

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
1	Bernard	0	0		Review and update the numbering of the paragraphs	e.g. para 5.6 is put after 5.9, para 5.10 to 12 are missing etc.	x	corrected		
1	Finland	0	0		A new chapter describing requirements for plant layout could be added.	Plant layout has major impact on e.g. cable routing, separation and plant safety.			x	this is implementation topic, not covered in thi guide.
1	SWE	0	0			It is not possible to understand the numbering of the paragraphs. For example after paragraph 5.6 comes paragraph 5.13 and paragraph 5.7 is before 5.6 and so on.	x	corrected		
1	Ukraine	0	0		It is proposed that the following requirement is added: the off-site power system should be able to operate at full capacity supplying power to the grid under failure of one the most powerful power supply lines.	Additional requirement.			x	This is a topic for grid, not covered in this safety guide.
1	Canada	0	0			we are aware that IAEA SSR 2/1 is subject to further amendments; consequently, this may impact the current version of DS-430 which in turn can impact our comments.	x	Latest mmodification to SSR 2/1 have been incorporated, see section 8.		
2	SWE	0	0			There is mismatch between requirements, advice, explanation for implementations and recommendations. This should be more clearly structured and understandable.			x	It is correct, this guide explains it in section1.
2	Canada	0	0			It is our understanding that the IAEA Safety Guides exclusively use the word 'should' in each paragraph. However there are a number of use of "can, may, might, will, could" As examples, refer to the following clauses: Can: 2.2 & 2.19, May: 2.22 & 2.32, Might: 5.17 & 5.59, Will: 2.20 & 5.84, Could: 5.67 & 5.49 Please ensure if this is appropriate.			x	It is correct, but there are also explanatory notes withou should.
3	Finland	0	0		The Defense in Depth and the independence of DiD levels as required by SSR-2/1 should be clearly presented.				x	DiD concept is in line with SSR 2/1.
3	Canada	0	0			It is noted that the terminology and singular/plural used in this document is not consistent and may cause confusion. For example 2.9, 2.17, 3.12, 4.10 d, 5.7, 5.83b, 5.308, 6.9 (title), etc. We recommend that consistency should be maintained throughout the document and all definitions if the meaning is different (i.e. Off-site power, Off-site system, Off-Site power supply, Off-site power system, Off-site power source), battery chargers/rectifiers, switchgear and switchyard be included in the glossary			x	It is correct, but there are also explanatory notes withou should.
4	Finland	0	0		DC430 classification should be in line with SSR-2/1. E.g. N+2 criteria should be included in DC430.		x	Section 3 repalced by new text consistenly with DS 367 Classification guide.		
6	CANDU	0	0		Include survivability assessments for SSC for a design extent condition and BDBA	To ensure that the systems important to safety are available to perform the required safety function.			x	
23	CORDEL	0	0		Title: Draft DS 430 Design of Electrical Power systems for nuclear power plants	DS 430 deals with electrical systems.			x	
25	CORDEL	0	0			The draft should concentrate on the main safety objective aiming to define the safety assessment principles of the electrical system. The detailed characteristic of components or systems may be addressed in the new initiative of the SC 45 for the release of the code and standard for the electrical system of the NPP. (example 6)			x	
7	RF REA	0	0		«Power supply» to be substituted with «electric supply»	Clarification of definitions			x	
2	FR	1	0		Precise that lessons learned from the Fukushima Daichi accident are not specifically addressed.				x	This guide was revised because opf different reasons; Fukushima accident lessons were incorporated.
4	Mexico	1	1		Add SSR-2/1 Requirement 15 and paragraph 5.4 ; 16 5.8; 5.13; Req 17, 5.16 and 5.17, Req 17, 18, 19	New proposal.			x	
5	Canada	1	1			The terms "electrical power systems important to safety and of safety power systems" are confusing. If there is a difference, a clarification is needed.			x	It is in line with SSR 2/1
3	SWE	1	2		New text: "The safety Guide does not provide details of implementation processes, development methods, or technology, except as explanation. For requirements in details and for implementations refer to IAEA respective standards and guides"	This can lead to a better understanding	x			

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6	Canada	1	2			Propose revising section 1.2 ORIGINAL TEXT: This Safety Guide provides recommendations on the characteristics that nuclear plant Electrical Power systems, and the processes for developing these systems, should have in order to meet the requirements of Safety Requirements SSR-2/1, Ref. [1]. It reflects international best practices and a consensus that the recommended characteristics (or equivalent) should be achieved in the development of electrical power systems. The Safety Guide does not provide details of implementation processes, development methods, or technology, except as explanation. The statement that "the guide recommends "processes for developing these systems" but does not "provide details of implementation processes, development methods..." appears to be inconsistent. We suggest more clarity to be provided.	x	1.2. This Safety Guide provides recommendations on the characteristics that nuclear plant Electrical Power systems, and the processes for developing these systems, should have in order to meet the requirements of Specific Safety Requirements SSR-2/1, Ref. [1]. It reflects international best practices and a consensus that the recommended characteristics (or equivalent) should be achieved in the development of electrical power systems. The Safety Guide does not provide details of implementation processes, development methods used, or technology, except as explanation.		
8	FR	1	2		It reflects international best practices and a consensus that the recommended characteristics (or equivalent) should be achieved in the development of electrical power systems.	Superfluous	x			
7	Canada	1	5		1.5. Electrical systems that supply power to systems important to safety are essential to the safety of nuclear power plants. These systems <b>should</b> include both the on-site and off-site power supply systems	Add "should" to allow flexibility to accommodate different designs	x			
1	RF REA	1	6		«...switchyard ...» to be substituted with «high-voltage switchgear...»	Russian NPPs are equipped both with switchyards (i.e. outdoor switchgears), which are mentioned in text of draft, and with high-voltage SF6 gas-insulated metalclad switchgears (KRUE), therefore it is recommended to use the word "HV switchgear" instead of "switchyard". According to Russian regulations, both switchyards and SF6 gas insulated switchgears are the plant equipment. This is confirmed by Fig.1 of the draft where switchyard is included as one of the plant power supply systems.			x	
2	RF REA	1	6		"switchyard" to be deleted from the following text "... that are part of the off-site power system (e.g. transmission system and switchyard)	In Russian practice switchyard is considered a part of NPP and is a safety classified system	x			
8	Canada	1	6	1	The preferred power supply identified in this Safety Guide is the power supply from the transmission system or main generator up to the safety classified electrical power system	Considers other designs	x			
10	FR	1	6		The portions of the preferred power supply that are part of the off-site power system (e.g., transmission system and switchyard) are not plant equipment	The switchyard might be operated by the same organization as the plant	x			
41	RF REA	1	6		Para.1.6, Fig.1, para.2.11, para.5.84, para.5.112, para. 6.6, para.6.37, definition of preferred power supply: Throughout the document text, to replace the word "switchyard" with "high voltage switchgear"	Due to the fact that metalclad switchgears with SF6 gas insulation are provided for electric power systems at a number of existing plants and new designs.			x	We prefer keeping existing wording.
11	FR	1	7		It might not be practicable to apply all the requirements of this Safety Guide to nuclear power plants that are already in operation or under construction; in addition, it might not be feasible to modify designs that have already been approved by regulatory bodies.	It is always possible to change a design, even if it requires a new approval by the regulator...	x			
4	SWE	1	8		Delete last sentence in 1.2 "The Safety Guide does not provide details of implementation processes, development methods, or technology, except as explanation." and place it at the end of 1.8: "However, the Safety Guide does not provide details of implementation processes, development methods, or technology, except as explanation.	"The objective of this Safety Guide is to give recommendations and guidance on meeting the Requirements...." This contradicts what it says in paragraph 1.2.	x			
3	RF REA	1	8		... It is intended for the use by those involved in the design, <b>construction, manufacturing, supply of systems and elements</b> , operation, maintenance, ... (hereinafter proposed insertions in text are marked with bold, while deletions are crossed out)	Safety Guide should be addressed to all experts involved, according to the Russian legislation and to paras. 5.167 ÷ 5.218 of this document			x	IAEA does not include national references

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12	Canada	1	9		Suggest the following amendment: 1.10: "This Safety Guide applies to all types of nuclear power plants. <b>The guidance provided in this document may also be applied to the design of electrical power systems for SMRs and research reactors in a manner that is commensurate with the risks presented by the facility.</b>	DS-430 applies to all electrical power systems that supply power to plant systems important to safety in Nuclear Power Plants i.e. this document only applies to NPPs. However, IAEA Safety Standards Series, Safety of Nuclear Power Plants: Design - Safety Requirements No SSR 2/1, Para 1.6 states that: 1.6. It is expected that this publication will be used primarily for land based stationary nuclear power plants with water cooled reactors designed for electricity generation or for other heat production applications (such as district heating or desalination). This publication may also be applied, with judgment, to other reactor types, to determine the requirements that have to be considered in developing the design. The contents of DS430 are actually written at a level where the requirements and guidance can be applied as-is to electrical system design for SMRs and even research reactors as long as consideration is given to risks presented by the facility. (i.e. recognize that the requirements and guidance can be met by alternative means)			x	This safety guide further elaborates requirements from SSR 2/1, which is meant for NPP. SMRs are considered as NPP.
12	FR	1	10		For example, in plants with passive engineered safety features <u>not relying at all on electrical power</u> , the classification of the electrical power systems may be substantially different than shown in Fig. 2.	"Passive" is not clear enough...			x	True, but there is no such plant, so the example is meaningless. It is very difficult to avoid needing the need for at least DC power where you need DC power, you usually need a way to charge the batteries, which is often done by an emergency AC source. The original statement was actually unnecessary, but desired by some.
13	FR	1	14			Is there a security publication foreseen on such topic ? If not, is there a need for interim guidance ?			x	This is just explanation that this safety guide will not provide details how to design power supply for security systems.
27	CORDEL	1	22		Proposal to replace "safety standby AC power supplies" by "emergency AC Power supplies"	Quality and Clarity use of "stand-by power supply" or "Emergency AC Power supply" for the same system			x	The safety supplies are used under normal conditions (at least the distribution parts, rectifiers, and inverters.
9	FR	1	22		Proposal to replace "safety standby AC power supplies" by "emergency AC Power supplies"	Quality and Clarity use of "stand-by power supply" or "Emergency AC Power supply" for the same system			x	The safety supplies are used under normal conditions (at least the distribution parts, rectifiers, and inverters.
24	CORDEL	2	0			The draft should deeply reassess the terminology, principle and requirement related to the safety categories, safety classification and relevant independency. Strong links should be done to IAEA DS 367 where safety categories are defined and where SSCs are defined as important or not important for safety. Basically the electrical system as support system inherits the categorization and classification of the supported functions. Requirement on physical separation between safety classes should consider practice of all member states. The classification is often used in order to require a given separation/independence between equipment although § 5.21 insists appropriately on the independence between the level of defence as the main objective. The use of the terms "important to safety", "safety classified" "related to safety" should be harmonized in the whole document. Moreover depending on the § in the IAEA DS 430 the number of considered categories is different (30 in § 2.7 or 2 in §3.5). It seems that the requirement regarding safety vs non safety separation is based on a particular classification scheme which is not used by all member states. The comment sheets identified specific § of concerns (2.9, 5.35, 5.36, 5.41, 5.42, 5.43, 5.42, 5.52.)	x	Section 3 replaced by new text consistently with DS 367 Classification guide.		
6	Mexico	2	1		Add SSR2/1 Req 21, 5.33	New proposal.			x	It is included on p. 20
2	Mexico	2	1		"Fulfillment of the following fundamental safety functions for a nuclear power plant shall be ensured for all plant states: (i) control of reactivity; (ii) removal of heat from the reactor and from the fuel store; and (iii) confinement of radioactive material, shielding against radiation and control of planned radioactive releases, as well as limitation of accidental radioactive releases"	Incomplete			x	
3	UK	2	4		The boundary is often at the bushings on the grid side of the transformer that connects to the transmission voltage, or on the grid side of the high voltage breaker closest to the plant	The phrase "step-up bushings" is unclear, and may not be a familiar term in most countries. In the UK the boundary is always at the busbar clamp on the grid side of the high voltage breaker.	x			
13	Canada	2	4		The off-site power system is composed of the grid, associated transmission lines and a switchyard connecting the plant with the grid.	We suggest that the original sentence be modified for better clarity.	x	Solved by UK comment.		

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14	Canada	2	4			The wording "switchyard connection to the plant with the grid" is unclear. Clarity is required for transmission lines for outgoing power.	x	Solved by UK comment.		
16	Canada	2	4		The off-site power system or main generator will ideally provide AC power to the plant during all modes of operation and in all plant states	Considers other designs			x	This para is related to off-site systems.
8	RF REA	2	4		To be recited as follows: «The off-site power system is regional power system (where the power generated by the main generator is supplied) and a back-up transmission line connected to the NPP. They supply power to plant in-house consumers in start-up and emergency modes, in case of absence of internal power sources while safety systems functioning is not requested.	The external system, first of all, is a very demanding consumer of electric power generated by the NPP. The principal source of in-house power supply is the back-up transmission line in this case.			x	This para is related to off-site systems in general; no need to specify main and back-up functions.
20	Canada	2	5		The off-site power system performs an important role in terms of safety in order to supply the onsite power systems with reliable power from multiple off-site generators.	Please consider deleting "essential" since it is not always the case and consider this comment where applicable throughout the document.	x			
18	Canada	2	5		The off-site power system performs an important role in terms of safety in order to supply the onsite power systems with reliable power from multiple power sources: (1) Main generator via auxiliary transformers (2) Grid power supply via the standby transformers. The off-site power system is part of the preferred power supply (see FIG.2.)	Current description "... reliable power from multiple off-site generators" is unclear.	x			
10	CORDEL	2	6		Add a Section for Passive NPPs	There needs to be a section that addresses passive plant electrical power systems which differ significantly from active plants. Many passive plants will be in service or designed in the future and their EPS requirements need to be addressed separately.			x	Even passive systems may need electrical power supply.
19	Canada	2	6		A robust grid system provides a highly reliable off-site power supply as it rapidly dampens the effects of grid perturbations during normal conditions and minimizes the voltage and frequency deviations in the connected nuclear plant electrical system	Please consider adding the proposed text. It improves guide.	x			
21	Canada	2	6		"Similarly, large nuclear units with fast turbine governor and generator excitation systems can impart considerable robustness to a grid system. Because of this interdependency, good design functional integration and good operational coordination between the grid and nuclear operators during major operating changes on either the grid or at the nuclear plant are important requirements for safe and reliable operation of both."	Electrical grids worldwide are increasing their reliance on small intermittent renewable generation sources. Consequently the role of the nuclear units to support grid robustness and to help restore normal conditions following a major blackout is becoming more important. As both renewable and nuclear generation achieve higher grid capacity penetration rates, the grid's growing dependence on the performance of nuclear plants has nuclear plant design implications. Please consider adding the proposed text.	x			
1	Spain	2	7		Say ".... It includes the AC and DC power supplies....."	It is recommended to provide DC power sources in Figure 1 and Figure 2, in order to make congruent figures and paragraph 2.7			x	it is on Fig. 3
31	CORDEL	2	7		The document should deeply reassess the use of the safety categories		x	deleted safety categories.		
1	CORDEL	2	8		The major components of the on-site power system include the main generator, generator step up transformer, auxiliary transformer, standby transformer and the distribution system feeding unit auxiliaries, service auxiliaries, switchgear, batteries, rectifiers, inverters/uninterruptible power supplies, cables and standby AC power sources. Portions of the on-site power system are part of the preferred power supply	Completion of the main components.	x			
3	ENISS	2	8		The major components of the on-site power system include the main generator, generator step up transformer, auxiliary transformer, standby transformer and the distribution system feeding unit auxiliaries, service auxiliaries, switchgear, batteries, rectifiers, inverters/uninterruptible power supplies, cables and standby AC power sources. Portions of the on-site power system are part of the preferred power supply.	Completion of the main components.	x			
2	Spain	2	9		Say "..... or dedicated batteries....."	It is recommended to define the term "dedicated batteries", because in Mexico it is not used			x	
4	UK	2	9		Sometimes DC power systems will be provided to support loads of different safety classification.	The word often in this sentence may not be factually correct.	x	Sometimes separate DC power systems are provided to support loads of different safety classification		
6	UK	2	9		"Usually the AC power system includes one or more standby power sources"	Most NPPs have more than one stand by power source.	x			
23	Canada	2	9		A uninterruptible AC power system supplies power from inverters or motor generator sets that are in turn supplied from the dedicated batteries with battery chargers, including a bypass circuit to allow feeding safety loads directly from safety class AC power systems.	This sentence is long and confusing; we suggest it to be modified.			x	But it is correct.
32	CORDEL	2	9		Proposal to delete the sentence "Often separate DC power systems will be provided to support loads of different safety classification." Or to replace "Often" by "Sometimes"	Section 5.42 deals with the separation criteria depending on safety class. This sentence would exclude without reason current European design	x			

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2	Bernard	2	9		Usually the AC power system includes a standby AC power source and an alternate AC power source .....In most cases the plant safety analyses..... design basis accidents, and the AC power source following DEC events	To be consistent with the rest of the document and the annex I Defence in depth levels	x			
2	CH	2	9		last bullet ..., and include a bypass circuit to allow for maintenance and emergency cases feeding safety loads .....	Should be not allowed during normal operation of the plant.			x	In case of malfunction yes. This is just description of the configuration.
9	RF REA	2	9		To be added as follows:...DC power system should include associated power sources, which would be activated, in case of loss of other power sources, as necessary to ensure monitoring of post-accident situation at NPP.	Provision of power supply for monitoring process in the post-accident mode is necessary even in case of loss of all power sources listed above.	x			
17	FR	2	9		A direct current (DC) power system. This supplies DC loads, without interruption, from batteries. The DC system includes battery chargers that are connected to the AC system of the electrical power systems. Often separate DC power systems will may be provided to support loads of different safety classification	Section 5.42 deals with the separation criteria depending on safety class. This sentence would exclude without reason current European design	x	Reformulated along with UK comment.		
24	Canada	2	11			We suggest that entire sentence be deleted as it does not provide any value It is duplication with Para 1.6 2nd sentence and is also found in glossary	x			
25	Canada	2	13		The off-site power system should satisfy the safety criteria established in national and international standards, the grid code and electrical design criteria (as imposed by national electrical codes).	The off-site power system is not designed to satisfy nuclear safety criteria. It is designed to satisfy various criteria set out by regulatory organizations, national and international standards. For example: system stability, interruption time, restoration time etc. Design for nuclear safety is the responsibility of the station owner via the design of the on-site power system.			x	The IAEA doe not include national references.
26	Canada	2	13		2.17-2.18	General comment: We do not believe that anyone designs the grid to satisfy nuclear safety requirements. In most cases, the grid is already in place before the plant is built. The plant has to be designed to address loss of grid .			x	But this sencece has different meaning.
11	CORDEL	2	14		"...high level of reliability and availability during all modes of plant operation."	The term "high level of reliability" is a relative term...it means different levels to different utilities. Can a reliability goal be placed here so all IAEA members are trying to achieve the same goal?			x	On the other hand would it be possible to connect NPP to the unreliable grid?
27	Canada	2	14		The plant electrical system shall be designed and constructed in accordance with national standards and national safety codes to ensure a high level of reliability and availability during all modes of plant operation. The development of national standards and safety codes should take into consideration the applicable requirements of international nuclear standards in regards to plant electrical systems and their impact on nuclear safety.	Plant design is subject to national requirements and laws. The national standards should define, if necessary, which external standards and which portions of the external standards apply to the design of plants in the nation.			x	National codes development is a MS responsibility.
28	Canada	2	15			Clarification is needed for reasonable assurance.			x	It is a standard term, reasonable to be considered by each MS.
2	USA	2	16	2 bullet	Generation of electrical power for commercial use is not a nuclear safety concern other than support of grid reliability.	See section 2.33 pg 11	x			
7	UK	2	16		The electrical power systems and components at a nuclear power plant: - Supply electrical power to the plant's auxiliary systems from off-site and on-site power supplies.	To align with the rest of the document , which refers to refers to on-site and off-site electrical supplies	x			
29	Canada	2	17		"The reliability of the off-site power system should be equal to or better than the reliability credited for the off-site electrical system in the nuclear plant's safety analysis for the respective plant states and operating conditions."	The term "highly reliable" is not sufficiently specific. If use the term "highly reliable", it should be defined.			x	As decribed in previous comments.
30	Canada	2	17		The off-site power system for a nuclear power plant should, as far as practicable, be robust and highly reliable in all plant states and operating conditions. The design of the on-site power system should take into consideration the limitations of off-site power system and its impact on nuclear safety.	In most cases the design of the nuclear station cannot dictate the design of the off-site electrical system, nor its reliability. The on-site power system must compensate for the weaknesses in the offsite power system with appropriate design features.	x			
3	CH	2	18		E.g. You can take a text passage from No. NG-T-3.8 (sheet 12): A Stable and reliable grid would be one where voltage and frequency are controlled within pre-defined limits and disconnections are infrequent events. Typical values are: - Frequency is controlled within +/-1% of nominal frequency for the majority of the time. - Voltage is controlled within +/- 5% of the nominal value on the high voltage transmission system for the majority of the time. - Events that disconnect parts of the grid, or lead to blackout of major part of the grid are rare (much less than once per year). This applies particularly tot that part of the grid to which the NPP is connected. - The grid recovery following regional a regional blackout restores power for essential services, incl. offsite power for NPP's, in less than two hours.	Definition for stabel and reliable operation is missing: If you give no information about the values what you expect from a stable a reliable grid the grid code will be change in a way which is not a safe direction for NPP's (tendency weaker). Also we get information, that experts expect for the future that grid in Europe will trip more than once per year.	x	deleted.		
31	Canada	2	18		A stable and reliable grid (with reliable production units and transmission and distribution systems) is fundamental to the safety of the nuclear power plant.	Delete, redundant			x	reformulated

