NUSSC and NSGC comments on:
Rev. "J" DS430 Design of Electrical Power Systems for Nuclear Power Plants
(16.10.2013)

COMMENTS BY REVIEWER				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
AR 1		General	This draft is practically ready for endorsement by NUSSC after discussion at the forthcoming meeting.	x			
AR 2		General	In connection with classification, reference 4 is still a draft but it needs to be retained in that list due to the modern guidance on how to assign safety classes to SSCs in association with (DiD); Table I-1 and related paragraphs of Annex I presents clear examples.	x			
AR 3		General	In a wide context the application of DiD to the design of electrical power systems for NPPs, as stated in OECD/NEA CSNI Technical Opinion Paper 16 (Reference 21), will be complementary useful information for improving safety.	x			
CA 1	1 (p. 3 of 39)	Suggest the following amendment: 1.10: "This Safety Guide applies to all types of nuclear power plants. 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.	To consider research reactors as well.			x	DS 430 further develops requirements of SSR 2/1 which is applicable to NPP. SMR design features were not explicitly analyzed when preparing DS 430.
CA 2	2 (p. 6 of 39) 2.21, 7.28, Annex I ,the 4th level of DiD &		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			x	Definition of DEC is provided in SSR 2/1. DS 430 does not repeat definitions from higher IAEA documents.

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	DEFINITIONS		in the Guide. Reference or definition should be in the guide.				
CA 3	5 (p. 10 of 39)		Please clarify what the blue and green lines represent in Fig 6. The meaning of Figure 6 is not clear.			x	This is Fig. 5. There is a description of what blue and green lines mean in the Fig. 5. They represent boundary for voltage swell and sag.
CA 4	5 (p.16 of 39)	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	Covered by **5.102. Electrical equipment should be selected, rated and qualified for its service conditions and environmental conditions**
CA 5	5 (p.16 of 39)	Motor operated valve (MOV) actuators should be designed in order to close with enough torque at minimum voltage and frequency, not exceeding maximum permissible torque at high voltage and frequency, and be able to open the valve at minimum voltage.	For better guidance this sentence should be modified			x	Covered by **5.102. Electrical equipment should be selected, rated and qualified for its service conditions and environmental conditions**
CA 6	5 (p. 17 of 39)		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 the title be changed adequately	x	Subheading change to: "Electrical equipment, cables and raceways"		

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CA 7	5 (p. 22 of 39)	Implementation of this recommendation involves evaluating and documenting the reasons for, ~~root causes of,~~ systematic review 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. Root cause is too thorough for tests that fail for readily apparent reason.	x	Deleted “root” .		
CA 8	5 (p. 23 of 39)	Evaluation and documentation of the ~~root causes~~ systematic review 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. Root cause is too thorough for tests that fail for readily apparent reason.	x	Deleted “root” .		
CA 9	5 (p. 24 of 39)	Each unit in a multi-unit power plant should have separate and independent power systems important to safety. Common electrical supply to multiple units is acceptable if analysis of the design shows adequate reliability.	Interconnecting power supplies between units can improve safety by allowing one unit to support one or more other units. An example is Fukushima 5 and 6, where one air-cooled DG supplied both units. See Requirement 33 of SSR-2/1. The common electrical supply to multiple units should be acceptable if it is properly justified (i.e. in Canada).			x	This comment is addressed in Section 8, Alternate power supply. 8.7. If an alternate AC power source serves more than one unit at a site where safety standby AC power sources are shared between units, the alternate AC power source should have sufficient capacity to operate systems necessary for coping with a station blackout for the time required to bring all units that share the safety AC power sources to a controlled state and to maintain them in a controlled state.

