>Observer EC-JRC 1</td><td>General / Annex</td><td>Revise SAR table of content in the annex according to structure of this guide.</td><td>Presentation of content and structure of a SAR in this guide is for several chapters very different from the example of a SAR table of content in the annex. Examples are chapters 3, 6, 7, 9, 17, 18, 21.</td><td>X</td><td></td><td></td><td></td></tr>
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