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32	Canada	2	19		Grid disturbances can challenge nuclear safety when the nuclear power plant acts as a: Production unit, Consumer during startup and shutdown, or High priority emergency load during certain events and operational occurrences.	Delete, does not add value			x	reformulated
18	FR	2	19		Merge 2.19 and 2.18: 2.18. A stable and reliable grid (with reliable production units and transmission and distribution systems) is fundamental to the safety of the nuclear power plant as 2.19: Grid disturbances can challenge nuclear safety when the nuclear power plant acts as a: • Production unit, • Consumer during startup and shutdown, or • High priority emergency load during certain events and operational occurrences.	Same topic			x	We prefer keeping it separate. By our rule normative and informative para are not combined.
33	Canada	2	20		2.21	Clauses are awkward, re-word - Editorial	x	Reformulated with FR comments 19,20		
3	Indonesia	2	21		Robust systems will have sufficient margins and built in <b>parameter control</b> conservatisms such that equipment	Conservatism of robust should be emphasized on control system point of view			x	reformulated
2	Finland	2	21		Attention shall be paid to that text is readable and easy to follow.	Many of the users of this guide aren't native English speakers. Thus complex sentences makes difficult to use this guide. E.g 2.21 second sentence could easily be split into two sentences to make it easier to understand.	x	Reformulated with FR comments 19,20		
9	Finland	2	21		... are support systems for all <b>plant states</b> ...	The text should be clarified. What is meant with this? Shall be clarified	x	Reformulated with FR comments 19,20		
12	CORDEL	2	21		"2.21. <u>The electrical power systems, at all voltage levels, are support systems for all plant states as well as for reaching and maintaining a safe state and provide defence in depth (refer to Annex I for a detailed explanation) in the case of an event requiring plant cool-down.</u> "	The underlined statement is not true for a plant with passive safety systems like ESBWR (although it is certainly applicable for the ABWR). This highlights the need for a separate requirements section for passive plants.	x	Reformulated with FR comments 19,20		
34	Canada	2	21		2.21, 7.28, Annex I, the 4th level of DiD & DEFINITIONS	There is no definition of 'design extension conditions', (DEC) in the guide. We suggest that the IAEA definition of 'design extension conditions', (DEC) be included in the Guide.			x	
3	RF SEC	2	21		The electrical power systems, at all voltage levels, are support systems for all plant states and maintaining a safe state and provide defence in depth.	Propose to eliminate wording "in the case of an event requiring plant cool-down" since it shrink the scope of plant states when EPS operation is essential (the wording does now cover, e.g., AOs requiring only plant trip without following cooldown).	x	Reformulated with FR comments 19,20		
19	FR	2	21		The electrical power systems, at all voltage levels, are support systems for all <u>many</u> plant <u>equipment</u> states as well as for reaching and maintaining a safe state and provide defence in depth (refer to Annex I for a detailed explanation) in the case of an event requiring plant cool-down.	Refocus the paragraph on plant equipment, not plant states (as plant states is an input to which equipment are needed..)	x	The electrical power systems, at all voltage levels, are support systems for many plant equipment.		
20	FR	2	21		A reliable power supply is critical for maintaining control during anticipated deviations from normal operation as well as to power, control and monitor <u>relevant</u> plant safety functions required to support the barriers that prevent radioactive releases during design basis accidents and design extension conditions.	Clarification	x	A reliable power supply is critical for maintaining control during anticipated deviations from normal operation, as well as to power, control and monitor relevant plant safety functions during design basis accidents and design extension conditions.		
38	Canada	2	23		"Fulfilment of the following fundamental safety functions shall be ensured for all plant states: (i) control of reactivity; (ii) removal of heat from the reactor and from the fuel store; and (iii) safeguard, confinement of radioactive material, shielding against radiation and control of planned radioactive releases, as well as limitation of accidental radioactive releases.	Under 2.23 we should add under (iii) "safeguards" since, at least in Canada, some of the dry storage facility electrical capabilities are powered from the plant preferred or class III systems.			x	This is a statement from SSR 2/1, cannot be changed.
39	Canada	2	24			Clarification is needed if the systematic approach is based on risk			x	It is clear statement.
10	RF REA	2	25		«... the proper implementation of the design, <b>development, construction, manufacturing and supply, testing...</b> »	Refining of text.			x	This SG is related to design and operation.
3	Spain	2	26		Say "..... use of dedicated power sources ....."	It is recommended to define the term "dedicated power sources", because in Mexico it is not used			x	In compliance with SSR 2/1 requirement 68.
40	Canada	2	26			Reliability: this can be achieved through equipment intrinsic reliability= availability, redundancy and diversity. Perhaps these specific words should be added to the text?			x	reliability is explained in the guide.
1	ENEL	2	27			The wording and the contents are not clear, a review of the paragraph is suggested.	x	This para is slightly revised.		

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35	Canada	2	28			The interface between the safety systems and systems of lower safety classification should be carefully designed to ensure that there is no adverse impact on safety equipment from non-safety equipment during events, normal or abnormal in the electrical systems. Clarification is needed for "normal or abnormal in the electrical systems".	x	The interface between the safety systems and systems of lower safety classification should be carefully designed to ensure that there is no adverse impact on safety equipment from non-safety equipment as a result of disturbances in the plant electrical systems.		
36	Canada	2	30		Design should consider transient and quasi-stationary variations of voltage and frequency that affect the electrical systems and components of the nuclear power plant.	If use the term quasi-stationary, it should be defined.			x	
37	Canada	2	31		"Because of the interdependency of the nuclear plant and the grid, it is important that the impact of the loss of the nuclear unit due to grid electrical frequency or voltage protective scheme actions has been considered in the calculation of the reliability of the off-site electrical system that has been credited in the nuclear plant safety analysis."	We suggest the proposed text to be added. A number of grids cannot survive electrical grid disturbances if large nuclear units are tripped off line coincident with the grid disturbance. The priority should be to protect the nuclear plant and all safety functions, however, the reliability credited in the safety analysis must be consistent with the impact on that reliability of nuclear plant protective schemes that could result in a grid collapse."			x	This is about protection setting.
1	CANDU	2	33		Please include "Monitoring function" to this para.	The defence in depth in Nuclear include "Control, Cool, Contain and Monitor"			x	This para is about Grid
41	Canada	2	33		"Switchgear should be designed with maintenance/ outage needs in mind. When on outage, the overall safety of the plant should not be compromised"	Suggest adding to 2.33			x	This para is about Grid
6	SWE	2	34		Exclude or modify as appropriate	The formulation as presented has no relevance to design considerations without it's a statement with requirement directed to transmission system operator This is preferably to be excluded from this Guide.			x	This is not a requirements.
42	Canada	2	34		High grid reliability is essential important for safe and reliable electrical power supply in a nuclear power plant.	"Essential" overstates the importance in some designs. Please refer to comment 26	x	replaced by important		
43	Canada	2	36		Electrical power systems should be designed to minimize personnel risk and equipment damage due to high temperatures, arcing or mechanical stress caused by rated current, overcurrent, or any internal mechanical stresses to the equipment.	This cleans up the wording	x			
44	Canada	2	36			We suggest that Under 2.36, arc flash should be added as it is a big issue in Canada/ US.	x			
45	Canada	2	37			Electrical systems should be designed and erected in such a way that they can withstand voltages that can be expected to occur in any plant state or operating mode. Does not belong in this section.			x	It is part of personnel protection.
2	CORDEL	3	2		To 3.11:	This section is not in line with the current version of DS 367 (Safety Classification of SSCs in NPPs). E.g. the terms "categorization" and "classification" are not used in a consistent manner. For the final version consistency is required for not having diverging requirements in IAEA documents and a clear reference to DS 367 as the leading document for the safety classification approach should be implemented	x	Entire section replaced by wording from DS 367.		
4	ENISS	3	2		3.2-31	This section is not in line with the current version of DS 367 (Safety Classification of SSCs in NPPs). E.g. the terms "categorization" and "classification" are not used in a consistent manner. For the final version consistency is required for not having diverging requirements in IAEA documents and a clear reference to DS 367 as the leading document for the safety classification approach should be implemented.	x	Entire section replaced by wording from DS 367.		
34	CORDEL	3	2		The possibility that the failure of an item important to safety may directly cause a postulated initiating event <u>leads to an accident</u> should be considered when determining safety classification.	Can be not practicable for some PIE as for example switch-over to stand-by grid	x	Entire section replaced by wording from DS 367.		
21	FR	3	2		The possibility that the failure of an item important to safety may directly cause a postulated initiating event <u>leads to an accident</u> should be considered when determining safety classification.	Can be not practicable for some PIE as for example switch-over to stand-by grid	x	Entire section replaced by wording from DS 367.		
7	Finland	3	3		The classification should be in line with the new classification guiden DS367 which has been approved by CSS. The guide is not yet published with a new identifications number.		x	Entire section replaced by wording from DS 367.		
13	CORDEL	3	3		"Member States use different classification schemes. This Safety Guide <del>does not recommend any specific scheme.</del> endorse Reference TBD (Safety Guide DS367 "Safety Classification of Structure, Systems and Components in NPPs") in an effort to harmonize all safety Classifications among NPPs.	This IAEA safety Guide would endorse (or reference) the classification schemes in IAEA Draft Safety Guide DS367 "Safety Classification of Structure, Systems and Components in NPPs" to be consistent with all IAEA Safety Guides and positions. Reference should be made of this Safety Guide in this requirement.	x	Entire section replaced by wording from DS 367.		
22	FR	3	3		Delete 3.3	Superfluous. 3.4 is enough	x	Entire section replaced by wording from DS 367.		

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
14	CORDEL	3	5		"3.5. All plant electrical power system functions, structures, systems, and components fit into one of two safety categories: important to safety or not important to safety. 3.7. Functions and structures, systems and components important to safety are further categorized as either 'safety' or 'safety related'."	DS430 is describing a multi tier safety system instead of the US safety or non safety. This will discriminate against the US designed NPPs unless they are significantly re-designed with European classifications in mind (also true with cyber security and quality as applied to microprocessor based protective relaying. Revisiting these requires to allow US safety classification to be considered.	x	Entire section replaced by wording from DS 367.		
4	RF SEC	3	5		All plant electrical power systems and components fit into one of two safety categories: important to safety or not important to safety	Propose to eliminate word "functions" since the term "function important to safety" is not defined in IAEA Glossary and is not used in IAEA Standards.	x	Entire section replaced by wording from DS 367.		
23	FR	3	6		Delete 3.6	The purpose of this safety guide is not safety classification of all plant equipment. Refer to safety guide on SSC classification.	x	Entire section replaced by wording from DS 367.		
24	FR	3	7		Delete 3.7	The purpose of this safety guide is not safety classification of all plant equipment. Refer to safety guide on SSC classification.	x	Entire section replaced by wording from DS 367.		
8	Finland	3	8		...or design basis accidents (DBA) or design extension condition (DEC).	SSR-2/1 includes also DEC conditions.	x	Entire section replaced by wording from DS 367.		
25	FR	3	8		Delete 3.8	The purpose of this safety guide is not safety classification of all plant equipment. Refer to safety guide on SSC classification.	x	Entire section replaced by wording from DS 367.		
26	FR	3	10		The classification scheme described above can be mapped to most of the Member States classification systems currently in use. The safety related or safety categories may be further subdivided.	Superfluous	x	Entire section replaced by wording from DS 367.		
22	Canada	3	11			Fig 4 - System Not Important to Safety should be further classified for the following reason: Advanced Light Water Reactor (ALWR) Utility Requirement Document (URD) for passive plants describes the process that the designer should use to specify the reliability/availability (R/A) missions of risk-significant SSCs. An R/A mission is the set of requirements related to the performance, reliability, and availability of an SSC function that adequately ensures the accomplishment of its tasks, as defined by the focused PRA or deterministic analysis. Hence, the IAEA Standard should have guidelines re: Systems not important to safety. Firstly, it should be further classified as whether they are risk-significant (as per PRA or deterministic analysis) And, whether they are involved in defense-in-depth.	x	Entire section replaced by wording from DS 367.		
46	Canada	3	12			This clause should be augmented. Although Off-site power systems and main generator are not classified as plant safety systems, but if they perform risk-significant defence-in-depth functions as per Comment #29 above (which I believe they do), then R/A mission requirements should be specified for Off-site power systems and main generator, as a result of PRA and deterministic safety analysis.	x	Entire section replaced by wording from DS 367.		
47	Canada	3	12		Off-site power systems and main generator systems also have an important role in ensuring performance...	"Essential" overstates the importance in some designs. Also, repetitive.	x	Entire section replaced by wording from DS 367.		
28	FR	3	12		Off-site power systems and main generator systems also have an essential role in ensuring performance of fundamental safety functions, but are not usually classified according to the plant safety classification scheme.	Main generator system may be (partly) classified, for example as a risk to the plant (fire hazards, flying debris in case of turbine failure...) or as input to protection system.	x	Entire section replaced by wording from DS 367.		
33	CORDEL	3			Rewrite the § providing a link to the IAEA DS 367.	The electrical system as a support system belongs to the SSC.	x	Entire section replaced by wording from DS 367.		
1	Mexico	4	2		• Supply electrical power to the plant's auxiliary systems from external and internal power supplies (the reliable operation of these systems is essential for ensuring plant safety, accident management) and the mitigation of the consequences of accidents, and • Generate electrical power for commercial use.	Because the idea is a complement			x	
29	FR	4	4		Merge 4.4 and 4.3	Same topic			x	This is not the same topic.
48	Canada	4	5		and 4.6.	It appears that clauses 4.5 and 4.6 provide the same guide using different text. Please consider combining the two.	x			
30	FR	4	7		Merge 4.7 and 4.6	4.7 builds on 4.6			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
8	UK	4	8		... in the nuclear power plant including:	Typographical error	x			
15	CORDEL	4	8	14	"...nuclear power plant, including..."	Replace "plan" with "plant".	x			
49	Canada	4	8		Change "nuclear power plan" to "nuclear power plant".	Typing Error	x			

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
51	Canada	4	8		The design bases should cover all modes of operation and take into account all possible credible events that could impact the electrical system in the nuclear power plant, including: b. Sub-synchronous resonance phenomena	Better wording :If use the term "Sub-synchronous resonance phenomena" it should be defined.			x	Subsynchronous resonance is a phenomenon in which the resonant frequency of the turbine generator shaft coincides with a natural resonant frequency of the electrical system such that there is a sustained, cyclic exchange of energy between the mechanical shaft and the electrical system. This exchange of energy results in torsional stress on the turbine generator shaft that can lead to severe damage. In extreme cases, the shaft can actually fracture.
50	Canada	4	8		Add: "g. Formation of grid islands and resulting frequency and voltage excursions."	Grid disturbances can often leave nuclear plants inside grid islands with no means of automatic grid frequency control. Nuclear plants are often large enough that they will drive the grid island to extremes in frequency when a grid island develops that contains one or more nuclear units.	x			
3	CORDEL	4	10		The design basis should describe for each subsystem of the plant power systems: e. Variables , such as system voltage, system current and frequency, of the main busbars should be monitored; This includes variables necessary for accident and post-accident monitoring.	The necessary monitoring variables are described more precise.	x			
4	Spain	4	10		Say "....and for house load operatoin where....."	Change "operatoin" by "operation"	x			
5	ENISS	4	10		The design basis should describe for each subsystem of the plant power systems: ... e. Variables , such as system voltage, system current and frequency, of the main busbars should be monitored; This includes variables necessary for accident and post-accident monitoring.	The necessary monitoring variables are described more precise.	x			
9	UK	4	10	d	... For house load operation...	Typographical error	x			
10	Finland	4	10		For house load <b>operatoin</b> operation	Spelling	x			
10	UK	4	10	d	Maximum and minimum values of grid voltage and frequency	Current wording is unclear/ambiguous	x			
11	UK	4	10	d	Events involving loss of synchronism between the nuclear plant and the grid	Current wording "out of step event" is imprecise and ambiguous	x			
12	UK	4	10	h	Clarification needed on the term 'run-out'	The term "run-out" is not a familiar term in the UK Suggest that it is explained at this point of the document or put or put into glossary			x	
52	Canada	4	10	d	Change "house load operatoin" to "house load operation"	Typing error.	x			
16	CORDEL	4	10	d	"...house load operat <b>oin</b> ion where applicable	Change "operatoin" to "operation" to correct typo	x			
53	Canada	4	10			Please consider adding requirement for withstanding full load rejection if required by design	x			
56	Canada	5	2		Suggest to add this item: 5.6 When nuclear power plants experience electrical transients such as turbine or generator trip, safety related bus and essential loads for onsite power system are supplied from the power grid. It is important to analyze the effect on safety related and essential bus voltage of onsite power system as a function of the change in grid performance such as degraded voltage ( possibly due to insufficient reactive power in the grid) leading to decreasing motor torque in safety related equipments. That situation can be developed into a potential loss of offsite power (LOOP). Hence, the design guideline as defence-in-depth in this situation has to design to maintain the integrity of the off-site power circuits as the first defence under all postulated events to guard against degraded performance and reliability in the grid. See details in Section 7.15.	See more details in : <a href="https://docs.google.com/viewer?a=v&amp;q=cache:ZdrDkc4-iGcJ:www.icee-con.org/papers/2008/pdf/P-092.pdf+UAT+and+SAT+in+nuclear+electrical&amp;hl=en&amp;gl=ca&amp;pid=bl&amp;srcid=ADGEEESi4-HSiseP2nOHULjprC0tFZxrBZP3KAIAzUBYQOUZ2bMgulup77e6rQHN5ddm4cFYXQuNtB7T_zia4Fj35W-FJ3KV2yWraYvL1PsgJA-Urb0DeNbSRexYfdgBYDVI7yepfaa&amp;sig=AHIEtbS08NTLpW4eYZo9L8s3tT5kG27yf_w">https://docs.google.com/viewer?a=v&amp;q=cache:ZdrDkc4-iGcJ:www.icee-con.org/papers/2008/pdf/P-092.pdf+UAT+and+SAT+in+nuclear+electrical&amp;hl=en&amp;gl=ca&amp;pid=bl&amp;srcid=ADGEEESi4-HSiseP2nOHULjprC0tFZxrBZP3KAIAzUBYQOUZ2bMgulup77e6rQHN5ddm4cFYXQuNtB7T_zia4Fj35W-FJ3KV2yWraYvL1PsgJA-Urb0DeNbSRexYfdgBYDVI7yepfaa&amp;sig=AHIEtbS08NTLpW4eYZo9L8s3tT5kG27yf_w</a>		x	This is redundant; degraded voltage and frequency is considered. In this case, safety buses should be isolated from the plant normal buses and emergency diesels start.	
6	ENISS	5	3		Events can cause symmetrical and asymmetrical perturbations in the plant and can be initiated: ...	Spelling mistake	x			
13	UK	5	3		"Events...." (Upper case E)	Typographical error	x			
7	SWE	5	4		New text: "The impact of such events on all the on-site electrical power systems (AC and DC) (see Fig. 6) should be evaluated and confirmed <b>by specific analysis</b> that the allowable voltage and frequency requirements are not exceeded and the protection system is adequate."	This can lead to a better understanding of what is required	x			