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							8.8. The alternate AC power source for one unit should not normally be connected to the on-site power system of that unit.
CA 10	7 (p. 29 of 39)	Degradation of the preferred power supply of each safety power system bus (i.e. over voltage, under voltage, over frequency, and under frequency) should be detected ~~on the buses of the safety AC power systems~~ as required per the plants design basis.	It is important to recognize that not all buses require individual detection. Perhaps a common source is connecting so frequency will be the same on sub-buses. The addition, allows this clause to be feasible.			x	In particular, **the safety buses require** individual detection. This is an intention of this safety guide.
CA 11	7 (p. 29 of 39)	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 per the plant's design basis.	It needs to be recognized that automatic disconnection of the PPS would be a non-conservative action in some CANDU multi-unit stations. the proposal from IEEE above is also acceptable. This guide should not document requirements that are adverse to overall plant safety.			x	This is a design rule that "those buses affected by degradation **must be** automatically (as soon as possible) disconnected in order to prevent propagation of electrical faults into the plant safety systems, which are powered from safety buses. Forsmark event of 2006 and Olkiluoto event of 2008 are lessons learned that underlines this design rule.
CA 12	7 (p. 30 of 39)	~~Each scheme should monitor all three phases.~~ Replace with: Each scheme should monitor the phase voltages necessary to produce a reliable design.	Many stations use two phase-phase sensing relays and trigger operation on a 2/2 logic. This provides a robust and reliable system that has worked well for many years. FMEA would likely rule out a complicated 3 relay system that would need complicated LOGIC/PLC to operate.			x	DS 430 provide for a recommended design practice. Modern digital electrical protection devices make that possible.
CA 13	7 (p. 30 of 39)	The protection system design should	Lower-level power supplies do not have nor need redundant			x	Not true. Generator, main transformers,

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		consider ~~be~~ redundant schemes for main supplies.	protections.				house load transforms should have backup protections. These are big sources. Any fault must be isolated
CA 14	8 (p. 35 of 39)	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.	This is a requirement in Canada	x	Added to section 8 8.17 The plant design shall include the necessary features to enable the use of non-permanent power sources which may be available at the site or not.		
CA 15	8 (p. 35 of 39)	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.	This is a requirement in Canada	x	8.18 Equipment necessary to mitigate the consequences of a core melt accident shall be able to be supplied by any of the power sources.		
CA 16	Annex I (p. 35 of 39)	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.	Requirement for a power quality assessment of control power supplies should be added. A clause is included for consideration.			x	This is covered by Annex I, I-37, and Annex II "Analysis of electrical power systems…"
CA 17	5.126 (P.31)	Suggest to remove this item: "~~5.126. All grounding systems should be connected to a single grounding grid."~~	There is no basis for this rigid recommendation. The installed splice could be the toughest part of a cable. Use of splices is very common in Canada.			x	The technical background is that if the different grounding systems are not connected together to a

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							single grounding grid, there will be circulating currents that could cause harm, interference or voltage differences.
DE 1	5.67	Failures of electrical components important to safety should be detectable by periodic testing or revealed by alarm or ~~**anomalous**~~ indication.	The word anomalou~~s~~ is used as an adjective, which can be omitted. The reason for that is that a failure of electrical component can be detected by an indication of certain parameters in analogue or digital way. This detection is not an anomalous indication. So not the indication is anomalous but the measured parameter. An indication that is anomalous would mean that the indication is not correct. An incorrect indication does not give any information about the state of the observed component. Therefore the word "**anomalous**" can be eliminated. This is analog to the other criteria "periodic testing" and "alarm" with have also no additional adjective.	x	Failures of electrical components important to safety should be detectable by means of periodic testing or revealed by means of alarms or indications of anomalies.		
DE 2	5.197	• The emission characteristics of wireless systems and devices used at the plant as well as those of repair, maintenance and measuring devices. Wireless systems and devices include, for example, mobile phones, radio transceivers, and wireless **da-ta** communication networks.	The last sentence is not necessary (twice). "**Data**" is one word without hyphen.	x			Already corrected by editor