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
54	Canada	5	4			Please clarify what the blue and green lines represent in Fig 6. The meaning of Figure 6 is not clear.			x	
8	SWE	5	5		Add the following new item after 5.5 stating that "The fault clearing time should be defined by the national transmission system owner ."	This can lead to a better understanding of what is required and from which organization	x			
14	UK	5	5		"...that do not result in the generator losing synchronism with the transmission system voltage"	Current wording "out of step" is imprecise and ambiguous or suggest a definition also see 8 above.	x			
55	Canada	5	5		The grid transient system stability analyses should demonstrate that the plant could ride through and remain connected to the grid for perturbations that do not result in generator falling out of step Suggested new text: <b>Since connection to the grid is important to the plant and grid stability, analysis should demonstrate that connection will be retained for grid perturbations unless the safe mechanical/electrical operation of the plant is jeopardized.</b>	Delete as overly restrictive.			x	Reformulated on UK 14.
1	Lithuania	5	6		To renumber these and subsequent paragraphs	Incorrect numbering of paragraphs	x			
35	FR	5	6		<del>5-6</del> 5.10	Numbering issue	x			
37	CORDEL	5	6		This section should be numbered 5.10 because it comes after 5.9; then the following numbers should also be modified.	typo	x			
3	Bernard	5	7		...Such an event is called station blackout and its frequency of occurrence should be low enough to be considered and analysed as a DEC event The term station blackout does not include the simultaneous failure of uninterruptible AC power supplies or DC power sources, or the failure of alternate AC power sources that are diverse in design and not susceptible to the events that caused the loss of on-site and off-site power sources.	For some of us it could be obvious, but writing it is better (in some counties the reliability of the grid is low and the number of LOOP occurrences is high).	x			
35	CORDEL	5	7		"International Studies as shown that loss of the preferred..."	The term "Operational experience" does not match with "credible event"			x	OEF is something different than international studies...
6	FR	5	7		Revisit the section on SBO (5.7 to 5.9) to differentiate "historical SBO" (where main emergency power supply is unavailable but alternate emergency power supply is available) and "Full SBO" (where alternate emergency power supply is unavailable) as considered in EU stress tests. In section 8, change "alternate AC power supply" to "alternate emergency AC power supply" to be clearer on the intended use				x	Wording corresponds with the definition of SBO.
31	FR	5	7		" <u>International Studies</u> operational-experience as shown that loss of the preferred..."	The term "Operational experience" does not match with "credible event"			x	OEF is something different than international studies...
32	FR	5	7		International operational experience has shown that loss of the preferred power supply concurrent with a turbine trip and unavailability of the emergency AC power system is a credible event. Such an event may affect a single unit, multiple units on one site, or <u>and even</u> all units on one site. Such an event is called station blackout.	Simplification	x			
4	Bernard	5	8		...use of unit to unit connections, or installing an alternate AC power source that is diverse in design and protected from elements that can degrade the normal and standby power sources. <b>A combination of these different means is suitable.</b>	Unit to unit connections do not help in case of a SBO affecting all the units at a same site. But having unit to unit connections could be very efficient for most of SBO events restricted to 1 unit.			x	A combination is already in the sentence.
5	TK	5	8		5.8. If needed, design shall have the following measures to extend battery depletion time in case of SBOs: 5.8.. 1. A charger from AAC, i f so it shall be verified that, 5.8.1.1. VERIFY! AAC, no common cause failure with PPS. 5.8.1.2. VERIFY! AAC, no common cause failure with Emergency AC Power System 5.8.1.3. AAC capacity is determined taking into account SBOs, 5.8.1.4. AAC power source supplying batteries becomes available in time 5.8.2. Additional batteries 5.8.3. Load shedding scenarios	In our opinion, the explanation on the left, can replace Station Blackout 5.8. for being more clear.			x	Desing provision of Aalternate AC power system is provied in section 8.
5	Bernard	5	9		<del>The plant's capability to maintain fundamental safety functions and to remove decay heat from spent fuel for the core fuel and the spent fuel should be analysed and adequate provisions should be included in the design to prevent any significant fuel damage for the period that the plant is in a blackout condition*. In addition, the total loss of AC power should be consider for determining the time period before a severe accident or unacceptable off site consequences would occurred to verify the consistency of the design with the emergency preparedness and response plan.</del>	Why restrict to the heat removal function in a IAEA safety standard? * The term 'station blackout condition' is used with the definition given in this document Considering a total loss of AC power with the aim to determine the time periods is a lesson learnt from FKSH accident and is required by the specifications for the stress tests of plenty of MS. Update ANNEX I para " Alternate AC power supply" to reflect the remarks made for 5.8 and 5.9	x	1st part accepted.		
16	UK	5	9		The results of this analysis should be used tom inform the electrical power requirements for the station black-out event.	As written it does not sit comfortably in this document since it relates to activities that are not electrical design.			x	However, it is important that SBO desing provisions are there.

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
17	UK	5	9		Interchange paragraphs 5.8 and 5.9	Design measures for implementation can only follow identified design requirements	x			
36	CORDEL	5	9		To be deleted	Requirement do not belongs to electrical design activities			x	However, it is important that SBO desing provisions are there.
5	RF SEC	5	9		The plant's capability to maintain fundamental safety functions should be analyzed for the period that the plant is in blackout condition.	Propose to eliminate wording "and to remove decay heat from spent fuel" since heat removal from spent fuel is already covered by mentioning "fundamental safety functions" (see SSR-2/1, requirement 4).	x			
33	FR	5	9		To be deleted	Requirement do not belong to electrical design activities			x	However, it is important that SBO desing provisions are there.
34	FR	5	9		The plant's capability to maintain fundamental safety functions and (including to remove decay heat from spent fuel) should be analysed for the period that the plant is in a blackout condition.	SSR2-1 includes spent fuel in the fundamental safety functions...	x			
17	SWE	5	14		New text: "Medium voltage AC electrical power systems should preferably be high impedance grounded."	"Medium and low voltage AC electrical power systems should preferably be high impedance grounded."  New text: "Medium voltage AC electrical power systems should preferably be high impedance grounded."  The reason for this is that NPPs with redundand divisions should be able to allow directly grounded low voltage AC systems. This simplifies the low voltage AC systems and will give better solutions, easier maintenance and will be more advantageous from the EMC point of view.			x	This is SSR 2/1 requirement; it cannot be changed.
38	CORDEL	5	15		It is not clear whether this requirement is adapted to safety related systems or to safety systems.	It is not clear if the safety related systems are also addressed.			x	Important to safety includes safety and safety related.
39	CORDEL	5	16		Should be modified to reflect the fact that redundancy in the electrical system is commonly inherited from the redundancy on the SSCs				x	
36	FR	5	16		Should be modified to reflect the fact that redundancy in the electrical system is commonly inherited from the redundancy on the SSCs		x	Reformulated.		
57	Canada	5	17		The availability of spare components such as an uninterruptible power supply, or battery charger, might preclude operating restrictions in the event of a failure or maintenance related outage of these critical components	This clause does not belong under redundancy; however, it should be placed in a more appropriate section.			x	
37	FR	5	17		Operating experience indicates that additional redundancy within a train or division provides operational flexibility and increased availability. The availability of spare components such as an uninterruptible power supply, or battery charger, might preclude operating restrictions in the event of a failure or maintenance related outage of these critical components.	Spare parts are not a topic related to redundancy. The deleted sentence is true even if no additional redundancy is implemented	x			
38	FR	5	21		Independence is provided to prevent a failure or internal or external hazard from affecting redundant elements of safety a systems.	Clarification. In addition, two bullets might be created into 5.21 to			x	Independence is provided particualry to safety systems.
39	FR	5	21		Independence is provided to prevent a failure or internal or external hazard from affecting: - redundant elements of a safety systems. - It also prevents a failure or hazard from affecting systems that provide different levels of defence in depth. Failure processes to be considered include: failures resulting from design basis events, exposure to the same internal or external hazards, failure of common support systems, electrical connections between systems or divisions, data exchange between systems or divisions, or common errors in design, manufacture, operations, or maintenance.	In addition, two bullets might be created into 5.21 to better highlight the two kind of independence considered.			x	Independency is described correctly.
40	CORDEL	5	22		Use either "design basis event" or "design basis accident", in a consistent manner under these 3 sections. 5.22; 5.23; 5.24		x			
58	Canada	5	22		Safety items should consider be independent of the effects of the design basis accidents to which they respond.	Please reword as it is confusing to the reader.			x	It is correct wording.
40	FR	5	22		Safety items should be independent of the effects of the design basis accidents to which they respond.	Too restrictive. DEC also have to be considered	x			
41	FR	5	23		Safety systems should be independent from systems of lower safety classification as necessary to ensure that the safety systems can perform their safety functions during and following any design-basis event that requires these functions.	Too restrictive. DEC also have to be considered. "Postulated event" could also be used	x			
42	FR	5	24		Redundant portions of safety groups should be independent from each other to ensure that the safety group can perform its safety functions during and following any design-basis event that requires these functions.	Too restrictive. DEC also have to be considered "Postulated event" could also be used	x			

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
41	CORDEL	5	25		Define the different part of the electrical system prior to the sentence	It is not clear whether the sentence address the component, the sources or the Systems (backed-up, uninterruptible, severe accident...)as a whole. If this address the system as a whole the requirement regarding the defense in depth are enough.	x	Deleted.		
4	Indonesia	5	25		... maintenance, provide assurance that electrical systems can perform their-mission with a minimum of disturbances reach the highest availability.	The reliability main role is to reach the system availability			x	
43	FR	5	25		Define the different part of the electrical system prior to the sentence	It is not clear whether the sentence address the component, the sources or the Systems (backed-up, uninterruptible, severe accident...)as a whole. If this address the system as a whole the requirement regarding the defense in depth are enough.	x	Deleted.		
44	FR	5	27		Merge 5.27 and 5.26	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
59	Canada	5	28		Means for providing independence include physical separation, electrical isolation, independence from the effects of communications errors, equipment qualification, and diversity. Generally a combination of these methods is applied to achieve independence goals.	Repeat	x			
42	CORDEL	5	30		To be Deleted	The intent of the § is not clear	x			
60	Canada	5	30		5.31	Unsure of intent, clarification is needed.	x			
45	FR	5	30		To be Deleted	The intent of the § is not clear	x			
1	IEEE	5	32		In the first paragraph include: water hazard protection from direct and indirect sources of water, such as spray and seepage through roofs, walls, raceways, and conduits.	Water hazards are one of the most prevalent everyday modes of failures of electrical equipment at NPPs. (ref. IEEE 833).	x			
7	TK	5	32		In Separation and barriers applications the power plant areas shall be classified as non-hazard, limited hazard, missile failure, pipe failure hazard and fire hazard areas. The DC installations in these areas shall be suitable for criteria determined for these areas.	The statement on the left can be added to this section.			x	
46	FR	5	32		• Might reduce the likelihood of common cause failures as a result of events that have localized effects (e.g., tornado, tsunami, or small aircraft impact).	Tornado, tsunamis or large aircraft impact have wide effects.	x			
43	CORDEL	5	35		To be Deleted	See independency requirement in 5.23. Physical separation is a way to granted independency as stated in § 5.28 and the main safety objective is to provide independency between the level of defence as stated in § 5.21. The § 5.35 make a link between classification and level of defence in depth which is relevant for a specific architecture and classification scheme which is not shared by all members. Additionnaly, the § using the word "lower" suggest a separation which is not adapted for a classification scheme with 3 classes.	x			
47	FR	5	35		To be Deleted	See independency requirement in 5.23. Physical separation is a way to granted independency as stated in § 5.28 and the main safety objective is to provide independency between the level of defence as stated in § 5.21. The § 5.35 make a link between classification and level of defence in depth which is relevant for a specific architecture and classification scheme which is not shared by all members. Additionnaly, the § using the word "lower" suggest a separation which is not adapted for a classification scheme with 3 classes.	x			
44	CORDEL	5	36		To be deleted	See independency requirement in 5.23. § Physical separation is only a mean to achieve independence	x			
11	RF REA	5	37			Additional requirements to manufacturing of NPP systems and components classified as safety important are existing in Russian regulations.			x	This SG is about desing.
48	FR	5	37			As these areas presents challenges, guidance would be valuable...			x	Out of scope
45	CORDEL	5	39		Replace "In general" by "As far as Reasonably Practicable"	This is not the practice in European nuclear power plants. The Concept of associated safety system is often used. The proposed modification strengthens the engineering approach to be used and well introduce the §5.43 - §5.47	x			
49	FR	5	39		Replace "In general" by "As far as Reasonably Practicable"	This is not the practice in European nuclear power plants. The Concept of associated safety system is often used. The proposed modification strengthens the engineering approach to be used and well introduce the §5.43 - §5.47	x			
4	CORDEL	5	40		If it is necessary to power non-safety loads from the safety electrical power systems they should be isolated by isolation devices <u>which are technical comparable to safety classified devices.</u>	"safety classified systems" have to be licensed. The main task is to use the same technical design to insure a reliable operation. In that case the new wording is more precise.	x	If it is necessary to power non safety loads from the safety electrical power systems they should be considered isolated by safety classified isolation devices		

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
7	ENISS	5	40		If it is necessary to power non-safety loads from the safety electrical power systems they should be isolated by isolation devices which are technical comparable to safety classified devices.	"safety classified systems" have to be licensed. The main task is to use the same technical design to insure a reliable operation. In that case the new wording is more precise.	x	If it is necessary to power non safety loads from the safety electrical power systems they should be considered isolated by safety classified isolation devices		
19	UK	5	40		If it is necessary to power non-safety loads from the electrical power systems they should be considered as associated circuits in accordance with 5.52 and isolated by safety classified isolation devices.	Emphasis of the need to treat non-safety loads as associated circuits.	x	If it is necessary to power non safety loads from the safety electrical power systems they should be considered isolated by safety classified isolation devices		
46	CORDEL	5	40		Replace the sentence by : If it is necessary to power non-safety loads from the safety electrical power systems they should be considered associated to safety according 5.52 and isolated by safety classified isolation devices.		x	If it is necessary to power non safety loads from the safety electrical power systems they should be considered isolated by safety classified isolation devices		
50	FR	5	40		Merge with 5.39	Same topic			x	two different topics.
51	FR	5	40		Replace the sentence by : <u>If it is necessary to power non-safety loads from the safety electrical power systems they should be considered associated to safety according 5.52 and isolated by safety classified isolation devices.</u>		x	If it is necessary to power non safety loads from the safety electrical power systems they should be considered isolated by safety classified isolation devices		
47	CORDEL	5	41		To be deleted	The requirement is only a particular application of the main objective considered in 5.40 and 5.52.	x			
48	CORDEL	5	42		To be deleted	Requirement already addressed in 5.40 and 5.52	x			
52	FR	5	42		Merge with 5.41	Same topic	x			
49	CORDEL	5	43		To be deleted	Requirement already addressed in 5.40, 5.52 and equipment requirement for example 7.39	x			
50	CORDEL	5	44		To be deleted	Requirement already addressed in 5.40, 5.52 and equipment requirement for example 7.39	x			
20	UK	5	45		This design prevents certain events, such as short circuits on the non-safety power systems, from affecting the safety power systems.	The second sentence in paragraph 5.45 does not make sense.	x			
21	UK	5	46		"... not be interconnected in normal operation"	Existing wording conflicts with 5.47 and 5.48	x	Modified along with UK 22 comment.		
53	FR	5	46		Merge 5.46 and 5.47 5.46. Redundant divisions of safety classified electrical power systems should not be interconnected. <del>5.47. Connections between redundant divisions may be made during operation if unless</del> a safety assessment confirms the reliability of a power supply is increased significantly and sufficient independence of the redundant divisions is ensured.	Same topic, the second sentence is somehow and exception to the first sentence	x	Modified along with UK 22 comment.		
9	SWE	5	47		Please, consider also the none sharing units during operation or shutdown.	The connection between redundant divisions during operation or shutdown is often not allowed from the regulatory point of view, where many NPPs use the principle in their safety thinking.	x	Modified along with UK 22 comment.		
22	UK	5	47		"Temporary connections between ...."	To emphasise that this requirement is not in conflict with 5.46.and implicitly that such connections are not intended to be permanent.	x	Modified along with UK 22 comment.		
23	UK	5	48		"Temporary connections between ...."	To clarify that this is not in conflict with 5.46.	x	Modified along with UK 22 comment.		
2	Romania	5	49		These interconnections will be used in abnormal operation and station blackout	Interconnections between redundant divisions will not be used for normal operating	x	Modified along with UK 22		
54	FR	5	49		Transform 5.49 into a footnote to 5.48	Explanation.			x	Modified along with UK 22 comment.
51	CORDEL	5	52		"When it is <u>unpractical</u> ..." and Replace" lower class" by "non safety classified function"	Unpractical instead of impractical to fit with the comment on §5.39 (as far as reasonable approach). This would allow not to exclude current European approach. Furthermore the document suggests separation between safety classes : this is not adapted for a classification system with 3 classes.			x	language is correct
55	FR	5	52		"When it is <u>unpractical</u> ..." and Replace" lower class" by "non safety classified function"	Unpractical instead of impractical to fit with the comment on §5.39 (as far as reasonable approach). This would allow not to exclude current European approach. Furthermore the document suggests separation between safety classes : this is not adapted for a classification system with 3 classes.			x	Non-safety classified" is ambigious. It could mean not classified as a safety system, or it could mean not-classified within the safety classification scheme, i.e., not safety or safety related. In
4	CH	5	54	c	Physical separated from other components in.....	Make instead of the point a blank after components			x	

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56	FR	5	54		Merge 5.54 with 5.53	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
10	SWE	5	57		A recommendation on extra external bypass on the UPS shall be added	If the independence between the inverter and the static switch is not good enough, it is preferable to build an extra separated bypass switch externally. The uninterruptible buses can then always be supplied with power from a power source, i.e. the diesel generators. This is crucial for the robustness and might often be necessary to improve the availability of the overall system.			x	it is covered.
11	SWE	5	57		Refer to the green part of Fig 3 page 6.	This can lead to a better understanding of what is proposed			x	too many references
12	SWE	5	60		New text: "If diverse non-electrical power systems are provided to accomplish a given safety function, their power supplies and their instrumentation and control systems should be independent of the power sources and instrumentation of the diverse power systems (electrical or other non-electrical). <b>For example the feeding of the I&amp;C of the EDG from two diversified feedings within the same division</b> "		x	Modified along with UK 24 comment.		
24	UK	5	60		If non-electrical systems are provided as a diverse means of accomplishing a given safety function, any of their associated power supplies, instrumentation and control systems, should be independent of the system to which they are intended to be diverse.	The way in which diverse is used in the existing paragraph is overly complex and makes it difficult to understand what is intended.	x	Modified along with UK 24 comment.		
52	CORDEL	5	60		Replace "diverse power system" by "stand by/main power system"	The sentence needs clarification. The proposed text is the reader interpretation	x	Modified along with UK 24 comment.		
61	Canada	5	60		5.61	Combine these 2 clauses to Add better clarity	x	Modified along with UK 24 comment.		
57	FR	5	60			Unclear. Why diverse non-electrical power system should have a (non-electrical) power source and I&C independent of the <i>diverse</i> system ? This would mean that the diverse system will rely on the primary power source and I&C, thus not being diverse anymore...	x	Modified along with UK 24 comment.		
58	FR	5	60		Replace "diverse power system" by "stand by/main power system"	The sentence needs clarification. The proposed text is the reader interpretation	x	Modified along with UK 24 comment.		
59	FR	5	61		Merge 5.61 with 5.60	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
53	CORDEL	5	62		"In addition to physical separation and electrical isolation, diversity might be necessary to achieve independence between redundant systems or between systems supporting different levels of the defence in depth concept. This may be achieved by the use of dedicated <u>diverse</u> power sources or by supply from uninterruptible power supplies <u>in regard to DC or AC Stand-by power source...</u> "	Quality and Clarity, to explain in regard to which power supply the described sources may be diverse.		1st sentence corrected as proposed.	x	2nd sentece remained the same.
60	FR	5	62		"In addition to physical separation and electrical isolation, diversity might be necessary to achieve <u>Increase</u> independence between redundant systems or between systems supporting different levels of the defence in depth concept. This may be achieved by the use of dedicated <u>diverse</u> power sources or by supply from uninterruptible power supplies <u>in regard to DC or AC Stand-by power source...</u> ".	Absolute independence may be difficult to achieve (see 5.37) Quality and Clarity, to explain in regard to which power supply the described sources may be diverse.		1st sentence corrected as proposed.	x	2nd sentece remained the same.
6	Bernard	5	66		The use of principles of independence and diversity helps to ensure,	Diversity is also of first importance to avoid CCF due to the use of a same technology	x			
61	FR	5	66		Transform 5.66 into a footnote to 5.65	Explanation only			x	No footnotes in safety guide.
13	SWE	5	67		Please consider the fact that "normally two independent transmission systems should be available".	In most NPPs two independent transmission systems are available as far as possible, not the sigle one only. This has to be taken into consideration or mentioned in this recommendation.	x	Modified along with UK 25 comment.		
25	UK	5	67		"As a nuclear power plant is normally connected to only one..."	It is possible for a NPP to have connections to two transmission systems. E.g. Fukushima Daiichi had it's main connections to the Tokyo Electric transmission system, but also had an independent connection to Tohoku Electric's transmission system.	x	Modified along with UK 25 comment.		
55	CORDEL	5	67		...If the redundant safety power systems are fed from independent connections to the grid the common cause failure possibilities will also decrease.		x	Modified along with UK 25 comment.		
17	CORDEL	5	68		"A 'no interruption' concept is desirable, realized as a series of design means to minimize the impact from transients (see Fig. 6)."	This sentence is unclear and should be reworded. I have read it several times and I don't understand the point being made here.			x	
54	CORDEL	5	69		Due to the voltage, frequency and phase angle excursions that can occur in a generating facility, operating experience from industrial applications is of limited value when screening for common cause failure vulnerability <u>from the preferred power supply.</u>	Industrial feedback may be used for the identification of the CCF of the component of the electrical distribution	x	Modified along with FR 62 comment.		
62	Canada	5	69		<u>Operating experience from the nuclear and relevant non-nuclear industries should be considered.</u>	Operating experience from non-nuclear generating plants shall be useful.	x	Modified along with FR 62 comment.		

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62	FR	5	69		Due to the voltage, frequency and phase angle excursions that can occur in a generating facility, operating experience from industrial applications is of limited value when screening for common cause failure vulnerability <u>from the preferred power supply.</u>	Industrial feedback may be used for the identification of the CCF of the component of the electrical distribution	x			
63	Canada	5	70		Comprehensive design bases and guidelines that identify all possible <b>but credible</b> events that could challenge the safety power systems;	Better wording: The use of the word 'credible' is more appropriate in this instance than the word 'possible'.			x	possible is also credible
12	RF REA	5	70		to 5.72	"Verified capability" should be defined.			x	Term Verified is in the glossary
11	Finland	5	71		One single electrical event cannot challenge redundant divisions, <b>when the divisions are emergency diesel energized.</b>	Is the divisions supplied from grid or emergency diesel, shall be clarified.			x	True, but it has already happened.
14	SWE	5	71		New text: "However the starting sequence of the standby power sources has a potential for common cause failure as the same physical properties are used to initiate all divisions. <b>This can be avoided by choosing diversified standby power sources"</b>	This can lead to a better understanding of what is proposed.	x	Modified along with FR 64 comment.		
63	FR	5	71		After an event that ends in a loss of off-site power and if the safety power systems is not fed from the main generator(s), the standby power sources will <u>start and supply the safety power systems.</u>	Clarification	x	Modified along with FR 64 comment.		
64	FR	5	71		When the <u>Even if</u> safety power systems as a result are divided into different divisions, <u>one single electrical event cannot challenge redundant divisions. However</u> the starting sequence of the standby power sources has a potential for common cause failure as the same physical properties are used to initiate all divisions.	Simplification	x			
5	CH	5	71		When the safety power systems as a result are divided into different divisions and designing / installation was correct, one single electrical event cannot challenge redundant division.	If we think about scenarios like in Forsmark or Fukushima redundancies and diversity does not help against design faults and results in a CCF. Delete the sentence "However the starting... has a potential for common cause failure..."	x	Modified along with FR 64 comment.		
5	CORDEL	5	73		In order to handle <u>minimize</u> common cause failure risks for software based devices, the design of these items should follow the <u>appropriate</u> design principles for I&C equipment given in DS-431, Ref. [3] <u>should be used.</u>	The design principles in DS-431 are mainly focused on I&C systems. Those are not all adequate to electronic protection devices or standby power sources.	x			
8	ENISS	5	73		In order to handle minimize common cause failure risks for software based devices, the design of these items should follow the appropriate design principles for I&C equipment given in DS-431, Ref. [3] should be used.	The design principles in DS-431 are mainly focused on I&C systems. Those are not all adequate to electronic protection devices or standby power sources.	x			
56	CORDEL	5	73		To be deleted	See 5.58			x	Modified along with Cordel 5 comment.
65	FR	5	73		To be deleted	See 5.58			x	Modified along with Cordel 5 comment.
66	FR	5	76		Merge 5.76 with 5.75 The failure modes of electrical components important to safety should be known and documented. <del>5.76: as</del> Knowledge of component failure modes is necessary in order to apply the fail-safe concept.	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
1	Germany	5	77		Failures of electrical components important to safety should be detect-able by periodic testing or revealed by alarm or <del>anomalous</del> indication of anomalous parameters.	The indication is correct, but the parameters are anomalous (=> component has failure)			x	editorial
3	Romania	5	79		To be defined what it means "...disabling saefy functions to below an acceptable levele".	Must explain the term "acceptable" or should delete.			x	
12	Finland	5	82		Selective tripping of <b>breakers protective equipment</b>	A fuse protection can also be utilized.			x	in this context breakers are OK.
64	Canada	5	83	a	...disturbances, equipment damage, and potential personnel and <del>property</del> hazards	The use of the term 'property' is not appropriate in this clause. Equipment damage is already mentioned in the sentence.			x	property has a broader meaning
65	Canada	5	83	b		Please remove "state of the art" as this term is not defined in this document. This term should be addressed in a higher level IAEA document such as SSR 2/1.			x	State of the art is howver good term used elsewhere.
66	Canada	5	83			Self diagnostic features of the protective devices shall be preferred.			x	It depends what protective devices are installed.
5	Indonesia	5	85		... diverse in design and protected from elements that can degrade the normal and standby power sources to assure the reactivity control, core heat removal, and radioactive material confinement	Additional description to emphasize the safety purposes			x	
67	Canada	5	87		<del>Protection coordination also includes measuring principles.</del>	Not sure of meaning of the 2 <sup>nd</sup> sentence of 5.87. Suggestion either to provide definition of measuring principles or provide more clarity to this statement.			x	
57	CORDEL	5	88		Provision of means ( <del>part of modern digital relay protection</del> )	Quality and clarity, it is proposed to have an objective independent from a given technology. The use of digital relay leads also to software qualification	x			
67	FR	5	88		Provision of means ( <del>part of modern digital relay protection</del> )	Quality and clarity, it is proposed to have an objective independent from a given technology. The use of digital relay leads also to software qualification	x			
26	UK	5	89		Suggest adding a new paragraph in relation to use of digital relays. "Digital protection devices should be verified for use in accordance with the safety duty they are intended to provide."	To highlight the potential problem with modern multifunction digital relays and. That caution needs to be exercised. .	x			
68	Canada	5	89			This clause is not always applicable.	x			

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68	FR	5	89		The design of the protection devices of electrical power systems and components of nuclear power plants should also comply with national safety standards that apply to the safety of electrical equipment ( <u>whether or not installed in a NPP</u> ) and electrical installations ( <u>whether or not NPPs</u> ), as well as other <u>relevant</u> electrical safety regulations issued by electrical safety authorities.	Clarification	x			
69	Canada	5	90			Power supply to the protective devices should be mentioned. Systematic approach based on what, better clarification of systematic approach should be provided.			x	
70	Canada	5	92			Software qualification requirements should be addressed.			x	It is covered in reference DS 431
15	SWE	5	95		New text: "Analyses and <b>simulations</b> to confirm the design margins should be performed, using conservative assumptions and qualified methods"	This can lead to a better understanding of what is proposed.	x			
13	RF REA	5	97		Paragraph to be deleted.	This recommendation introduces uncertainty into design solutions and requires a feasibility study to be performed			x	It is important paragraph to be address in the design.
3	USA	5	98		Change "degraded voltage" to "minimum allowable design voltage"	At degraded voltage or voltage at the bottom of the design allowable voltage range? Degraded voltage is below the allowable design voltage range.	x			
16	SWE	5	98		Modify by adding clarification proposal/requirement on the overdimensioning of the motors.	The motors should be over dimensioned with the factor 1.20 in relation to the process demand. This way of dimensioning motors will make sure that the motor will consume rated current when the voltage at the motor is at the lowest permissible level in relation to the nominal voltage (85 % of the nominal voltage). If this is not taken into consideration at the design, this can lead to serious CCF "Trip on overload protections at all divisions simultaneously." The above mentioned would be reflected in the paragraph on motor loads and motor design.	x	Modified along with USA 3 comment.		
71	Canada	5	99		Motors and other devices for items important to safety connected to the power system should withstand the over- and under-voltage as well as the over and under frequency that could result from the applicable steady state, short term operation and transient conditions that are specified in the design basis.	Motors should have the capability to withstand voltage and frequency excursions associated with grid disturbances until disconnected and connected to the alternate power supplies.	x			
58	CORDEL	5	101		To be deleted or rephrased	It is not clear what requirement is here given to the electrical design	x			
72	Canada	5	101			We suggest that this clause should be treated as a note, otherwise the recommendation is unclear and is too specific for an electrical guide.	x	Deleted.		
69	FR	5	101		To be deleted or rephrased	It is not clear what requirement is here given to the electrical design	x			
73	Canada	5	102		Valve Torque calculations should also include the impact of high ambient temperature where applicable.	Some valve actuators are required to operate under conditions of high ambient temperature. High ambient temperature may impact cable and motor winding resistance with an effect on available torque.			x	It is correct.
74	Canada	5	102		Motor operated valve (MOV) actuators should be designed in order to close with enough torque at <b>minimum voltage</b> and frequency, not exceeding maximum permissible torque at high voltage and frequency, and be able to open the valve at <b>minimum voltage</b> .	For better guidance this sentence should be modified			x	It is correct.
59	CORDEL	5	104		Rephrase the sentence "Electrical systems, including cables, should be designed to permit necessary overload operation" <del>without exceeding their rating.</del>	The definition of overloaded is to be beyond the rated value. Different approach exist depending on the component we address the protection, the motors, the cable	x	Modified along with Canada 75 comment.		
75	Canada	5	104		Electrical <b>equipment and</b> cables should be designed to permit necessary overload operation without exceeding their rating.	We suggest that this sentence to be modified to clarify the meaning	x			
70	FR	5	104		Rephrase the sentence "Electrical systems, including cables, should be designed to permit necessary overload operation" <del>without exceeding their rating.</del>	The definition of overloaded is to be beyond the rated value. Different approach exist depending on the component we address the protection, the motors, the cable			x	Modified along with Canada 75 comment.
76	Canada	5	105		5.106	Combine the two, they should be one clause	x			
14	RF REA	5	107		Para to be deleted.	Overload protection system can switch off cable in situation where it should be kept in operation by all means (even in the mode of overload and increased insulation deterioration)			x	This is general statement, electrical protection will switch off the equipment when overloade, except of start -up, when protection is delayed.
71	FR	5	109		The continued operation of safety system equipment under overloaded conditions with the consequent risk of its damage <u>should not be a condition considered in need not form part of the safety justification for design basis operation under accidents conditions</u> , although it is to be recognized that unforeseen circumstances might arise.	The recommendation should be more direct and not exclude DEC.	x	The continued operation of safety system equipment under overloaded conditions with the consequent risk of its damage should not be credited in the safety justification for operation under accident conditions.		

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77	Canada	5	112			The definition of electrical equipment provided in this clause includes cable systems. We feel that this sentence should be deleted since it is confusing and it is not in line with many of the clauses referring to cables, equipment and associated cables. (i.e. 5.104, 5.107, 5.118 5.119, 5.120, 5.121, 5.122, 5.123, 5.124, 5.127, 5.128, 5.129, 5.155, 5.209, 9.15c etc) For better clarity, we suggest that the title be changed adequately			x	
78	Canada	5	112			Electrical switchgears and panels shall be arc flash protected			x	Already covered by US comment
72	FR	5	112		Merge 5.112 and 5.113 5.112. Electrical equipment ( <u>i.e. is defined here as switchgear, motor control centres, transformers and cable systems.</u> ) 5-113. Electrical equipment should be selected, rated, and qualified for their service and environmental conditions.	Simplification			x	
73	FR	5	114		Merge 5.114 and 5.115 5.114. <u>As part of the fire protection aspect addressed in NS-G-1.7, Ref. [7].</u> Electrical equipment should be sufficiently fire retardant to prevent the propagation of fires. 5-115. Aspects of fire protection are considered in NS-G-1.7, Ref. [7].	Simplification			x	
6	CORDEL	5	116		Electrical equipment should have a voltage rating greater than (typically 110% of) the nominal system voltage ( <u>depending on grid code conditions</u> ) and an impulse rating greater than any transient voltage to which the equipment might be subjected ( <u>e.g. transfer to house load operation</u> ).	The boundary conditions of the national grid codes influence the voltage rating of electrical equipment.			x	unnecessary clarification.
9	ENISS	5	116		Electrical equipment should have a voltage rating greater than (typically 110% of) the nominal system voltage (depending on grid code conditions) and an impulse rating greater than any transient voltage to which the equipment might be subjected (e.g. transfer to house load operation).	The boundary conditions of the national grid codes influence the voltage rating of electrical equipment.			x	unnecessary clarification.
6	CH	5	117		.....and the impulse rating greater than any transient voltage (e.g. 130%) to which the equipment might be subjected transient Medium voltage power cables (from 1kV to 35 kV).	Add a value as an example to the transient voltage level.			x	It is subjective to country code.
2	Lithuania	5	119		The first paragraph number 5.119 shall be renumbered as 5.117	Number 5.119 is used twice	x			
74	FR	5	120		Safety system buses, cubicles, and cables should be adequately protected against the hazards that might result from postulated initiating events, <u>including internal (fire, flooding...) and external (flooding, earthquake,...) hazards.</u>	Clarification (in line with TEPCO Fukushima accident)			x	
75	FR	5	121		Merge 5.120 with 5.121 Safety system buses, cubicles, and cables should be adequately protected against the hazards that might result from postulated initiating events, <u>including internal (fire, flooding...) and external (flooding, earthquake,...) hazards.</u> 5-121. Hazards that could affect buses, cubicles and cables <u>also</u> include: the effects of fire, and the failure or malfunction of fluid systems and mechanical or structural components.	Same topic			x	
76	FR	5	123		Merge 5.123, 5.124 and 5.125	Same topic. Consider also deleting 5.124 and 5.125 as the topic is already addressed by 5.272 to 5.278			x	
13	Finland	5	126		In general, the use of cable splices should be prohibited in raceway. <u>If the usage of cable splice can't be avoided, a metal pipe or similar cover for splice should be used. This offers protection for other cables in the same raceway, and also protects the splice mechanically.</u>	If there is a fault in the cable splice there is a danger of fire.			x	The statement is clear, no clarification needed.
79	Canada	5	126			What is the basis for this rigid recommendation? We suggest that this clause should be either elaborated further or removed since the installed splice may be the toughest part of the cable.			x	The statement is clear, no clarification needed.
15	RF REA	5	126		The use of cable splices should be prohibited in raceways inside buildings and constructions				x	The statement is clear, no clarification needed.
77	FR	5	126		Merge 5.126 and 5.127	Same topic, the second sentence is somehow an exception to the first sentence			x	The statement is clear, no clarification needed.
16	RF REA	5	127		Cable splices may be used at the site for connections within cable constructions				x	The statement is clear, no clarification needed.
27	UK	5	128		Physical separation by use of appropriate methods (egg distance or physical barrier) should be ...'	The use of separation in relation to cables is not clearly defined. And needs to be consistent with 5.32 and 5.33.	x			
60	CORDEL	5	128		a. Cables classified as safety <u>respectively associated to safety and non safety classified cable of a lower safety classification</u>	Not to exclude European approach and to be consistent with 5.21 and 5.52. Furthermore, by using the term "of a lower safety classification" instead of "non classified as safety" the document suggests a separation between 3 levels of safety classes depending on classification scheme.	x			
78	FR	5	128		a. Cables classified as safety <u>respectively associated to safety and non safety classified cable of a lower safety classification</u>	Not to exclude European approach and to be consistent with 5.21 and 5.52. Furthermore, by using the term "of a lower safety classification" instead of "non classified as safety" the document suggests a separation between 3 levels of safety classes depending on classification scheme.	x			
7	CH	5	129		Medium voltage power cables (from 1kV to 35 kV).	The high value for medium voltage was not correct. Acc. IEEE Std. 1623-2004 or DIN IEC 60038 is from 1 kV to 35 kV.	x			

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
79	FR	5	129		Merge 5.128 and 5.129 as follows: 5.128. Physical separation should be provided between: a. Cables classified as safety and cables of a lower safety classification. <u>Separation by safety classification is intended to avoid damage to safety classified cables as a result of failures in lower classified systems or cables.</u> ; b. Cables belonging to different safety divisions. <u>Separation between cables of different safety divisions is intended to prevent a single hazard from affecting more than one redundancy in a safety system.</u> ; and c. Cables of different voltage classes. <u>Separation by voltage classes is intended to the high levels of electromagnetic interference expected in higher energy circuits from affecting lower energy circuits.</u> 5.129. Separation by safety classification is intended to avoid damage to safety classified cables as a result of failures in lower classified systems or cables. Separation between cables of different safety divisions is intended to prevent a single hazard from affecting more than one redundancy in a safety system. Separation by voltage classes is intended to the high levels of electromagnetic interference expected in higher energy circuits from affecting lower energy circuits.	Same topic			x	
80	Canada	5	129		Separation of cables by voltage class is to protect from a higher voltage being impressed on a system of lower design voltage.	There have been a limited set of occurrences of high voltage impression. These occurrences while infrequent may cause multiple simultaneous failures (fires).			x	
80	FR	5	129		Add "In a divisional concept where cable belongs exclusively to one division independently from the safety class where the requirement regarding the associated circuit is fulfill and providing relevant independency between the level of defence in order to cope with the design basis and design extension condition It may not be reasonable to introduce a separation between the safety and non safety classes"	Not to exclude European approach and to be consistent with 5.21 and 5.52.			x	Current 5.129 does not exclude European approach.
28	UK	5	130		Medium voltage power cables (1kV to 20kV)	To emphasise the difference between low and medium voltage cables.			x	Already covered in 5.130
17	RF REA	5	130		a. → instrumentation and control cables; a1. instrumentation and control cables under voltage above 60 V; a2. instrumentation and control cables under voltage less than 60 V;	Clarification of the statement			x	
	RF SEC	5	130	c	Medium voltage power cables (from 1kV to 20 kV)	Refinement of voltage rate for Medium voltage cables (avoiding overlapping with Low voltage cables).			x	Already covered in 5.130
81	FR	5	131		Delete 5.131	Explanation only			x	
14	Finland	5	132		Only cables of the same voltage class should be placed in the same raceway (i.e. ladder, tray or conduit). <b>If this is not feasible and cables of different voltage classes must be installed in the same raceway, they should be installed with maximum feasible distance (= in different sides of the raceway). The exception must always be justified.</b>	Sometimes it is not possible to have separate raceways for different voltage classes.			x	Covered by 5.132
15	Finland	5	134		Please elaborate	Grounded conduit is acceptable barrier for electromagnetic interference point of view but for e.g. fire protection it is not enough. Shall be clarified for what want to separate.			x	
18	RF REA	5	134		Grounded metallic conduit <b>or metallic tray with a separating divider</b> represents an acceptable separation barrier				x	This is just one option.
82	FR	5	137		Merge 5.137 and 5.136	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
61	CORDEL	5	139		...multiple point <u>Surface</u> ...	To cope with used terminology	x			
83	FR	5	139		International standards describe a number of solutions for I&C grounding. Typically, generating stations use one of two approaches for I&C grounding: single point grounding or multiple point grounding. <del>The selected solution is design specific.</del>	Superfluous	x			
84	FR	5	139		...multiple point <u>Surface</u> ...	To cope with used terminology			x	I don't know what is a surface ground. IEC has no definition in either IEV or the Glossary. It does have ground surface which relates to a surface which has been ground. IEEE 1050 also does not have the term and it uses surface to mean only the surface of a cabinent or cable. We don't think that is intended here. Perhaps you want to say earth grounding.

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
85	FR	5	142		Merge 5.143 with 5.142	Same topic, the second sentence (5.143) is somehow and exception to the first sentence (5.142)			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
81	Canada	5	144		In the design of the grounding systems; electrical systems should be considered one entity; since inadequate grounding of even one part of the system might affect the entire system.	We believe that this does not belong in this section			x	This section is about Grounding.
4	Romania	5	145		5.145-5.147: Medium and low voltage AC electrical power related to safety systems...	These paras are only valid for electrical power systems that supply safety systems.			x	not the same
24	Finland	5	145		... National standards must be taken into account.	Add reference to national electrical safety regulation. The current version is incompatible with the Finnish national electrical safety requirement.			x	The IAEA does not refer national standards
62	CORDEL	5	145		Delete	It is not understood why high impedance grounding is preferred in LV systems. Operating experience with solid grounding in Europe is very good.	x	Ecluded low voltage		
82	Canada	5	145		<del>Medium and low voltage AC electrical power systems should preferably be high-impedance grounded.</del> <b>Medium and low voltage AC electrical power systems should preferably be high impedance grounded as required to control fault current levels per the plants design basis.</b>	Medium and low voltage should be also defined in the document.		Ecluded low voltage	x	we prefere keeping existing text
19	RF REA	5	145		To be stated as follows: It is allowed to choose dead grounding for transformer neutral terminals in case of low voltage (less than 400V) AC power grids, and high impedance grounding – in case of medium voltages 660V and higher. Otherwise to delete this para as being not relevant to this document.	All Russian NPPs and known NPPs abroad are equipped with that system		Ecluded low voltage	x	we prefere keeping existing text
86	FR	5	145		<b>2 options proposed :</b> <input type="checkbox"/> Merge 5.145, 5.146 and 5.147 as follows  5.145. Although other grounding solutions such as solid grounded or insulated system may be used when justified, Medium and low voltage AC electrical power systems should preferably be high impedance grounded. 5.146. High impedance grounding limits fault current and allows continued operation of the affected equipment. 5.147. Other grounding solutions such as solid grounded or insulated system may be used when justified.  5.145 Delete	Same topic. It is not understood why high impedance grounding is preferred in LV systems. Operating experience with solid grounding in Europe is very good		Ecluded low voltage	x	we prefere keeping existing text
83	Canada	5	146		to 149	Clauses seem to combine un-grounded, insulated (isolated?), AC and DC. The intent is not clear and should be re-written.			x	this is about electrical safety and personel protection in general.
20	RF REA	5	149		Para to be deleted as being not relevant to safety.	NPP design practices in Russia are based on the following requirement: in case of detection of low insulation in a medium voltage grid 6-10kV, the damaged section shall be immediately disconnected. Reasons to this are as follows: 1. In case of a single-phase-to-ground fault, phase voltage value becomes equal to line voltage $U_{ph} = U_l$ . This may result in insulation breakdown in another location and transition from single-phase to double-phase fault. 2. In case of a single-phase fault in a terminal box, a ground fault frequently turns into double- or triple-phase fault, with serious consequences.3. A prolonged single-phase fault in a motor (which may be as long as 1-2 hours) leads to a severe damage. This protection of motors of a safety system is to be switched off in emergency conditions (diesel generator startup).			x	this is about electrical safety and personel protection in general.
87	FR	5	152		Make 5.153 and 5.154 two bullets in a bullet list introduced by current 5.152	Same topic			x	
84	Canada	5	157			The plant grounding may be supplemented by specific ground connections. The intent is not clear, the sentence should be re-written to provide better clarity			x	The intention is clear.
21	RF REA	5	160		Constructions which are not integral part of NPP, including stocks, offices, repair services, should be supplied from the common NPP power system in general case.				x	
88	FR	5	160			For clarity, A title may be inserted before 5.160			x	
89	FR	5	164			For clarity, A title may be inserted before 5.164			x	
85	Canada	5	166			Clause does not belong in this section, wondering if it belongs under lightning & surge protection.			x	Agree but there is no other place to put it.
90	FR	5	169		Delete 5.169	Superfluous considering 5.167			x	5.167 is SSR 2/1 statement.