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		~~**Wireless systems and devices include, for example, mobile phones, radio transceivers, and wireless data communication networks.**~~					
DE 3	7.25b (second a)	Any undetectable failures, i.e., any failure that cannot be detected by periodic testing, alarm or ~~**anomalous**~~ indication;	See reason of comment no. 1 "The word anomalou~~s~~ is used as an adjective, which can be omitted. The reason for that is that a failure of electrical component can be detected by an indication of certain parameters in analogue or digital way. This detection is not an anomalous indication. So not the indication is anomalous but the measured parameter. An indication that is anomalous would mean that the indication is not correct. An incorrect indication does not give any information about the state of the observed component. Therefore the word "**anomalous**" can be eliminated. This is analog to the other criteria "periodic testing" and "alarm" with have also no additional adjective."	x			
DE 4	7.25	a. Any single detectable failure within the safety system; ~~**a**~~**b**. Any undetectable failures, i.e., any failure that cannot be detected by periodic testing, alarm or anomalous indication; ~~**b**~~**c**. All failures caused by the single failure; ~~**c**~~**d**. All failures and spurious system actions that cause, or are caused by, the design basis event requiring the safety	The character "a" is twice.	x			Already corrected.

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		function; and ~~**de**~~. The removal from service or bypassed of part of the safety system for testing or maintenance that is allowed by plant operating limits and conditions.					
DE 5	7.49	**In case that ~~O~~o**ff-site sources of fuel and other consumables **and in addition possibilities** ~~**may be depended upon if sources**~~ of replenishment **the on-site sources** are identified**, following requirements should be fulfilled**: • **quantity of fuel and other consumables** ~~**and on-site sources are**~~ **is** sufficient for **supporting** the ~~**time**~~ required **functions in the plant** • **the time for** ~~**to**~~ replenish**ment is within the limits of an operation determined by existing on-site sources** ~~**supplies.**~~ In most member states on-site sources are sized for 1 to 2 weeks of operation without replenishment from external sources.	The sentence is difficult to understand.		Off-site sources of fuel and other consumables may be depended on if sources of replenishment are identified and if on-site sources are sufficient for the time required to replenish supplies. In most States, on-site sources are sized for one to two weeks of operation without replenishment from external sources.	x	We prefer existing, slightly modified short wording.
CH 1	Sheet 8, last bullet, last part of the sentence	An uninterruptible AC power system which supplies power from inverters or motor generator sets that are in turn supplied from a DC source, such as the DC power system, or dedicated batteries with rectifiers, and include a bypass circuit to allow ~~and include a bypass circuit to allow~~ **for maintenance and emergency cases** feeding safety loads directly from safety class AC power systems.	Should be not allowed during normal operation.	x			
CH 2	Sheet 9, 2.17 Definition for stable and reliable is missing.	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:	If you give no information about the values what you expect from a stable a reliable grid the grid code will be changed in a way which is not a safe direction for NPP`s (tendency weaker). Also we			x	NG-T-3.8 is referenced in 6.64 I-11 covers stable grid with direct reference to NG-T-3.8. We prefer existing short

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		- 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 to~~t~~ 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.	get information, that experts expect for the future that grid in Europe will trip more than once per year.				wording in 2.17.
CH 3	Sheet 29, 5.105	…..and the impulse rating greater than any transient voltage **(e.g. 130%)** to which the equipment might be subjected transient	Title is rating a~~n~~ sizing. Please give an example value for transient voltage e.g. 130%.			x	This transient value differs in MS, we prepare not to put a number.
CH 4	Sheet 31, 5.119 character c	c. Medium voltage power cables (from 1kV up to 35 kV) and	Instead of “35 kV or less” write “from 1 kV up to 35 kV”.	x			
CH 5	Page 57, 7.19	spurious shedding of safety loads from the standby **power supply**	In the document generally power supply is used, including diesel generator	x	… standby power sources…		
ENIS 1	§ 1.9	The Safety Guide makes recommendations and provides guidance on the electrical power systems provisions necessary for both new and operating nuclear power plants. It applies to all electrical power systems important to safety in nuclear power plants and to the preferred power supply. For operating nuclear power plants, deviations to these recommendations should be analysed during Periodic Safety Review and reasonable improvements should be implemented.	Considering the possible difficulties of implementation of the modifications.			x	Typically, the IAEA safety guide in a preamble contain wording on applicability to existing NPPs as practicable possible. It is up to MS to handle implementation.
ENIS 2	Fig. 1	- Delete the dotted lines inside the figure,	The dotted lines are misleading because there are			x	There is a note to explain meaning of