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
86	Canada	5	170		e. Software qualification	The software qualification should added to the list of qualification programs.			x	Software qualification is not needed here because it is part of the demonstration of suitability and correctness of functions and performance for digital components. Our fundamental goal is not software qualification, it is the qualification of the device or system in which it resides. But Software added in the new 5.168.
87	Canada	5	171			Analysis to interpolate test results and operating experience .... Canadian practice does not allow the extrapolation of test results. Extrapolation inherently is an unverified assumption In addition, we suggest adding the following: Analysis as a supplement to type testing, ongoing qualification or any combination thereof.However, qualification by analysis alone is not acceptable. In general, type testing of equipment/ cables / field splices should be the preferred qualification method.			x	But this does not exclude national practice. This is just recommendations.
26	Finland	5	172		... Component qualification should be in line with safety significance of the component. The exchangeability of evidence depends on the safety classification of the components.	Add, OPEX is a good source of information. The components of the safety systems should be qualified properly.			x	OPEX is covered in 5.171
91	FR	5	172		Merge 5.172 with 5.171	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
29	UK	5	174		and 175: Where operating experience is used to support equipment qualification, it should be shown to be relevant to the proposed application, use and environment of the target application.	Suggest Paris 5.174 and 5.175 are combined to for simplicity			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
10	ENISS	5	175		Delete this para.	5.174 and 5.175 seem to be redundant	x			
63	CORDEL	5	175		To be deleted	Same as 5.174	x			
88	Canada	5	175			§ 5.175 to be deleted as it is duplication with § 5.174 and doesn't add any additional value to the document	x			
22	RF REA	5	175		To be deleted	Replication of para 5.174	x			
92	FR	5	175		Delete 5.175	Duplicates 5.174	x			
89	Canada	5	176		5.178	Combine these two clauses			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
93	FR	5	177		Merge 5.177 with 5.176	Same topic	x			
90	Canada	5	178		5.179	Combine these two clauses	x			
94	FR	5	179		Merge 5.179 with 5.178	Same topic	x			
95	FR	5	182		The equipment qualification programme <u>checks or tests performed during construction and commissioning</u> should demonstrate that the as-built electrical power systems and installed components correctly implement the qualified design.	Clarification			x	Tests are part of the EQ programme
91	Canada	5	183			In this Safety Guide environmental qualification is qualification for temperature, pressure, humidity, chemical exposure, radiation, meteorological conditions, submergence, and ageing mechanisms that might affect the proper functioning of components under those conditions Wet conditions are covered. What is the basis for meteorological condition – if it is recommended to be considered, it should be elaborated further			x	This is what is in the scope for qualification.
2	CANDU	5	187		Please "Certificate of Conformity" by the supplier	Separate qualification report for components in mild environment is not required			x	The more vague language was used before because there might be other acceptable forms for documenting the certification.
2	ENEL	5	187			A simplification of the paragraph could be useful to reach easily the content.	x			
25	Finland	5	187		...may be based upon third party certificates that the components...	Independence third party certificates also current practice in conventional industry. The vendor may make a summary statement of the compliance with the requirements.	x	reformulated with CANDU 2 commet.		

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96	FR	5	187		Environmental qualification of electrical power system components important to safety whose environmental service conditions during accidents are at no time significantly more severe than conditions during normal operations (mild environments) may be based upon supplier certification that the components are suitable for the specified operating conditions.	It is either no more severe or more severe. If it is more severe, the qualification should cover these potential conditions			x	Significantly is important here, because we don't care about conditions deviations that don't represent a meaningful increase of risk to the equipment. There needs to be some room for judgement.
97	FR	5	188		Environmental qualification of safety classified electrical power system components whose environmental service conditions during accidents are at any time significantly more severe than the conditions during normal operations (harsh environments) should show that the component is, at the end of its qualified life, capable of performing its safety functions under the full range of specified service conditions.	It is either no more severe or more severe. If it is more severe, the qualification should cover these potential conditions.	x			
92	Canada	5	190		5.232	New sentence at the end of section 5.190 "Equipment must be replaced prior to the end of the qualified life." A clear statement needs to be made. Section 5.232 does not address the issue specifically enough.			x	Not the same for passive and active components; this discussion is covered in NS-G-2.12.
93	Canada	5	190		The design life of the plant might be considerably longer than the qualified life of devices-	This is unnecessary and should be removed	x			
98	FR	5	190		Transform 5.190 into a footnote to 5.188	Explanation only			x	we prefer keeping it separate
94	Canada	5	193			The meaning of 5.193 is not clear as-written and needs to be re-examined by the writing team. Particularly the use of MAY when used in concert with "most rigorous".			x	This was here to try and head off regulators from requesting full scale EQ testing for equipment that is not safety classified. The sentence doesn't read quite right. It might be better to say that it may be acceptable to apply less rigorous qualification methods may be applied to items that are not classified as safety (or cat 1)
95	Canada	5	193		The most rigorous environmental qualification methods may be applied only to safety components-	We believe the meaning of most rigorous should be clarified. See comment # 107			x	This was here to try and head off regulators from requesting full scale EQ testing for equipment that is not safety classified. The sentence doesn't read quite right. It might be better to say that it may be acceptable to apply less rigorous qualification methods may be applied to items that are not classified as safety (or cat 1)
99	FR	5	193		Delete 5.193	Superfluous. (covered by 5.185) Furthermore, it weakens the previous paragraphs.			x	This was here to try and head off regulators from requesting full scale EQ testing for equipment that is not safety classified. The sentence doesn't read quite right. It might be better to say that it may be acceptable to apply less rigorous qualification methods may be applied to items that are not classified as safety (or cat 1)
96	Canada	5	208		Establishing the electromagnetic compatibility environment of electrical systems and components at each nuclear power plant unit involves unit specific analyses based on which the adequacy of each electrical component's electromagnetic compatibility requirements is evaluated.	This clause is not clearly written and is very difficult to interpret. Please re-visit the wording and clarify the intent of the clause.			x	Statement is clear.
100	FR	5	209		Locate 5.209 before 5.201	More logical place	x			
2	Germany	5	210		• The emission characteristics of wireless systems and de-vices used at the plant as well as those of repair, maintenance and measuring devices. Wireless systems and devices include, for ex-ample, mobile phones, radio transceivers, and wireless da-ta communication networks	The sentence below the last point belongs to the sentence of the last point and not to all points.	x			
18	CORDEL	5	210		5th bullet	It is suggested to insert a bullet that requires consideration of external or internal man made electromagnetic interference (i.e. EM pulse)			x	covered

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101	FR	5	213		Merge 5.213 with 5.12: 5.212. Limits on radiated and conducted electromagnetic emissions should be established for all plant equipment ( <u>important to safety and not important to safety</u> ): 5.213. as Any electrical or electronic equipment in the plant will contribute to the electromagnetic environment. Therefore, the need to apply limits to electromagnetic emissions applies to all plant equipment, not just equipment important to safety.	Same topic			x	editorial
97	Canada	5	223			This section is not specific enough. Please consider revising for better clarity.	x			
102	FR	5	223		Transform 5.223 into a footnote to 5.230	Explanation only	x			
23	RF REA	5	224		The existing text should be added with the following: In case of identification of the ageing mechanisms affecting the embedded electric components of the complete equipment, which are not acceptable from the perspective of declared performance of the complete equipment as a whole, it is recommended to apply relevant protection means that would ensure the reliability parameters as defined by the design. (e.g. electromagnetic shielding, seismic protection platforms, etc.)	E.g. the cabinets containing microprocessing devices have declared performance parameters that are different from the microprocessing devices' ones. Therefore, in some cases there is a need to apply additional protection means.			x	I&C is covered in DS 431
103	FR	5	225		Merge 5.225 with 5.224	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
6	Indonesia	5	227		<del>The ageing management program should be integrated with component procurement and warehousing in the implementation</del>	component procurement and warehousing are very important in the ageing management program to find the desired component effectively			x	there is no such wordig...
104	FR	5	230		The qualified life of safety components, <u>especially if they</u> that must perform their safety function in harsh environments should be determined.	Why limiting the question to components working in harsh environment ?			x	This is an objective of EQ.
16	Finland	5	231		Safety classified components should be replaced before the end of their qualified life. The requalification should be performed as necessary.	Replacing can be sometimes inferior alternative (e.g. ALARA point of view)			x	This is an objective of EQ.
105	FR	5	231		Locate 5.231 after 5.232				x	editorial
18	SWE	5	240		Add requirement on testability of redundant channels and load groupsx	There is a missing requirement for the testability of redundant channels and load groups.			x	this comment is not understood.
98	Canada	5	241		It is envisaged that certain tests could only be performed during reactor shutdowns.	Broadens coverage			x	Para is general enough.
106	FR	5	241		Design of test provisions <u>should</u> must be coordinated with the design of the operational test programme in order that availability requirements of the systems and components are fulfilled.	Recommendation			x	This sentence was originally intended to be informative. Don't use "should" unless you really mean to make it normative. If you do, then the next two sentences should form a new, normative, paragraph.
107	FR	5	241		This includes establishing test frequencies that take into consideration failure rates of components <u>as well as if</u> . It is envisaged that certain tests could only be performed during refuelling outages.	Clarification			x	This sentence was originally intended to be informative. Don't use "should" unless you really mean to make it normative. If you do, then the next two sentences should form a new, normative, paragraph.
108	FR	5	244		Merge 5.244, 5.245 and 5.246 as follows: 5.244. Periodic tests during plant operation will normally be necessary to achieve the reliability required of safety systems; however it is sometimes desirable to avoid conducting tests during operation if they put at risk safe plant operation: 5.245. <u>If</u> The capability for testing and calibration during power operation is not necessary if doing so would adversely affect the safety or operability of the plant. 5.246. <u>If</u> means are not provided for testing safety equipment during power operation the following should be provided: a. Justification that the reliability of the functions affected is acceptable, and b. <u>Consequences of unavailability of the system</u> , c. The capability for testing during shutdown.	Simplification. Consequence of unavailability should be evaluated.			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
30	UK	5	245		Delete	The intent of this paragraph is contained in the second sentence of Para 5.244.			x	This is different to 5.244. (Capability)
3	Germany	5	249		between 5.249 and 5.250: In order to increase reliability of standby components and functions a staggered testing should be pre-ferred.	The reliability of re-dundant standby sys-tems could be in-creased, if staggered testing is applied.			x	This section is about testing in general, testing methods are with each country.
109	FR	5	249		Delete 5.249	Not specific to electrical systems.			x	
99	Canada	5	250		Implementation of this recommendation involves evaluating and documenting the reasons for; root causes of; <u>systematic review</u> and actions taken after a failed test before the results of a repeated test can be used to demonstrate operability of the system or component involved	The term Root causes should be explained as these are not always necessary.			x	Root cause analysis is a standard tool.
110	FR	5	250		Delete 5.250	Not specific to electrical systems			x	editorial

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100	Canada	5	251		Evaluation and documentation of the root causes <b>systematic review</b> of a failed test, and remedial actions taken, are necessary before the results of a repeated test can be used to demonstrate operability of the systems or component involved. Corrective actions may, for example, include calibration or repair of components, or changes to test procedures.	The term Root causes should be explained as these are not always necessary.			x	Root cause analysis is a standard tool.
111	FR	5	251		Delete 5.251	Not specific to electrical systems			x	Relevant to tets
112	FR	5	252		Delete 5.252	Not specific to electrical systems			x	Relevant to tets
101	Canada	5	253		Ensure that Forbid the use of makeshift test set-ups, temporary jumpers, or temporary modification of computer code or data in plant components <b>are controlled by approved procedures.</b>	We suggest revising the text and removing the word makeshift, as it implies substandard installation or no controlled processes and should be avoided.			x	I think that this is an important point and is required, at least in the US.
113	FR	5	253		Delete 5.253	Not specific to electrical systems			x	I think that this is an important point and is required, at least in the US.
7	Indonesia	5	254	1	The design of I&C systems should include maintenance plans for all systems and components. It is recommended that the maintenance plans are completed with fault troubleshooting which performed in software and the system schematic diagram.	fault troubleshooting which performed in software is very valuable device to find the faulty components easily and fast			x	This is general recommendation on maintenance.
64	CORDEL	5	254		The design of I&C electrical...	Typo	x			
102	Canada	5	254		The design of I&C systems should include maintenance plans for all systems and components	This clause as written does not belong in this guide and should be in DS-431. However, if I&C was supposed to be part of Electrical Power Systems, then clause should stay.	x			
114	FR	5	254		The design of I&C electrical...	Typo	x			
65	CORDEL	5	256		Avoiding locating equipment in areas where conditions of extreme temperature or humidity are <u>ab</u> normal.	Typo			x	No, no, no! inserting ab makes the meaning incorrect. It now recommends installing conditions where extreme temperature conditions are normal. Maybe you want to go farther and say that on should avoid locating where extremes may be expected, i.e., not necessarily normal, but could occur from time to time.
115	FR	5	256		Avoiding locating equipment in areas where conditions of extreme temperature or humidity are <u>ab</u> normal.	Typo			x	No, no, no! inserting ab makes the meaning incorrect. It now recommends installing conditions where extreme temperature conditions are normal. Maybe you want to go farther and say that on should avoid locating where extremes may be expected, i.e., not necessarily normal, but could occur from time to time.
116	FR	5	258		Provisions for removing electrical equipment from service should ensure the equipment is properly isolated in order to protect the safety of operational personnel and to avoid spurious operation.	Superfluous	x			
103	Canada	5	259		If use of a facility for testing or maintenance can impair a function, the interfaces should be subject to hardware interlocking to ensure that interaction with the test or maintenance system is not possible without deliberate manual intervention <b>per plant design basis.</b>	Overly restrictive			x	This is the intention of this para.
117	FR	5	259		Delete 5.259	Not specific to electrical systems	x			
19	SWE	5	260		Add this text "There should be a desing solution in place to assure evidence of ready for operation mode".	The proposal should be complemented with the following text, as there are events reported on this issue.	x	Added new para		
104	Canada	5	260		The design should consider means to prevent the system from being unknowingly left in a test or maintenance configuration.	Improves wording	x	Deleted.		
118	FR	5	261		Delete 5.261	Not specific to electrical systems			x	This relevant also to elctrical systems.
17	Finland	5	262		... of paragraph 5.262 5.261		x			
19	CORDEL	5	262		"...recommendation of paragraph 5.262 will include..."	Is paragraph 5.262 the correct paragraph to be referencing? This seems to be a circular argument.	x	corrected		
31	UK	5	262		Provision shall be made to allow periodic tests of part of a safety system whilst the parts remaining in service can perform the required safety task.	To remove circular reference to Para 5.262.	x			
105	Canada	5	262		Change "5.262" to "5.261"	Typing error	x			

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
106	Canada	5	262			Clause refers to itself	x			
3	Lithuania	5	262		To change the referenced paragraph number	The reference in Paragraph 5.262 to itself (5.262)	x			
4	Germany	5	262		Safety systems designs that comply with the recommendation of para-graph 5.262??? will include provisions to allow periodic tests of part of a safety system while the parts remaining in service can perform the	The reference to para-graph 5.262 in this sen-tence seems to be not correct. Because this sentence is paragraph 5.262.	x			
24	RF REA	5	262		The No. of reference paragraph to be clarified (looks like § 5.261 instead of 5.262).	Paragraph No. is wrongly indicated	x			
119	FR	5	262		Delete 5.262	Not specific to electrical systems			x	This relevant also to elctrical systems.
120	FR	5	263		Delete 5.263	Not specific to electrical systems			x	This relevant also to elctrical systems.
121	FR	5	264		Delete 5.264	Not specific to electrical systems			x	This relevant also to elctrical systems.
107	Canada	5	267		Each unit in a multi-unit power plant should have separate and independent power systems important to safety. <b>Common electrical supply to multiple units is acceptable if analysis of the design shows adequate reliability.</b>	This is not case in some emergency power systems in CANDU plants.			x	This is about power systems important to safety which should not be shared among units.
2	IEEE	5	268		Replace: "in the event of an accident in one unit, an orderly shutdown and cool-down of the remaining units", with "a simultaneous accident in all shared units"	Fukushima has proven this scenario.	x			
7	Bernard	5	268		Should be deleted. Add a para stating that unit to unit connections should be installed to cope with the loss of the off-site and on site power sources	SSR 2/1 states that safety systems <b>shall not</b> be shared. In this document, the safety power AC or DC sources are the safety stand by AC power sources and the batteries (the alternate AC power source is assigned as a safety related system). EDG and batteries shall not be shared between units	x	Modified along with IEEE 2 comment.		
25	RF REA	5	268		To be deleted.	It can hardly be imagined that same important for safety element is shared by different objects.	x	Modified along with IEEE 2 comment.		
122	FR	5	268		Electrical power systems or components important to safety should not be shared between reactor units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions <u>for each unit</u> , including, in the event of <u>all units under accident conditions</u> an accident in one unit, an orderly shutdown and cool-down of the remaining units.	To be consistent with SSR2-1. Clarification (TEPCO Fukushima accident lesson)	x	Modified along with IEEE 2 comment.		
25	RF REA	5	269		To be deleted.	It can hardly be imagined that same important for safety element is shared by different objects.			x	That is the reason to keep it.
3	IEEE	5	270		Replace "the following conditions", with "both the following conditions"	Provides additional clarity and avoids possibility of misinterpretation of the intent.			x	This change and deleting 5.271 may be correct, but I think that you are ahead of consensus. It may be a destabilizing change.
25	RF REA	5	270		To be deleted.	It can hardly be imagined that same important for safety element is shared by different objects.			x	This change and deleting 5.271 may be correct, but I think that you are ahead of consensus. It may be a destabilizing change.
4	IEEE	5	271		Delete this paragraph in its entirety	This totally negates the intent of 5.270.			x	This change and deleting 5.271 may be correct, but I think that you are ahead of consensus. It may be a destabilizing change.
25	RF REA	5	271		To be deleted.	It can hardly be imagined that same important for safety element is shared by different objects.			x	This change and deleting 5.271 may be correct, but I think that you are ahead of consensus. It may be a destabilizing change.
123	FR	5	271		Merge 5.271 with 5.270	Same topic			x	This change and deleting 5.271 may be correct, but I think that you are ahead of consensus. It may be a destabilizing change.
66	CORDEL	5	275		Replace by " a-The component of different safety divisions should be easily distinguishable form each other b- In a same division the safety or associated safety systems should be distinguishable from the non safety systems.	The requirement is to identify from one hand the division and from the hand the safety or associated to safety system from the non safety systems			x	The wordig is in line with SSR 2/1 5.33
124	FR	5	275		Replace by " a-The component of different safety divisions should be easily distinguishable form each other b- In a same division the safety or associated safety systems should be distinguishable from the non safety systems.	The requirement is to identify from one hand the division and from the hand the safety or associated to safety system from the non safety systems			x	The wordig is in line with SSR 2/1 5.33
125	FR	5	276		Merge 5.276 with 5.274	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
126	FR	5	277		Merge 5.277 with 5.273	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
127	FR	5	277		Coherent and easily understood naming and identification of systems and components reduces the likelihood of <u>installing</u> , operating, maintaining, testing, modifying, repairing, or calibrating an item other than the one intended.	Clarification			x	during the installation, it may not always be possible
3	CANDU	5	279		Please include Testable Electrical Containment Penetration	This is required by most of the regulatory guides for Nuclear power Plant (RD-337 for Canada specifies the same).	x	Deleted.		
108	Canada	5	279			We suggest deleting this sentence as it is duplication with § 5.280 1st sentence and doesn't provide any additional value	x			
26	RF REA	5	280		...The safety classification of <b>electrical penetrations, irrespectively of their electrical functions, affects the structural integrity of the containment; therefore they should be classified as safety elements</b> To add, in the end of the paragraph: : .....taking into account the containment itself being a safety element.	According to Russian regulations NP-001-97 (PNAE G -01-011-97), para 4.6, all service lines (electric penetrations) passing through the containment boundary shall be treated as localizing elements of the safety system and shall be designed for confining, within the design boundaries, radioactive substances and ionizing radiation.			x	It is already included.
128	FR	5	280		Merge 5.280 with 5.279 as follows: 5.279. All containment electrical penetration assemblies should be classified as safety: 5.280. <del>as</del> Electrical penetrations are elements of accomplishing the containment safety function and will always be safety classified. Structural integrity functions include the ability to withstand rated and fault currents without the penetration leak rate exceeding requirements. The safety classification of a penetration's electrical functions that do not affect structural integrity will follow the safety classification of the in-containment items that depend upon the penetration.	Simplification. Superfluous			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
109	Canada	5	282	e	To withstand, without <b>consequential</b> loss of mechanical integrity, the maximum possible overcurrent condition that could occur following a single random failure of devices protecting against circuit overload.	Overly restrictive. Some loss of mechanical integrity may be permissible.			x	This is correct requirement.
27	RF REA	5	283		284,285: To exclude and replace with the following requirement: "Conductor cross-section for connecting cables shall be less as compared to that for the penetration conductor, at least at one side of the penetration."	A failure of (or a calculation error related to) such a protection device may lead to an accident with radioactive release. It is proposed to replace " <i>redundant protective devices</i> " with "a weak link" outside the penetration.			x	
5	IEEE	5	284		Replace: "by redundant" with "by redundant safety"	To protect the penetrations these devices must be safety.	x			
27	Finland	5	284		...protected by redundant protective devices that operate...	The text should be clarified	x			
67	CORDEL	5	284		To be deleted	The § deals with a given technology. The main requirement should deals with the single failure criteria for the containment integrity.			x	see 5.285
110	Canada	5	284		Delete 5.284-286	Overly restrictive. Some loss of mechanical integrity may be permissible (see comment for 5.282 (e))			x	see 5.285
129	FR	5	284		To be deleted	The § deals with a given technology. The main requirement should deals with the single failure criteria for the containment integrity.			x	see 5.285
130	FR	5	286		A containment penetration that can indefinitely withstand the maximum current available due to a fault inside the containment <del>does</del> <u>may</u> not need redundant protection.	To allow flexibility for the regulator or the licensee			x	editorial
111	Canada	5	290		The electrical protective devices for safety systems should be considered part of the safety system	Clarifies wording			x	I don't know the difference between should be, and should be considered. Suggest deleting considered. They are either part of the safety system or not. Dose considered part of the safety system mean that they could be not part of the safety system?
112	Canada	5	293		The function of the protective devices is to minimize equipment damage and any unnecessary interruption of electrical service resulting from mechanical or electrical failures.	Clarifies wording	x			
131	FR	5	296		The human machine interface (HMI) for electrical power systems should <del>comply with</del> <u>follow the</u> HMI recommendations of DS431, Ref. [3].	Clarification			x	What does it mean to follow? Does it mean to comply or does it mean something else.
28	RF REA	5	297		«busbar current» to be deleted.	There is a source current.			x	Not understand this comment.
29	RF REA	5	297		«standby» to be deleted.	Word «standby» is excessive.			x	This is mean for "stand-by" power sources.
20	CORDEL	5	299		"5.299. Procedures should exist for operation of the power systems during all plant states and electrical events <b>including design basis accidents and design extension conditions (i.e. severe accidents, aircraft crash etc.)</b> "	Does this include emergency procedures for design basis accidents and design extension conditions like severe accidents, aircraft crash etc.? If this is not the meaning here these conditions need to be added to this requirement.			x	This should be e.g., not i.e., etc is then not neededed and it is not useful in any case. It is not appropriate languae for a guide as it explains nothing. etc is not appropriate language for a guide.

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
4	Lithuania	5	301		To renumber paragraph 5.301 and subsequent paragraphs	Paragraph 5.300 is lacking	x			
113	Canada	5	304		Means should be provided to automatically initiate and control all safety actions per the design basis	Allows broader applicability			x	editorial
132	FR	5	304		Means should be provided to automatically initiate and control all <u>relevant</u> safety actions <u>expected from electrical systems</u> .	To allow flexibility and focus on electrical systems			x	editorial
6	IEEE	5	305		Delete, "In order to substantiate a claim that" and replace with "When"	Removes unnecessary wordage.	x			
133	FR	5	307		Delete 5.307	Superfluous			x	This is an important recommendation.
114	Canada	5	308	d	xAutomatic start and connection of the standby AC power source and loads to the safety power system in the specified sequence per the design basis;	Allows broader applicability			x	editorial
21	CORDEL	5	309		This section assumes that all safety standby AC power sources are prime movers running a generator. This is not true for the latest generation of passive plants use battery banks and DC/AC converters to provide safety power for 72 hours. This section needs include requirements to address standby AC power for passive plants.				x	The load sequencer applies only to EDG.
30	RF REA	5	309		«Automatic load-switching sequencers should work correctly ....»	Specification of wording			x	editorial
11	ENISS	5	310		At the end of the paragraph, delete "or non-safety": Some designs have standby AC power sources that are not safety classified. The general guidance for safety standby AC power sources applies, but the degree of equipment qualification, design confirmation and documentation is according to principles for safety related or non-safety components.	Incoherence between 5.310 and 5.311 that recommends safety related standby AC power sources.	x			
31	RF REA	5	310		5.313 This group of paragraphs to be deleted.	It is inadmissible to consolidate a standby power source for normal operation with an emergency power source.			x	
134	FR	5	310		Some designs have standby AC power sources that are not safety classified. The general guidance for safety standby AC power sources applies, but the degree of equipment qualification, design confirmation and documentation is according to principles for safety related or non-safety components. An adequate number of safety classified standby AC power sources should be available with appropriate diversity.	Non safety classified sources should not be credited in safety assessment.			x	
135	FR	5	311		Plants which <u>design and operation</u> do not require safety classified standby AC power sources should <u>nevertheless</u> have safety related standby AC power sources, <u>eventually not safety classified</u> , to provide reliable power for defence in depth functions that supplement and reduce the challenges to the safety systems.	In the safety assessment, either there is a need for standby source or not. If there is no need, then non safety classified sources could be used.			x	we prefer the current wording.
6	TK	6	0		Redundant HVAC systems should be located in the same enclosure as the redundant unit they serve or are separated in accordance with the same criteria as those for the systems they support	The statement on the left can be added to this section.			x	Out of scope
5	Mexico	6	1		Add SSR2/1 Req 22	New proposal.			x	Safety classification is covered in Section 3.
32	RF REA	6	2		The transmission system should be able to supply the NPP with power during startup, <b>normal operation</b> , shutdown and ...	Clarification of the statement			x	During operation main generator provides output to transmission.
115	Canada	6	3		The preferred power supply to the safety power systems is from the grid or main generator. During power operation the power supply is normally from the main generator, connected to the grid. The generator will act as a stabilizer against voltage variations on the grid and can power the on-site power systems during house load operation.	The strikethrough text is not a recommendation rather is a statement and we suggest that it should be treated as a note.			x	We prefer keeping existing text
116	Canada	6	4			Suggest to combine 6.4 & 6.5	x			
136	FR	6	5		Merge 6.5 with 6.4	Same topic			x	We prefer keeping it separate. By our rule normative and informative para are not combined.
3	ENEL	6	6		[...] without significantly increase the risk for undue trips and other disturbances	Minor wording suggestion.			x	editorial
137	FR	6	6		The preferred power supply could also come from a separate connection to the grid, the benefits of separating the different divisions of the nuclear power plant	Alternative wording			x	We prefer keeping existing text
20	SWE	6	7		New Text: "The design of the connection to the grid, the control circuits, and the relay protection should be <b>reliable</b> and contribute to a reliable preferred power supply."	High quality can lead to confusion and is difficult to be defined. Better wording is according to the new suggested text.			x	We prefer keeping existing text, reliable is already there.
68	CORDEL	6	9		The off-site power source 1 should have adequate capacity and capability to power plant loads during all modes of the nuclear power plant's operation.	Standby grids (off-site power source 2) have usually not the short circuit power to assure the start and normal power operation of the NPP.			x	We prefer keeping existing text
138	FR	6	9		The off-site power source 1 should have adequate capacity and capability to power plant loads during all modes of the nuclear power plant's operation.	Standby grids (off-site power source 2) have usually not the short circuit power to assure the start and normal power operation of the NPP.			x	We prefer keeping existing text
139	FR	6	10		Transform 6.10 into a footnote to 6.9				x	We prefer keeping existing text

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
117	Canada	6	11			This clause is difficult to follow because of the different terminology used: transmission system, on-site power, offsite and the power supply. It should be re-written to provide more clarity as per section 9.3 (i). With regards to terminology, please see comment # 3			x	We prefer keeping existing text
140	FR	6	11		The transmission system is also a significant contributor to the defence in depth strategy of the plant's safety design. The means for safe shut down of a nuclear power plant during transients and accidents, as well as normal shutdown, are more flexible and more reliable if off-site power is available.	The reliability is primarily relying on on-site sources.			x	We prefer keeping existing text
141	FR	6	13		Merge 6.13 and 6.15 as follows 6.13- 6.15 The total number of transmission line connections to the electrical grid will depend on the capabilities of the entire grid and on the design of the nuclear power plant itself. 6.15- Nuclear power plants with a single transmission line might have a higher forced outage rate owing to line tripping. This should be considered particularly important in areas where the frequency of lightning strikes on the line is high. In such cases, the nuclear power plant may prematurely reach design thermal stress limits unless the plant is designed to withstand the effects of the forced outages or that measures are taken to reduce the number of forced outages, possibly by adding additional transmission lines and greater level of protection.	Same topic			x	We prefer keeping existing text
118	Canada	6	14		In areas with high risk of pollution increased insulator length may be necessary to ensure that insulator contamination is not a threat of common cause failure of off-site supplies	We suggest the word "both" be removed to clarify the wording.	x			
119	Canada	6	15			We believe that the incorrect terminology is used and we suggest to change: "thermal stress limits" to "thermal stress cycles"	x			
120	Canada	6	15		<del>Nuclear power plants with a single transmission line might have a higher forced-outage rate owing to line tripping. This should be considered particularly important in areas where the frequency of lightning strikes on the line is high. In such cases, the nuclear power plant may prematurely reach design thermal stress limits unless the plant is designed to withstand the effects of the forced outages or that measures are taken to reduce the number of forced outages, possibly by adding additional transmission lines and greater level of protection.</del>	Unnecessary detail as this does not provide any value. It is more a statement rather than a recommendation and should be treated as a note.			x	We prefer keeping existing text
142	FR	6	16		Delete 6.16	In contradiction with all other recommendations			x	Not true, it is related to passive plants.
7	CORDEL	6	17		As a minimum, each <u>at least two</u> offsite power supply <u>supplies</u> should have the capacity and capability to power all electrical loads required to mitigate the consequences of all design basis accident and anticipated operational occurrences.	For plants with a third or fourth grid connection for special events (air craft crash ...) it is not adequate to claim the same capacity as for the first and second grid connection.			x	We prefer keeping existing text
12	ENISS	6	17		As a minimum, each at least two offsite power supply supplies should have the capacity and capability to power all electrical loads required to mitigate the consequences of all design basis accident and anticipated operational occurrences.	For plants with a third or fourth grid connection for special events (air craft crash ...) it is not adequate to claim the same capacity as for the first and second grid connection.			x	We prefer keeping existing text
13	ENISS	6	18		Delete this paragraph: Each offsite supply required for normal plant operation, start up and shutdown should have the additional capability to power the normal loads.	If required for normal plant operation, it is by definition, capable to power the normal loads.			x	We prefer keeping existing text
7	IEEE	6	19		After "At multi-unit sites", add "and adjacent plants utilizing one or more of the same off-site power supplies"	Some independently owned plants located adjacent to each other may utilize the same offsite power supply yet fail to recognize the limited capability of the power supply.			x	What are adjacent plants if not part of a multi unit site? Be specific.
8	IEEE	6	19		Add: "The requirements of 6.17 shall be met assuming design basis events and operational occurrences occurring simultaneously at multi-unit and adjacent Stations utilizing common offsite power supplies."	Fukushima has proven this scenario.			x	What are adjacent plants if not part of a multi unit site? Be specific.
33	RF REA	6	19		Paragraph to be added with the text: «including those connected to the same high-voltage distributing unit»	As we understand, it was assumed that the in-house consumption of unit should be powered from two off-site power sources (normal and standby ones), but this consideration is relevant also to single-unit NPPs.			x	We prefer keeping existing text
5	Spain	6	20		Say "..... dedicated circuits."	It is recommended to define the term "..... dedicated circuits." because in Mexico it is not used			x	We prefer keeping existing text which is not country specific.
9	IEEE	6	22		After "multiple units", add "or plants"	<b>See Comment No. 7 for the rationale.</b>			x	What is the difference between an plant and a unit? Derrik and I agreed to use unit and site, because plant is an ambiguous term. It can mean either unit or site depending upon who is using the term. So the meaning here is unclear.

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
34	RF REA	6	23		To be deleted.	We consider that the connection of normal-operation circuits to emergency supply buses should be minimized, especially it concerns to the standby transformer, since various circuits of safety system could be integrated within it.	x			
121	Canada	6	24		A minimum of one off-site circuit should be designed to be automatically available to provide power to its associated safety divisions within a few seconds following an anticipated operational occurrence or a design basis accident to meet the accident analysis requirements	We suggest this sentence to be modified. The AOO is a frequent event and this paragraph should include guidance for that event as well.			x	We prefer keeping existing text which is not country specific.
122	Canada	6	26		Preferably the second circuit would also be available within a few seconds following an anticipated operational occurrence or a design basis accident.	We suggest inclusion of AOOs as per the above comment			x	We prefer keeping existing text which is not country specific.
123	Canada	6	26		The on-site DC batteries should have sufficient capacity to support fundamental safety function loads for a time stated in the SBO analysis. A load shedding program may be implemented to decouple non-essential DC loads to prolong the battery life.	We suggest the following should be considered and addressed: It is noted that the DS 430 has no design bases clause recommending emergency power system batteries to have sufficient capacity to support fundamental safety function loads for a required time during a SBO event. Note:It is regulatory requirement in Canada that operator action for connecting temporary on-site services may not be taken for 8 hours. (Ditto for off-site services for 72hours). (RD337 v2 , section 7.10)Similarly, a load shedding program should be recommended to decouple non-essential DC loads to prolong the battery life.			x	We prefer keeping existing text which is not country specific.
143	FR	6	26		Merge 6.26 with 6.25	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
144	FR	6	29		Switching between two live circuits is not performed without risk and the transfer capability is <u>should</u> only to be used when actually necessary.		x			
124	Canada	6	31		6.32	We suggest that these two clauses be combined			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
145	FR	6	32		Merge with 6.31 6.31. The more reliable power supply should be selected for use during normal plant operation-6.32- <u>as</u> Selection of the most reliable supply for normal plant operation minimizes the transfer demands on switchgear.	Same topic	x			
32	UK	6	33		Keep text, but put text of 6.34 before text of 6.33	The intent of the text is more logical if the order of these two paragraphs is reversed.	x			
18	Finland	6	37		Examples of events that could cause simultaneous failure of both off-site circuits include: • The use of a common take-off structure for both off-site circuits; • Failure of a single breaker, switchyard bus cable, or control power supply that causes failure of both off-site circuits. • Fire at switchgear premises should be considered. Attention should be paid to the off-site connections so that their simultaneous lose is not likely.	These kind of events have happened at operating plants			x	This poara is bout switchyard.
125	Canada	6	39			Normally switchyard is not under nuclear plant, 6.39 can be deleted as 6.44 is adequate.			x	We prefer keeping existing text which is not country specific.
126	Canada	6	41		Control circuits to outdoor switchyards should be equipped with overvoltage protection when entering the plant and be isolated from the control circuits inside the plant <b>if the design allows vulnerabilities to switchyard voltage transients.</b>	Certain stations do not have over-voltage protection on the control connection to the switchyards. This has not been an issue. Properly designed grounding and lightning interception systems help control voltage from lightning. Control power is derived from power-conversion-equipment that controls voltage levels.			x	We prefer keeping existing text which is not country specific.
4	USA	6	45		Shouldn't there be some mention of the grid's ability to absorb losses of other transmission system elements in addition to large generators while maintaining stability and reliability?	Additional required capabilities of a Stable and Reliable Grid			x	This safety guide does not adress grid system.
127	Canada	6	46		"The grid under normal grid operating conditions should have enough running inertia"...	We suggest this change since many electrical grids may not survive a nuclear unit trip caused by off-normal grid frequency and voltage conditions.			x	We prefer keeping existing text which is not country specific.
128	Canada	6	47		The degree to which the grid can maintain an uninterrupted power supply to the nuclear power plant with sufficient capacity (e.g. voltage and frequency) is a measure of grid reliability	We suggest removing this clause as it appears to be more of a note than a clause.			x	We prefer keeping existing text which is not country specific.
10	IEEE	6	48		Add (g). "Coordinate circumstances and conditions arising from receipt of a sustained degraded voltage condition at the nuclear plant that may necessitate manual disconnection of the offsite power supply by the nuclear plant operator."	See provisions of para 5.305).	x			
129	Canada	6	49			Is the use of "States" in alignment with the IAEA nomenclature?	x	Corrected to Member States		
146	FR	6	49		Transform 6.49 as a footnote to 6.48	Not a recommendation			x	We prefer keeping existing text not a footnote.
147	FR	6	50		Transfer the last sentence ("One or more transmission system operators can supply the nuclear power plant.") in the footnote (former 6.49)	Not a recommendation			x	We prefer keeping existing text not a footnote.
148	FR	6	59		Transform 6.59 into a footnote to 6.58				x	We prefer keeping existing text not a footnote.

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
21	SWE	6	60		The preferred power characteristics that are essential to plant safety - delete including compliance with the recommendations of this SG- should be documented in the plant Safety Analysis Report	It has been stated that the recommendations of this Safety Guide, should be documented in the plant Safety Analysis Report. This is very demanding and could lead to a lot of cost in form of new projects and to a new agreement with the national inspectorate.	x			
130	Canada	6	60		Change: "The preferred power characteristics" to "the preferred power supply characteristics"	To maintain consistent terminology with established definitions.	x			
149	FR	6	60		The preferred power characteristics that are essential to plant safety, including compliance with the recommendations of this Safety Guide, should be documented in the plant safety analysis and ensured by the <u>nuclear power plant operator</u> licensee.	For consistency with previous paragraphs	x			
22	SWE	6	61		The text should give understanding what does it mean regular basis and what normal /practical periodicity should be.	It has been stated that "...the analysis should be performed on a regular basis."  What kind of analysis? This should be specified in more details here.  How often the regular basis? The time factor should be stated here based on best engineering estimations.	x			
131	Canada	6	61		That is, a regular update of the electrical model should be performed to keep the model in-line with the plant configuration.	Please add the text at left to clarify the existing text.	x			
150	FR	7	1		The variations of voltage and frequency in the nuclear power plant's electrical power system during any mode of plant operation should not degrade the performance of any safety system equipment important to safety.	No need to restrict to safety systems			x	It is true but it is relevant especially for safety systems.
3	Mexico	7	2		"The design basis for each items important to safety shall specify the necessary capability, reliability and functionality for the relevant operational states, for accident conditions and for conditions internal and external hazards, to meet the specified acceptance criteria over the lifetime of the nuclear power plant"	Compatibility with requirements			x	We prefer keeping existing text which is not country specific.
23	SWE	7	4		New text: "The magnitude of these variations <b>should not</b> impact equipment negatively that is starting, already sequenced or operating."	This can lead to a better understanding	x			
132	Canada	7	4		7.4 Standby power supplies used for on-site power systems will have voltage and frequency variations during load sequencing. The magnitude of this variation which may impact the equipment that is starting as per prescribed sequence or already operating should be considered.	Suggest to modify the clause in this way.	x			
1	TK	7	5		Vibration: Vibration amplitudes shall be limited to be within the design of the diesel-generator unit and auxiliary components. Solenoids, relays, and other devices shall be mounted in such a way to minimize vibration effects	In our opinion this can be mentioned especially.			x	This is related to electrical events.
133	Canada	7	6		Degradation of the preferred power supply of each safety power system bus (i.e. overvoltage, undervoltage, overfrequency, and underfrequency) should be detected on the buses of the safety AC power systems <b>as required per the plants design basis.</b>	It is not necessary to detect on the safety buses.			x	It concerns especially safety buses.
11	IEEE	7	7		First line, after "automatic", add " or manually (by operator action)"	Manual disconnection following operator assessment of the degraded situation should remain an available option in the interests of nuclear plant safety. (See provisions of para 5.305). It is recognized that no voltage sensor is capable of accurately monitoring and predicting the transient conditions on the grid that cause degradation; therefore, manual operator action may be preferred to automatic action.			x	Manual action is generally considered to be not fast enough because the degradation can prevent proper operation of ESF. The degraded grid condition could also trigger a need for ESF.
134	Canada	7	7		Buses affected by degradation of the preferred power supply should be automatically disconnected from its power source if the degradation exceeds the levels specified in the design requirements <b>per the plant's design basis.</b>	Annunciation plus operator action may be acceptable depending on the station			x	Manual action is generally considered to be not fast enough because the degradation can prevent proper operation of ESF. The degraded grid condition could
135	Canada	7	9		7.9. A time delay may be associated with the disconnection to allow the system to ride through minor disturbances if supported by the assumptions in the accident analysis.7-10. The time delay should be supported by the assumptions in the accident analyses	Combine, clarifies wording			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
4	ENEL	7	10			This paragraph could be shifted to the previous adding completeness to the 7.9 paragraph due to similarity of content.			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
151	FR	7	10		Merge 7.10 with 7.9	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
138	Canada	7	15	c	Two levels of voltage protection with different time delays <b>should be considered</b> are necessary <b>per the plants design basis</b> : one level to detect loss of off-site power at the safety buses; and a second level for degraded voltage.				x	This is a correct recommendation.