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		and - Delete the sentence under the figure "~~Dotted lines indicate not important to safety power supply~~".	no dotted lines at the level of offsite power systems although being systems not important to safety. The dotted lines of Fig.2 are sufficient.				dotted lines.
ENIS 3	§ 2.5	The off-site power system performs an ~~important~~ essential role in terms of safety in order to supply the onsite power systems with reliable power from multiple power sources	Be careful: The word "essential" was deliberately chosen by the working group to avoid the possible extrapolation which would lead to consider the off-site power system as being important to safety, which is not the case.	x			
ENIS 4	§ 2.5 (1)	(1) ~~Main generator~~ Grid power supply via auxiliary transformers.	The main generator is not an off-site power source. It is an on-site power source.		The off-site power system performs an essential role in terms of safety in supplying the on-site 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).	x	
ENIS 5	§ 2.5 (2)	(2) Grid power supply via the standby transformer~~s~~. The off-site power system is part of the preferred power supply (see Fig.2).	On Fig.2, there is only one standby transformer.	x			
ENIS 6	§ 2.34	High grid reliability is ~~important~~ essential	Be careful (see comment n°2 §	x			

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		for safe and reliable electrical power supply in a nuclear power plant. The transmission system operator has the responsibility to ensure reliable electrical power supply to the nuclear power plant as well as the responsibility for transmitting its power to the electrical distribution operators.	2.5 (1)): If a high grid reliability is "important" for safe, it is easy to state that the grid is "important to safety", which is not the case.				
ENIS 7	§ 5.52 (new 5.42)	*Associated circuits* When it is impractical to provide adequate physical separation and isolation from electrical faults between a safety circuit and a circuit of a ~~lower class~~ non-safety function, the ~~lower class~~ non-safety circuit (associated circuit) should be : a. Analysed or tested to demonstrate that the association does not unacceptably degrade the safety class circuits with which it is associated, b. Identified as part of the safety division with which it is associated, and c. Physically separated from other components in the same manner as the circuits of the safety division with which it is associated.	Due to the deletion of § 5.35 ("Items that are part of safety systems should be physically separated from items of lower safety classification"), the notion of associated circuits concerns only non-safety circuits.			x	Not all MS have classification scheme with "non-safety" and "safety" SSC.
ENIS 8	Add a new § between § 5.129 and § 5.130	**Cable separation** When it is impractical to provide adequate physical separation from electrical faults between safety classified cables and a non-safety classified cable, the non-safety cable (associated cable) should be : a- Analysed or tested to demonstrate that the association does not unacceptably degrade the safety class cables with which it is associated, b- Identified as part of the safety division with which it is associated,	Applying the concept of "associated circuits" to the cables leads to the concept of "associated cables".			x	This is a compensatory measure applicable to existing plants. This should be handled by MS for existing plants.