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
139	Canada	7	15	e	Each scheme should monitor all three phases. Replace with: <b>Each scheme should monitor the phase voltages necessary to produce a reliable design.</b>	Overly restrictive, may not be required			x	This is a correct recommendation.
140	Canada	7	15	g	The protection system design should <b>consider</b> be redundant <b>schemes for main supplies.</b>	This clarifies wording.			x	This is a correct recommendation.
152	FR	7	16		Voltage monitoring, used only for alarms, does <u>may</u> not have to meet the guidance of paragraph 7.14.				x	It is correct wording.
141	Canada	7	18			This is a statement and should be treated as a note rather than a clause.			x	We prefer keeping existing text not a footnote.
5	Finland	7	19		DC430 classification should be in line with SSR-2/1. E.g. N+2 criteria should be included in DC430.		x	The entire section 3 replaced to comply with DS 367 classification.		
5	Romania	7	19		Insert the definition for "single failure criterion."	For better understanding.			x	It is in Safety Glossary
153	FR	7	23		Merge 7.23 with 7.22	Same topic			x	We prefer keeping it separate. By our rule normative and informative para are not combined.
5	Germany	7	24	b	Any undetectable failures, i.e., any failure that cannot be detected by periodic testing, alarm or anomalous indication of anomalous parameters;	The indication is correct, but the parameters are anomalous (=> component has failure)			x	We prefer keeping existing wording.
154	FR	7	25		Delete 7.25	True but weakens the overall section	x			
155	FR	7	26		Locate 7.26 in 7.28	More logical place (see comment below)			x	We prefer keeping existing wording.
156	FR	7	28		Merge 7.28 with 7.27 : 7.27. Non-compliance with the single failure criterion should be exceptional and should be clearly justified in the safety analysis. 7.28: Non-compliance with the single failure criterion may be justified <u>for example</u> for:	Same topic. To insist the list may not be all inclusive			x	We prefer keeping existing wording.
157	FR	7	28		• Very rare postulated initiating events. <u>It is however advisable to pay particular attention to the possibility of low frequency external hazard;</u>	To incorporate recommendations of (former) 7.26			x	redundant to 7.28
158	FR	7	28		• <del>Features that are provided only for design extension conditions;</del> and	DEC provisions might need some redundancy. Deleting this bullet does not preclude its applicability as the list is given as example (see previous comment)			x	It does not exclude minimum redundancy.
159	FR	7	28		• Postulated failures whose likelihood can be shown to be sufficiently remote as to be discounted. <u>It is however advisable to pay particular attention to the possibility of the long term unavailability of support systems that are necessary for the operation of power supplies.</u>	To incorporate recommendations of (former) 7.26			x	redundant to 7.28
160	FR	7	31		Merge 7.31 with 7.30	Same topic			x	We prefer keeping it separate. By our rule normative and informative para are not combined.
4	CANDU	7	35		Please include Seismic Qualification for the Safety Standby AC Power Sources	This is to comply with the requirement of Safety standby AC power sources to continue to be able to operate before, during and after a Design Basis earthquake.			x	This is SSR2/1 specific statement, cannot be changed.
69	CORDEL	7	37		To be deleted				x	It is correct recommendation.
161	FR	7	38		Merge 7.38 with 7.37	Same topic			x	We prefer keeping it separate. By our rule normative and informative para are not combined.
19	Finland	7	39		When electric motors are subjected to voltages, below the...	Spelling	x			
70	CORDEL	7	39			Typo: There are two § 7.39	x			
71	CORDEL	7	39		Delete numerical requirement on diesel	The guide should give the high level requirement. Technology oriented solution should not be part of the guide.			x	We prefer keeping existing text.
5	Lithuania	7	39		The second paragraph number 7.39 and subsequent paragraphs shall be renumbered	Number 7.39 is used twice	x			
162	FR	7	39			Typo: There are two § 7.39	x			
3	FR	7	40		The draft should concentrate on the main safety objective aiming to define the safety assessment principles of the electrical system. The detailed characteristic of components or systems may be addressed in the new initiative of the SC 45 for the release of the code and standard for the electrical system of the NPP. (example § 7.91, 7.40, 7.39, Annex II				x	We prefer keeping existing text.
36	RF REA	7	40		Text to be clarified.	The statement: "The continuous rating of the standby source prime mover preferably allows 3000 to 4000 hours of continuous operation without major overhaul" requires further clarification..			x	We prefer current level of details.

MS No.	Member State	Para/Line No.	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
142	Canada	7	40		The continuous rating of the standby source prime mover preferably allows 3000 to 4000 hours of continuous operation without major overhaul. A 10–15 % for a minimum of two hours in a 24 hour period is typically provided. This provides assurance that the power source can handle the short time loading at the onset of an event when engineered safety feature systems are realigning for injection or cooling system operation and their pumps are operating at run out conditions or with higher flow than assumed in thermo hydraulic analyses. The thermo hydraulic analyses are normally conservative in such a way that the expected power consumption of motors might be underestimated	Delete the clause. The clause contains too much info on too many topics. Most of the clause is not universally applicable or does not have justifiable bases.			x	We prefer keeping existing text.
163	FR	7	40		The thermo hydraulic analyses are normally conservative in such a way that the expected power consumption of motors might be underestimated.	Superfluous			x	We prefer keeping existing text.
143	Canada	7	42			This is a statement and should be treated as a note rather than a clause.			x	We prefer keeping existing text.
164	FR	7	42		Merge 7.42 with 7.41: 7.41. The capability of motor driven pumps to deliver required flows should be evaluated for the generator operation at lower end of frequency. 7.42: as A variation in frequency affects the torque developed by motors.	Same topic			x	We prefer keeping existing text.
5	ENEL	7	44		44-46	It is suggested to collect all the information in only one chapter in order to guarantee clarity and simplicity of the content.			x	We prefer keeping existing text.
35	RF REA	7	45		To be deleted.	Not clear which emergency signal is meant here. Diesel generator should start exclusively upon the fact of decrease of frequency or of voltage			x	We prefer keeping existing text.
144	Canada	7	47		7.47 On-site sources of fuel and other consumables (such as lube oil) should be sufficient to operate the standby power sources until off-site power supply can be restored or off-site shipments of fuel/consumables are delivered. 7.48 Off-site sources of fuel and other consumables may be depended upon if sources of replenishment are identified and on-site sources of are sufficient for the time required to replenish supplies. In most member states on-site sources are sized for 1 to 2 weeks of operation without replenishment from external sources.	Clarifies and simplifies			x	We prefer keeping existing text.
165	FR	7	47		Locate 7.47 before 7.44	More logical location			x	We prefer keeping current location.
34	UK	7	48		"... Are of sufficient capacity for the time..."	Typographical error - word missing	x			
6	Germany	7	48		Supply of fuel and other consumables may depend on Off-site sources of fuel and other consumables may be depended upon if sources of replenishment are identified and on-site sources of are sufficient for the time required to replenish supplies. In most member states on-site sources are sized for 1 to 2 weeks of operation without replenishment from external sources.	The sentence was difficult to understand.	x			
166	FR	7	48		Merge 7.48 with 7.47	Same topic			x	We prefer keeping it separate. By our rule normative and informative para are not combined.
24	SWE	7	50		Reformulate the text. The loss of the DC power source within the same division as the standby power source could lead to the unavailability of the standby AC power source, but it would also cause loss of other functions in the division, <b>which are not requiring the standby AC supply.</b>	"...making the standby AC supply in that division not required." This is confusing and needs to be reformulated.			x	We prefer keeping existing text.
167	FR	7	50		Merge 7.50 with 7.49	Same topic			x	We prefer keeping it separate. By our rule normative and informative para are not combined.
33	UK	7	51		When using batteries specifically dedicated to the standby power source, they should be subject to an adequate surveillance to detect deterioration and failure and is applied to the same extent as it is on any safety system battery.	The second sentence is not required if it is stated that failure surveillance should be adequate.	x			
145	Canada	7	51		When using batteries specifically dedicated to the standby power source, they should be subject to the adequate surveillance as any safety system battery. Use of station batteries for control power is preferred because it is more likely that failure of station batteries will be detected	We suggest that the last sentence be further elaborated as its basis is unclear.	x			
168	FR	7	51		Delete 7.51	First part on surveillance is applicable for any item important to safety. The second sentence is supposing inadequate surveillance...			x	Modified with UK33 comment.
3	TK	7	52		If non automatic interconnecting means are furnished, provisions that prevent paralleling of the redundant standby power sources shall be included	When reviewing standby power source divisions' independency the sentence on the left blank can be added to 7.52.			x	It is correct statement.
169	FR	7	52		Standby power sources should be independent of electrical power <u>and</u> I&C sources other than those in their own division.	I&C should also be considered	x			
170	FR	7	52		Locate 7.52 before 7.49	More logical position considering modified 7.52	x			
25	SWE	7	54		Please clarify in the text what does it mean exactly - see comments.	This is confusing about the peaking generation. Is it a requirement on batteries or on diesel-generators? If it is on batteries it has to be wrong, batteries shall always have peaking generation capabilities. If it is on diesel generators it is confusing. This needs to be reformulated.			x	We prefer keeping existing text. See Canada 146 comment.

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146	Canada	7	54		The use of standby power sources as peaking generation is not preferred. However, if it is demonstrated that this mode of operation has no adverse impact on nuclear safety it may be applied to support the reliability and stability of the Grid.	Standby power sources may used for peaking generation when there are multiple sources and only a limited number are required to meet the nuclear safety requirements (e.g. 2 out of 4 generators) and they are needed to support the stability and reliability of the electrical grid.			x	We prefer keeping existing text.
171	FR	7	57		Merge 7.57 with 7.56	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
72	CORDEL	7	59		Delete sentence "The load sequencer should only permit start of non-safety loads after safety loads are started and it is determined that there is enough capacity for start and operation of the non-safety load." Or change "load sequencer" by "load sequence"	Quality and clarity. The respect of § 5.43 allows the load sequencer to reload the few non safety loads. Otherwise this may lead to less simple load sequence program which did not enhance robustness	x			
172	FR	7	59		Merge 7.59 with 7.58	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
173	FR	7	59		Delete sentence "The load sequence should only permit start of non-safety loads after safety loads are started and it is determined that there is enough capacity for start and operation of the non-safety load." Or change "load sequencer" by "load sequence"	Quality and clarity. The respect of § 5.43 allows the load sequencer to reload the few non safety loads. Otherwise this may lead to less simple load sequence program which did not enhance robustness	x			
4	TK	7	60		Provisions may be made for control both from the control room and external to the control room.	In our opinion, when reviewing standby power source transferring to PPS manuel actions the sentence on the left blank can be added to 7.60.			x	It is correct statetment.
174	FR	7	61		Merge 7.61 with 7.60	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
147	Canada	7	64		The design of the test provisions should <b>consider allowing</b> ensure that the standby power source <b>to</b> ean continue to perform its safety function during testing.	Overly restrictive			x	It is correct statetment.
175	FR	7	66		Transform 7.66 into a footnote to 7.65	Example			x	we prefer keeping it at current location.
35	UK	7	68		" on motor terminals is sufficient..."	Typographical error	x			
176	FR	7	71		Merge 7.71 with 7.70	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
7	Germany	7	77		Starting systems typically have the capacity to support at least 5 starts. In order to preserve resources for starting systems, duration of starting period is limitedsupport this, it is normally necessary to abort any starting attempt after a specified time to preserve resources.	The second sentence is too long, so that this sentence should be shortened.			x	We prefer keeping existing text.
177	FR	7	77		Merge 7.77 with 7.76	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
178	FR	7	81		Merge 7.81 with 7.80	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
5	CANDU	7	82		Please include the requirement of embedded software categorization and software qualification for all DC systems such as battery charger, UPS systems	This is to prove that the required system and the embedded software are available after performing Failure MODE Effect Analysis. The software is designed to meet the system safety qualification.			x	I&C requirements ar in DS 431.
179	FR	7	83		Merge 7.83 with 7.82	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
8	TK	7	84		7.84. The connected DC loads should be rated for float voltage and equalizing voltage.	In our opinion, this is not "general" principles needed in general dc power systems part. It can be under "battery" section.			x	this is related to DC section, not only battery.
36	UK	7	85		Add a new paragraph –between 7.85 and 7.86 to read : 'equipment within battery rooms (egg light fittings) should be explosion proof rated.	The aspect of electrical equipment in battery rooms does not appear to be included.			x	Not ure if it is a standard requiremet.
180	FR	7	85		Merge 7.85 with 7.87	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.

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6	ENEL	7	86		7.94	ENSREG in the "EU Stress Tests Specifications" asks for the evaluation of consequences in case of loss of off-site power and of on-site backup power sources (SBO). In the specifications, for each of the analysed situations, is required that should be possible to "provide information on the battery capacity and duration". No information regarding the monitoring system for the battery capacity and status is highlighted in these paragraphs. It is suggested to include for completeness a paragraph regarding this topic.			x	Sizing is covered by 7.87
8	Bernard	7	87		Should be deleted.	The sizing case shall be defined by the deign basis. It is difficult in a safety guide to affirm what the safety case is.			x	
181	FR	7	87		The limiting case for battery capacity sizing is normally station blackout. <u>An autonomy of a few hours should be sought to avoid undue pressure on operating staff for implementing actions described in emergency operating procedures. For NPP with an alternate standby power supply, a significantly longer autonomy should be sought for battery to used under a full SBO.</u>	Strengthen the recommendation and include full SBO aspects			x	Autonomy is not the right word here. I think that you mean capacity. There are two new normative statements there should be each their own paragraph. These statements could be informative as 7.86 seems to be sufficient as a recommendation.
37	UK	7	88		Battery rooms should be designed and ventilated to maintain concentrations of combustible gases below prescribed levels. Passive ventilation (without the use of fans) is strongly preferred provided that the required number of air changes per hour are met"	Shape of room/ceiling can assist removal of combustible gases. Also It is much safer to avoid any dependence on ventilation fans etc if this is possible.			x	We are not sure why. Most often there are hydrocaps now so the fans are not so important. Further if there is not power for fans, you are probably not charging the batteries either. There should normally be alarms on the fans.
73	CORDEL	7	88			This statement addresses the sizing of a specific system. What about the severe accident batteries?			x	see comment UK 37.
20	Finland	7	89		c. The exhaust should be directly neted out.	Otherwise hydrogen might be transferred to other plant rooms.			x	Desing of ventilation system is separate issue.
182	FR	7	89		Merge 7.89 with 7.88	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
11	TK	7	90		7.90. Batteries should be periodically tested in order to demonstrate the operability of the system and to detect any degradation. Design should have the capability to peimit integral periodic testing of safetyrelated dc systems when the reactor is in operation.	In our opinion the second sentence can be used for 7.90.			x	It is already covered in the first sentence, the implementation is not pat of the safety guide.
183	FR	7	91		Merge 7.91 with 7.90	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
184	FR	7	93		Merge 7.93 with 7.92 as follows: 7.92. The temperature of the battery rooms should be monitored.-7.93- as Battery capacity and lifetime is temperature dependent.	Same topic			x	Keep 7.93 and 7.94 separate. Informative and normative. Even without this diference they don't make a poper paragraph
37	RF REA	7	94		To reword as follows Fuses in the connecions to the DC panel should be monitored.	Line distribution and protection is arranged within the DC panel.			x	Keep 7.93 and 7.94 separate. Informative and normative. Even without this diference they don't make a poper paragraph
6	Romania	7	100		Delete subparagraph a, b, fig. 7 and fig. 8.	These explanations are not necessary.			x	We prefer keeping existing text.
21	Finland	7	101		Battery chargers should be able to supply the loads without any battery connected. Even in this case the voltage quality should be kept in the range that the loads require.				x	It is covered by 7.100
38	RF REA	7	101		To be deleted.	The requested capacity of rectifiers should be unreasonably high in that case.			x	We prefer keeping existing text.
74	CORDEL	7	105		Depending on the type of loads and the diversity provision an uninterruptible AC power systems may not be necessary. With modern I&C systems it is feasible to power all loads requiring continuous power with DC. Such an approach eliminates a source of failure.	Quality and clarity. The use of AC Uninterruptible Power has two main drivers. It is preferable to identify the drivers for a better understanding			x	editorial

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185	FR	7	105		Transform 7.105 as a footnote to 7.104, with a slight change as the beginning (Some plant designs will <u>may</u> not need uninterruptible AC power systems.) Depending on the type of loads and the diversity provision an uninterruptible AC power systems may not be necessary. With modern I&C systems it is feasible to power all loads requiring continuous power with DC. Such an approach eliminates a source of failure.	Clarification. The use of AC Uninterruptible Power has two main drivers. It is preferable to identify the drivers for a better understanding			x	We prefer keeping existing text.
26	SWE	7	106		A requirement on extra external bypass on the UPS or additional source would be useful and should be added	If the independence between the inverter and the static switch is not good enough, it is preferable to build an extra separated bypass switch externally. The uninterruptible buses can then always be supplied with power from a power source, i.e. the diesel generators. This is crucial for the robustness and might often be necessary to improve the availability of the overall system.			x	already described in section
9	Bernard	7	110		Should be deleted.	Idem as comment 7			x	This is true statement
186	FR	7	110		Transfer 7.110 at the end of 7.112	More logical location			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
38	UK	7	113		"...by the inverter itself, as well as by any non-linear loads, do not degrade..."	I have never heard the term "non-sinusoidal load". I believe the normal/correct term is "non-linear load"			x	This is true statement.
187	FR	7	118		Merge 7.118 with 7.117	Same topic			x	We preefer keeping it separate. By our rule normative and informative para are not combined.
27	SWE	7	122		The following text shall be added: " Note that it is preferred that the inverter does not have an over voltage protection on the DC side."	Note that it is preferred that the inverter does not have an over voltage protection on the DC side.	x			
28	SWE	7	125		Reformulate the text.	Normally there is no frequency protection on the rectifier. The inverter has a frequency window on the inverter output versus the bypass, but no protection.			x	This is in case of inverter malfunction.
2	TK	7			Moving parts shall be designed to withstand that level of over speed that results from a short-time rating load rejection.	In our opinion this can be mentioned because of preventing unit from tripping on short-time rating load rejection.			x	cannot locate this comment in the text.
2	Ukraine	8	0		It is proposed to introduce a clarification to the requirement set to alternatie AC sources. "different types of initiating events resulting in NPP blackout shuld be taken into account under selection of a connection diagram and location of alternative AC sources".	For clarification.	x	The entire section modified in line with latest SSR 2/1 requirements 68.		
148	Canada	8	0		<b>Bypassing</b> trip devices that protect the standby power source from non-catastrophic failures should be <b>bypassed considered</b> when the standby power source is supplying safety loads during emergency operation <b>per plant design basis</b> . <b>Trip devices</b> but should be in service during normal operation and testing.	Overly restrictive, should not require this feature in all cases	x	The entire section modified in line with latest SSR 2/1 requirements 68.		
10	Bernard	8	1		An alternate AC power supply should be provided at or near the plant if the plant's design depends upon AC power to bring the plant to a controlled state following loss of offsite power <b>a station black out</b> .	Mistake	x	The entire section modified in line with latest SSR 2/1 requirements 68.		
14	ENISS	8	1		An alternate AC power supply should be provided at or near the plant if the plant's design depends upon AC power to bring the plant to a controlled state following loss of offsite and onsite power.	Alternate AC power supply is used for coping with a station blackout where offsite and onsite are lost.	x	The entire section modified in line with latest SSR 2/1 requirements 68.		
39	UK	8	1		8.16??	This whole section is a new proposal – I am not aware of any NPP that currently has such an off-site alternate AC supply. Hence I believe it goes beyond current "international best practice" which paragraph 1.2 claims this document represents	x	The entire section modified in line with latest SSR 2/1 requirements 68.		
39	RF REA	8	1		To add in the end of paragraph: ... <b>and internal standby power source.</b> »	Existence of internal standby power sources of the safety system channels should be taken into account.	x	The entire section modified in line with latest SSR 2/1 requirements 68.		
40	RF REA	8	2		Alternate AC power supplies are provided to <b>supply the consumers with AC</b> . protect the electrical systems against the simultaneous failure of off-site and emergency AC power supplies.	Alternate AC power supplies are elements supporting the process and control equipment; they are not intended for protection of electric systems	x	The entire section modified in line with latest SSR 2/1 requirements 68.		
11	Bernard	8	4		To be deleted	8.4 and 8.5 are similar, the sentence in 8.5 "for a period of time that is sufficient for reliable restoration of other power sources".is much better.	x	The entire section modified in line with latest SSR 2/1 requirements 68.		
12	Bernard	8	7		Should be deleted for new reactors		x	The entire section modified in line with latest SSR 2/1 requirements 68.		
22	CORDEL	8	8		The alternate AC power source <b>circuit breaker</b> for one unit should <b>not</b> normally be <b>connected disconnected to from</b> the on-site power system of that unit.	It should be cleared which portion should be disconnected. Para. 8.9 allowed that support systems that maintain the AAC in readiness are powered from on-site power systems.	x	The entire section modified in line with latest SSR 2/1 requirements 68.		