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		and c- Physically separated from other cables in the same manner as the cables of the safety division with which it is associated.					
ENIS 9	§ 7.12	~~It is preferred that two breakers be provided~~ A single breaker is satisfactory even though it may be preferred to provide two breakers to disconnect each preferred power supply feed to a safety system bus. See, for example, Fig.3	Two breakers are not mandatory.			x	This is a compensatory measure applicable to existing plants. This should be handled by MS for existing plants.
ENIS 10	§ 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 and safety standby power sources.	Alternate AC power supply is used for coping with a station blackout where offsite and safety standby power sources are lost.	x			
JP 1	Para 2.9/L5	An alternating current (AC) power system. The functions of the assigned AC loads will tolerate a certain interruption in the power supply. Usually the AC power system includes a standby AC power sources and an Alternate ~~(dedicated)~~ AC power source.	Clarification. It is likely to understand that AAC is a dedicated power source for only use of SBO and not for other use as refer to definitions in page 92. Clear expression should be necessary.	x			
JP 2	Para. 2.16 2nd sentence	The design of the on-site power system should take into consideration the limitations of capability on off-site power system and its impact on nuclear safety.	Clarification for meaning of what kinds of "limitations" are assuming here.	x			
JP 3	Para. 5.4/ L3	The impact of such events on all the on-site electrical power systems (AC and DC) (see Fig. 5) should be evaluated and confirmed by specific analysis or calculation that the allowable voltage and frequency requirements are not exceeded and the protection system is adequate.	Clarification. Usually, analysis doesn't include a simple calculation.			x	Specific analysis typically contains calculation too.
JP 4	Para. 5.9/	The plant's capability to maintain	Clarification between	x			

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	L2, L4	fundamental safety functions and to remove decay heat from spent fuel should be analysed for the period that the plant is in a station blackout condition and adequate provisions should be included in the design to prevent any significant fuel damage for the period that the plant is in a station blackout condition.	"blackout" and "station blackout" because there are much different meanings. The same expression is shown in para. 5.39.				
FR 1	Fig 2 note	*Some plant designs ~~do~~ may not require safety standby power sources. All nuclear power plants are expected to have safety DC power supplies.*		x			
FR 2	3.10	The Electrical system functions should then be categorized on the basis of their safety significance~~, using a constant risk approach,~~ with account taken of the three following factors	Superfluous (not anymore in DS367)	x			
FR 3	4.10		An additional bullet might be added to cover the need for connection points (for mobile/off-site equipment)	x	Included in section 8 "8.17 The plant design shall include the necessary features to enable the use of non-permanent power sources which may be available at the site or not".		
FR 4	5.34	Merge 5.34 with 5.33	Same topic			x	We prefer keeping writing style "normative" and "informative" paras
FR 5	5.132	Merge 5.132 with 5.131	Same topic			x	We prefer keeping writing style "normative" and "informative" paras
FR 6	5.134 5.135 5.136	Merge 5.134 to 5.136 : 5.134. Medium voltage AC electrical power systems should preferably be high impedance grounded as ~~5.135.~~ High impedance grounding limits fault current and allows continued operation of the affected equipment.~~5.136.~~ Other grounding	Same topic			x	We prefer keeping writing style "normative" and "informative" paras

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		solutions such as solid grounded or insulated system may <u>also</u> be used when justified.					
FR 7	5.165	Merge 5.165 with 5.164	Same topic			x	We prefer keeping writing style "normative" and "informative" paras
FR 8	5.177		5.177 might be better located before 5.216 (ageing aspects)			x	5.177 is related to Equipment qualification programme. 5.216 is related to Qualified life of environmentally qualified components.
FR 9	5.239	The test programme should define processes for periodic tests that: <u>a)</u> Ensure the safety of the plant during the actual testing;	End of sentence should be in the bullet list	x			Already corrected by editor
FR 10	5.257	Merge 5.257 with 5.256	Same topic			x	We prefer keeping writing style "normative" and "informative" paras
FR 11	5.262	Merge 5.262 with 5.260	Same topic			x	We prefer keeping writing style "normative" and "informative" paras
FR 12	5.272	Merge 5.272 with 5.270: 5.270. Conductors in containment penetrations should be protected by redundant safety protective devices that operate separate interrupting devices. <u>However,</u> ~~5.272.~~ A containment penetration that can indefinitely withstand the maximum current available due to a fault inside the containment does not need redundant protection.	Same topic.			x	We prefer keeping writing style "normative" and "informative" paras
FR 13	5.276 5.277	Locate 5.276 and 5.277 after 5.280	Specific consideration for some system, thus better after general aspects	x			
FR 14	5.279	Locate 5.279 before 5.278		x			
FR 15	5.289	Means should be provided to automatically initiate and control all safety actions related	Clarification and better interface with 5.290			x	This is a compensatory measure applicable to