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22	Finland	8	12		Provisions should be made for connecting the alternate AC power supply to one or all safety power system buses. This connection shall be normally open and require manual actions to introduce it in operation.	This reduces common cause failure probability			x	We prefer keeping existing text.
13	Bernard	8	14		The alternate AC power supply may also have the capability to power the loads necessary to mitigate a severe accident or to prevent an early or large release	The alternate AC power source shall not be credited or used for just any else event.			x	We prefer keeping existing text.
149	Canada	8	15		The design should include complementary design features for connection of portable or transportable power sources or a combination of these to cope with prolonged total loss of AC power or DC sources	IAEA DS-430 does not include guidance for complementary design features involving provision for connecting portable or transportable generator sets to plant emergency power systems to cope with design extension conditions. This approach would allow operational flexibility to respond to prolonged total loss of AC power or DC source resulting from extreme or unpredictable scenarios. Also, SSR 2/1 § 6.45 should expand to address this addition and verify the consistency with these documents Note: This should come after §8.16 as (a)			x	We prefer keeping existing text.
150	Canada	8	16		Alternate AC power supplies should be capable of supplying the required loads within the time specified in the plant safety analysis, the plant station blackout and DEC coping analyses.	As per definition of Alternate Power Supply, we suggest that DEC should be included in this paragraph as well			x	We prefer keeping existing text.
12	IEEE	8	17		Add a para 8.17 as follows: "Extreme caution should exercised when the AAC power supply is 30° out of phase with plant systems. There are extreme safety hazards associated with the inadvertent connection of this AAC source when the plant buses are energized. It is important that both mechanical and electrical interlocks be provided to positively block such inadvertent closures to ensure the continued integrity of nuclear plant safety buses."	Some existing plants have been approved with 30° phase shift AAC systems that are under control of only administrative procedures and electrical interlocks.			x	Paralel operation should be allowed, this, when applied may be dangerous.
7	FR	8				In section 8, change "alternate AC power supply" to "alternate emergency AC power supply" to be clearer on the intended use			x	We prefer keeping existing text.
9	TK	9	0		Independence between redundant portions of the system; independence between non-class IE systems and class IE systems; and effects of DBA on the systems should be provided.	The statement on the left can be added to this section.			x	We prefer keeping existing text.
10	TK	9	0		In the design of battery locations: loading calculations of floor and supports, adequate space and illumination for inspection, maintenance, testing and cell-battery replacement, protection against natural hazards, arching contacts and hydrogen pockets formation should be taken into consideration.	The statement on the left can be added to this section.			x	We prefer keeping existing text.
151	Canada	9	3	f	See proposed text in comment 166	Refer to comment #166			x	We prefer keeping existing text.
152	Canada	9	4		Demonstration that adequate mitigating measures against station blackout and DEC are implemented	The sentence needs to be modified to include DEC			x	We prefer keeping existing text.
188	FR	9	8		The use of software or complex multi-element logic modules might provide result in difficulties in justification of reliability and sensitivity to common cause failures. The reliability may therefore largely depend on assurances of freedom from error in the design and implementation process.	Clarifications			x	It is a fine point, but we have tried to be careful to use may for something that is permitted and might for some that could happen, but is not necessarily ok.
153	Canada	9	12		7.91	The purpose of this sentence is not clear and should be clarified.			x	Sentence is clear.
14	Bernard	Annex	1		Comments made for 5.8 and 5.9 should be reflected in the para dealing with the fourth level				x	
154	Canada	Annex	1		The discharge rate and test duration should correspond as close as practicable to the battery duty cycle	We suggest that the discharge time of the battery should be specified in either of these sections.			x	
156	Canada	Annex	1	12	Power Quality Power quality analysis should be performed for important to safety AC and DC control and instrumentation power supplies, including the evaluation of transient disturbances, electro magnetic effects and harmonic distortion. It should identify equipment that will be affected by poor power quality and the ones which potentially contribute to it such as variable speed drives and battery chargers. Assumptions and conclusions demonstrating that the acceptance criteria addressing the power quality for the identified equipment have been met.	We feel that requirement for a power quality assessment of control power supplies should be added. We have included a clause for consideration.			x	We prefer keeping existing text.
75	CORDEL	Annex	1	2	Common cause failure due to electrical events is not postulated for passive equipment like busbars, cables and transformers and fuses	To be consistent with 5.284 and not to exclude European approach (e.g. KTA 3705)			x	There is no CCF.
189	FR	Annex	1	2	Common cause failure due to electrical events is not postulated for passive equipment like busbars, cables and transformers and fuses	To be consistent with 5.284 and not to exclude European approach (e.g. KTA 3705)			x	There is no CCF.
8	CORDEL	Annex	1	9	Incomplete design bases, resulting in equipment not qualified appropriate for the intended function, cannot be solved by redundancy or diversity.	"qualified" means to fulfill certain specifications. In that case "appropriate" seems to be a more precise wording.			x	qualified is appropriate wording
15	ENISS	Annex	1	9	Incomplete design bases, resulting in equipment not-qualified appropriate for the intended function, cannot be solved by redundancy or diversity.	"qualified" means to fulfill certain specifications. In that case "appropriate" seems to be a more precise wording.			x	qualified is appropriate wording

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190	FR	Annex	I	22	For some reactor designs (usually designs with passive safety features) it might be shown in the safety analyses report <u>that</u> only one off-site power connection is sufficient.	Superfluous	x	we prefer keeping brackets.		
50	UK	Annex	I	30	Remove last sentence of this paragraph	Any modification to the control system introduces complexity and the risk of failure. In addition, it means the test is no longer reflective of the duty the unit will have to perform.	x			
9	CORDEL	Annex	I	38	In order to handle <u>minimize</u> common cause failure risks for software based devices, the design of these items should follow the <u>appropriate</u> design principles for I&C equipment given in DS-431, Ref. [3] <u>should be used</u>	The design principles in DS-431 are mainly focused on I&C systems. Those are not all adequate to electronic protection devices or standby power sources.			x	It is not so important here in an annex, but how do you verify that CCF risks have been minimized? Guides should use verifiable language.
16	ENISS	Annex	I	38	In order to handle minimize common cause failure risks for software based devices, the design of these items should follow the appropriate design principles for I&C equipment given in DS-431, Ref. [3] should be used	The design principles in DS-431 are mainly focused on I&C systems. Those are not all adequate to electronic protection devices or standby power sources.			x	It is not so important here in an annex, but how do you verify that CCF risks have been minimized? Guides should use verifiable language.
28	Finland	Annex	I	43	At this point SSR-2/1 updated item 2.13a should be considered, so that these two documents would be sync with each other.	Independent SBO power should be considered. Now this point is incompatible with SSR-2/1.			x	Section 8 has been modified in line with new SSR 2/1 Req. 68
157	Canada	Annex	I	12	The substantial part of this is covered by national electrical codes, but equipment qualification as well as equipment specifications based on plant design bases.	"The substantial part of this is covered by national electrical codes, but qualification of equipment (environmental and electrical) as well as equipment specifications based on plant design bases contribute."			x	We prefer keeping existing text.
40	UK	Annex	I	11	"...are of utmost..."	Typographical error			x	there is no such word
41	UK	Annex	I	40	"...scenarios have to be..."	Typographical error	x			
49	UK	Annex	I	14	The on-site power systems' robustness and reliability should be analysed for all plant configurations including those where part of the electrical power system may be taken out of service, such as refuelling outages.	Analyses should be undertaken for all plant configurations, not just plant refuelling outages.	x			
155	Canada	Annex	II		The fifth level of defence in depth is the mitigation of radiological consequences of significant radioactive materials, and is not part of this guide	Although it is stated in Table I-1, We suggest that a sentence to be added after the Fourth level (page 83) for the fifth level of defence in depth for better visibility			x	
5	USA	Annex	II	5	This information is required to design an adequate protective relaying system and to determine interrupting requirements for circuit breakers at each voltage level <u>during maximum fault current levels</u> and verify timely fault clearance <u>with enough available fault current to operate protective relaying</u> by protective devices.	Clarification.	x			
6	USA	Annex	II	14	The voltage and time delay set points <u>for degraded voltage protective relaying</u> are determined from an analysis of the operating voltage requirements of the safety significant loads at all on-site system distribution levels.	Clarification.	x			
42	UK	Annex	II	2	...bus voltage amplitude, active and reactive power flow...	The correct term is "active power", not "real power" as defined in national and international Standards	x			
43	UK	Annex	II	2	Active and reactive power flow	The correct term is "active power", not "real power"	x			
44	UK	Annex	II	3	Steady state voltage at all buses to be within +/- 5% of the nominal value for all operating conditions considered	Use of words "drop" and "rating" makes the sentence unclear. However, +/-5% may be too small. Many nuclear units operate with fixed tap on the generator step-up transformer so that generator terminal voltage can vary by +/-5% to allow changes in reactive power output. If consideration is taken of the variation in voltage drop due to change of auxiliary load from zero to maximum the overall range of voltage variation can reach +/- 10%.			x	We prefer keeping existing text.
45	UK	Annex	II	10	Full stop (period) missing in last line	Typographical error.	x			
51	UK	Annex	II	3	Transfer second bullet point to II-17 or II-18	Transient state voltage variations are not relevant to load flow studies			x	We prefer keeping existing text.
52	UK	Annex	II	4	Transfer fourth bullet point to II-17 or II-18	Large motor starting effects are not relevant to load flow studies			x	We prefer keeping existing text.
6	Lithuania	Annex	II	10	Protective systems have to provide ...	Superfluous "to" before "provide"	x			
13	IEEE	Annex	II	15	Second bullet, third line: Change, "the safety distribution system is automatically separated from the off-site power system." to "the safety distribution system is automatically or manually (by operator action) separated from the off-site power system."	Manual operator action to perform this disconnection must be an available option. (See provisions of para 5.305).	x			
191	FR	Definit ion				It would be worth to have "controlled state" and "safe state" defined in the IAEA safety glossary			x	Outside of this guide
192	FR	Definit ion				Add a definition of a "Complete SBO" to cover the case where, in addition to LOOP, main emergency power and alternate emergency power are unavailable (which was a condition assessed under EU stress tests)			x	SBO definition is covered; complete SBO is outside of this guide.

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193	FR	Definit ion				“electrical safety authorities” (if used in the document) might warrant a definition			x	Outside of this guide
1	ENISS	Fig	1		Add on Fig. 1 the electric connection leading to a not important to safety bus, such as drawn on Fig. 2.	On Fig.2 is represented an electric connection leading to a bus located in the green area.	x	corrected		
1	Indonesia	Fig	1		Avoiding the note written inside the figure 1. It is suggested that the figure can be represented using diagram block	Diagram block give more flexibility to describe the system comparing with the single diagram like figure	x	corrected		
1	UK	Fig	1		Add label for “step-up transformer”	For consistency since all the other transformers in Fig 1 are labelled.	x			
1	RF SEC	Fig	1		Provide figures with legends explaining symbols used in the pictures	Legends would facilitate understanding of the pictures.			x	There is just block diagrams with description of its main element.
4	RF REA	Fig	1		«Alternate AC Source» to be withdrawn outside the blue line.	«Alternate AC Source» is not an internal power system.			x	Based on SSR 2/1 new requirement 68 yes.
5	RF REA	Fig	1		Fig. 1, 2,3 to be clarified	Two standby transformers per one unit are represented. This seems to be excessive	x	corrected		
14	FR	Fig	1		Proposal to separate the switchyard of the main off-site and stand-by off-site connection.	main and stand-by off site as independently as possible	x	corrected		
15	Canada	Fig	1			Showing the separation of the Standby and Auxiliary connections in the switchyard is questioned as preferred arrangement. Separating the supply of the standby system to another transmission line in many cases would provide little benefit due to the high degree of interconnection in the off site grid while limiting the reliability of the standby grid supply to no better than the reliability of the transmission which supplies it.	x	corrected		
23	Finland	Fig	1		The pictures represent only two redundant plants. However the test should be clarified to explain why only two redundant plant is shown. There are numbers of three or four redundant plants.				x	this is just an example of minimum configuration.
28	CORDEL	Fig	1		Proposal to separate the switchyard of the main off-site and stand-by off-site connection.	main and stand-by off site as independently as possible	x	corrected		
42	RF REA	Fig	1		Plant power system. «all-plant transformers» to be added.				x	
136	Canada	Fig	1			The Title of Figure 1 is the “Relationship of the plant power system, the off site power system and the on-site power system. It would be reasonable that all connections between the plant and the grid would be shown as part of Figure 1.	x			
2	RF SEC	Fig	1		Eliminate lines from auxiliary (standby) transformer to safety buses	The figure contradicts with figure 3, where essential buses are powered only from normal buses and not from transformers. Also the picture contradicts with state-of-the-art electrical safety system designs which implies only one line for feeding each safety train from preferred source (this feature is intended to increase reliability of safety buses separation from preferred source in case of preferred source loss).	x	corrected		
1	USA	Fig	2		Shouldn't the important to safety box extend to the switchyard?	See Section 1.5 pg 1			x	not for majority of the plants.
2	Indonesia	Fig	2		Avoiding the note written inside the figure 2. It is suggested that the figure can be represented using diagram block	Diagram block give more flexibility to describe the system comparing with the single diagram like figure	x	corrected		
2	UK	Fig	2		The 'Not Important to Safety Power Supply' box should be completely contained within the 'Preferred Power Supply' box.	The implication is you can have an electrical system which is outside all power supplies.	x	corrected		
9	Canada	Fig	2			Clarification is required for the bus “hanging” under preferred power supply to the bottom left			x	
10	Canada	Fig	2			While one could eventually understand the IAEA nomenclature (“Not important to safety power supplies”, “Important to safety power supplies”, “Safety power supplies” and “Preferred power supplies”), the Canadian system has “Class I, II, III and IV”). In addition, CANDU uses the terminology of “Stand by power supplies” (back feeding classes I and II) and “Emergency power supplies” carrying the most critical safety loads (a trim down from Class II itself). This is based on the following operational philosophy: 1. Normal Operation—operation within specified OLCs, including start-up, power operation, shutting down, shutdown, maintenance, testing, and refuelling; 2. Anticipated Operational Occurrence—a deviation from normal operation that is expected to occur once or several times during the operating lifetime of the NPP but which, in view of the appropriate design provisions, does not cause any significant damage to items important to safety, nor lead to accident conditions; 3. Design Basis Accidents—accident conditions for which an NPP is designed according to established design criteria, and for which damage to the fuel and the release of radioactive material are kept within regulated limits; and Beyond Design Basis Accidents—accident conditions less frequent and more severe than a design basis accident. A BDBA may or may not involve core degradation. Acceptance criteria are assigned to each plant state, taking into account the expectation that frequent PIEs will have only minor or no radiological consequences, and events that may result in severe consequences are of extremely low probability.			x	The IAEA does not follow national standards.
11	Canada	Fig	2			Figures 1 and 2 are overlapping and confusing. A clarification is needed.			x	Role of each figure is described.

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15	FR	Fig	2		The system elements included in the important to safety power supplies and safety power supplies will differ according to plant design...	Clarification			x	correct, but as an example of minimum configuration.
17	Canada	Fig	2			The switchyards should be labeled. For instance, Switchyard "A" connects main generator output to the grid; Switchyard "B" connects the grid power supply to the Standby Transformers. The arrow showing the grid supplying power to the switchyard "B" should be incoming, rather than outgoing. Hence the direction of the arrow should be reversed.			x	Too much details, just an example.
29	CORDEL	Fig	2		Proposal to separate the switchyard of the main off-site and stand-by off-site connection.	main and stand-by off site as independently as possible	x	corrected		
1	CH	Fig	3		Take out from this picture on DC the voltage level. Reason in Europe a Plant I&C never is connected 120/240 V DC. Also delete the DC/DC converter between 120/240 V DC and 12/16V DC.	Figures should be representative for several NPP's and not dedicated to one type. Also on all other pictures no voltage level is shown. Information: we have different batteries for 24/48 V DC and 120 or 220 V DC level.	x	corrected		
5	SWE	Fig	3		Complement the fig with the structure of the uninterruptable AC	The very important structure of the uninterruptable AC is missing in this fig. The UPS units have created the most known problems the latest 10 years or so, and probably so will be in the future as well. This gives a good argument to the IAEA to focus more on the power electronics in a relevant safety reports, TECDOCs, etc.	x	corrected		
5	UK	Fig	3		Insert a key for colour codes to cables	Circuits appear to be colour coded but it is not clear why.	x	corrected		It is described in the text so that B&W reproduction is possible.
6	RF REA	Fig	3			Relevance of the scheme elements Safety-Related Bus, DC Bus with an accumulator and a rectifier, a transformer in circuit from Alternate AC Generator should be clarified.			x	This is a example of power supply configuration.
16	FR	Fig	3		Simplify the schematic representation as far as possible, e.g. by suppressing : - the sub distribution, - the transformer and rectifier supply by the Alternate AC Generator, - the DC/DC converter	Quality and Clarity	x	simplified		
30	CORDEL	Fig	3		Simplify the schematic representation as far as possible, e.g. by suppressing - the sub distribution, - the transformer and rectifier supply by the Alternate AC Generator, - the DC/DC converter	Quality and Clarity	x	simplified		
137	Canada	Fig	3			The Title of Figure 3 is the "Schematic representation of the different parts of the plant power supplies discussed in this Safety Guide, with their boundaries." However, the Left hand note refers to: "Safety related loads and Loads not important to safety" which are both connected to the same "Safety related bus". This is confusing and should be explained further. In addition, it should be explained what are the "secondary power inputs". This implies there are primary power inputs. These should be explained further as they are not mentioned in the guide.	x	corrected		
27	FR	Fig	4		Locate 3.11 and Fig 4 after 3.4	More logical location.			x	we prefer keeping existing location
2	ENISS	Fig	3		Extend the area covered by the green part to the main generator, the main transformer, the auxiliary transformers and the standby transformers.	The on-site power systems are separated into three different safety categories according to their safety significance: safety systems, safety related systems and systems not important to safety. The green part, dedicated to "Not Important to Safety Power Supply" has to be represented by the area existing between the boundary of Onsite Power System (Fig.1) and that of Important to Safety Power Supply (Fig.2).	x	corrected		
15	UK	Fig	3		Suggest that there is an overlap and design interface between the 'Alternate AC Power Supply' and the 'Safety class electrical power system'.	The figure currently indicates that there is not a design interface and overlap between the AAC and safety class electrical power systems. This may not always be the case.			x	It shows AAC item important to safety.
1	Romania	Fig	6		Delete.	Did not give useful information and it is not necessary.			x	
18	UK	Fig	6		"Typical ranges of voltage variation for continuous operation. (Note that initial..."	Existing title unclear			x	
6	Finland	FUKU	0		The impact of the Fukushima accident should be taken into account in this guide or some other method to provide the needed information should be planned?		x			
1	FR	FUKU	0		It is unclear if all TEPCO Fukushima accident lessons learned (as known today) have been properly addressed. For example, the potential use of mobile (off-site) diesel generator and the need for connecting points at the plant seems missing. A second example would be guidance on battery autonomy (not necessarily a precise figure but giving a direction i.e a few hours, several hours...)		x	connecting points are added.		
5	FR	FUKU	0		As SSR-2/1 is evolving to take into account TEPCO Fukushima accident, the IAEA should confirm that the guide will be made consistent with the new requirements		x	It is consistent, see section 8.		

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4	FR	FUKU	0		As a lesson learned from TEPCO Fukushima accident, add a paragraph to remind that loss of AC and DC power can happen over a long duration and therefore: - compromises the continuous performance of fundamental safety functions (which ly lead to a severe accident with large off-site radioactive releases) ; - hinders the accident and emergency response actions		x			
26	CORDEL	FUKU				Precise that lessons learned from the Fukushima Daichi accident are not specifically addressed.	x	In section 1.		
46	UK	Glossary			Definition of "Alternate AC Supply"	As this is a new concept introduced into this publication, suggest that a definition would be useful.			x	Alternate (dedicated) power supply is defined at the beginning of section 8.
47	UK	Glossary			Definition of "Standby Power Supply"	Similar to above it would be helpful to have this defined, to help distinguish it from "Alternate AC Supply"			x	Standby power supply is defined at the beginning of section 5.295-298.
48	UK	Glossary			Definition of "Division"	It would be helpful to define Division .			x	Explanation of "division" is provided in Idependency section 5.
4	Canada	TOC				Under Equipment Qualification, the heading for Seismic Qualification is missing. Please consider adding that.	x			