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		to electrical systems unless manual action alone is demonstrated as acceptable.					existing plants. This should be handled by MS for existing plants.
FR 16	5.292	Merge 5.292 with 5.291	Same topic.			x	We prefer keeping writing style "normative" and "informative" paras
FR 17	5.295	Some designs have standby AC power sources that are not designated as safety system support features ~~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 components.	The term "safety classified" may be misunderstood (safety related items are safety classified). Better consistency with IAEA glossary.	x			
FR 18	5.296	Plants which do not require ~~safety classified~~ standby AC power sources designated as safety system support features should have safety related standby AC power sources to provide reliable power for defence in depth functions that supplement and reduce the challenges to the safety systems.	See previous comment	x			
FR 19	6.5	Merge 6.5 with 6.4	Same topic			x	We prefer keeping writing style "normative" and "informative" paras
FR 20	6.12					x	We prefer keeping writing style "normative" and "informative" paras
FR 21	Merge	6.12 with 6.10	Same topic			x	We prefer keeping writing style "normative" and "informative" paras
NSGC FR 1	1.14	1.14. Electrical power for security systems (e.g., fences, surveillance systems, entrance control) is outside the scope of this Safety Guide. IAEA Nuclear Security Series No. 13, Ref. [11 and its implementing guide NST xx [|ref xxx]] give guidance on				x	We prefer existing short wording because security is addressed in 5.220-5.225.

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		physical protection of nuclear facilities					
NSGC FR 2	1.17 bis	Suggestion to add a paragraph mentioning potential interfaces 1.17bis. While designing electrical power systems security requirements also have to be taken into account. Potential interfaces between nuclear security and safety aspects should have to be analysed and managed. IAEA Nuclear Security Series No. 13, Ref. [11] give guidance on security for nuclear facilities	Potential interfaces between nuclear safety and nuclear security should be mentioned			x	Covered by 5.220-5.225
NSGC FR 3	CONTROL OF ACCESS p40	5.224. IAEA Nuclear Security Series No. 4, Ref. [10], and No. 13, Ref. [11] give guidance on security for nuclear power plants and the coordination of nuclear safety and nuclear security. As nuclear security also requires for physical access control requirements provisions for control as regard safety and security should be developed together to benefit from potential synergies.. IAEA Nuclear Security Series No. 13, Ref. [11] give guidance on security for nuclear facilities	Paragraphs 5.220 to 5.223 refer to control of access to prevent errors and mistakes (not as regard nuclear security). Moreover NSS4 and NNS13 do not give information on coordination of nuclear safety and nuclear security.	x	5.221. Access to equipment in systems important to safety should be limited so as to prevent unauthorized access and to reduce the possibility of error or malicious act. **Deleted:** "5.224. References [9] and [10] provide guidance on nuclear security for nuclear power plants".		
RF NSGC 4	Para 5.222, Page 40, CONTROL OF ACCESS	5.222. Effective methods include appropriate combinations of physical security protection systems, e.g., locked enclosures, locked rooms, alarms on enclosure doors, and administrative measures.	Terminology should be consistent with the NSS13 (INFCIRC/225/Revision 5)	x			
USA 1	1.2, Sent. 2	It reflects changes that were made to the current revision of SSR 2/1, issued in 2012. ~~requirement 68 as a result of Fukushima accident lessons learned.~~	The wording implies that (potentially) ALL issues resulting from the Fukushima event have been incorporated in SSR 2/1 and also in DS430. That is not correct. The mitigating strategies from the lessons learnt at Fukushima involve diverse means of	x	This Safety Guide provides recommendations on the necessary characteristics of electrical power systems for nuclear power plants, and of the processes for		

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			restoring AC and DC power to the critical equipment at a nuclear plant as the onsite systems may be degraded and unable to support safe shutdown conditions over an extended period. There are industry efforts sponsored by IAEA, USNRC and IEC that will address the robustness of electrical systems post Fukushima that may be incorporated into the next revision of DS430		developing these systems, in order to meet the safety requirements of SSR-2/1 [1]. It reflects revisions that have been made to Ref. [1] and in particular to Requirement 68.		
USA 2	1.10, Sent. 4	For example, in plants with passive engineered safety features, the classification of the electrical power systems may be substantially different than that shown in Fig. 2.	Editorial, add the word that.	x			
USA 3	1.11	Additional recommendations applicable to electronic devices used in the control and protection of the plant electrical power systems are given in the Safety Guide for Instrumentation and Control (I&C) systems, DS431, Ref. [3].	Editorial added Instrumentation and Control	x	1.11. Additional recommendations applicable to electronic devices used in the control and protection of the plant's electrical power systems are provided in Ref. [2].		
USA 4	1.20.	Section 5 provides general recommendations that apply to all alternating current (AC) and direct current (DC) electrical power systems.	Editorial to introduce the acronyms AC and DC as the figures use these acronyms before they are introduced in the text.	x			
USA 5	1.23	Section 8 provides recommendations that are specific to the design of alternate AC (AAC) power supplies.	Introduce acronym AAC	x			
USA 6	2.2, sent. 2	Alternate ~~alternating current (A~~AC~~)~~ power supplies can also supply the safety power systems in design extension conditions.	Editorial, since acronym AC has been introduced above; or use AAC.	x	Alternate AC power supplies can also supply the safety power systems in design extension		

COMMENTS BY REVIEWER				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					conditions.		
USA 7	2.4, Sent. 2	The off-site power system will ~~ideally~~ normally provide AC power to the plant during all modes of operation and in all plant states.	Editorial	x			
USA 8	2.4, Sent. 4	The boundary is ~~often~~ generally 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.	Editorial	x			
USA 9	2.9	An ~~alternating current (~~AC~~)~~ power system… A ~~direct current (~~DC~~)~~ power system… An uninterruptible AC power system (UPS)…	Editorial – acronyms defined earlier, and introduce UPS	x			
USA 10	2.20	The electrical power systems, at all voltage levels, are support systems for ~~many~~ most of the plant equipment.	Editorial	x			
USA 11	3.5	The draft Safety Guide DS 367	Is this still a “draft”? Recommend deletion of the word draft in 3.5, or insertion in 3.14, and References, as appropriate.	x			
USA 12	3.8	“…cause a PIE…”	Explain PIE	x			
USA 13	5.3	External and internal events can cause symmetrical and asymmetrical perturbations in the plant ~~and~~. These events can be initiated:	Editorial for clarity	x			
USA 14	5.8, Sent. 2	“...considered and analysed as a DEC event.”	Define DEC	x			
USA 15	5.34	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.	Editorial for clarity	x			
USA 16	5.35	An example of a preferred isolation device is a safety grade circuit breaker that is automatically tripped by an accident signal or loss of voltage signal generated within the same safety division as the isolation	Editorial	x			

COMMENTS BY REVIEWER				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		device.					
USA 17	5.106 a.	To carry ~~safely~~ the current~~s~~ of the main circuits and branch circuits required under allowable voltage variations;	Editorial	x			
USA 18	5.111, Sent. 1	Generally the design ensures that cables, that are part of safety systems, are routed or protected ~~so~~ to ensure that ~~neither~~ external events such as a fire, ~~nor~~ failure of rotating mechanical equipment or failure of support systems ~~can~~ more do not damage more than the minimum set that ~~affect more than~~ is justified in the safety analysis report (normally one division of any safety group).	Editorial	x			