Tables of resolutions of Member States/ International organizations comments before Technical editing

Note: The following tables provide resolutions of Member States/International Organizations comments on the draft safety guide on Design of Auxiliary Systems and Supporting Systems for Nuclear Power plants, in alphabetic order. These resolutions that have been carried out before the Technical editing are implemented in track changes in the file 'Track changes_DS440 Resolution of MS comments_Before technical editing.pdf'.

Further improvements in terms of language and consistency within DS440 and with other safety guides have been achieved after the Technical editing. These are reflected in the file 'Clean_DS440 Resolution of MS comments and further Technical editing.pdf. In particular, Figure 1 has been simplified and its structure improved to reflect the stepwise approach followed to define the auxiliary systems and supporting systems.

Resolution of Belgium comments

		COMMENTS BY REVIEWER			RESC	LUTION	
Reviewer:	Bel V		Page 1of 2				
Country/Or	ganization: B	Belgium – FANC/Bel V	Date:				
Comment	Para/Line	Proposed new text	Reason	Accepted	Accepted, but	Rejected	Reason for
No.	No.			*7	modified as follows		modification/rejection
1	3.30	" the failure of some AS&SS has	Wording. This proposed	Х			
		the potential to lead <u>to</u> accident	correction was				
		conditions,"	"Accepted" in the Step /a				
			comment resolution form				
			(then it was para 3.29),				
			but was not implemented				
	4.47 4.04		in the Step 8 version.		37		G 1 2 1 2
2	4.47 – 4.94	This part on sampling systems is to	For balance of different		Х		Comments 2 and 3
		our opinion over-developed	parts of the document.				have been resolved
		compared to other parts (e.g. the					by having two
		part on heat transport systems). See	The comment resolution				separate sub-
		also our comment on $4.78 - 4.93$.	form for Step 7a				sections for process
			mentions "This change				and post-accident
			may be done during the				sampling system,
			next step of review by				and process
			Member States if it is				radiation
			requested."				monitoring system
			Therefore we reproduce				respectively.
			the comment here in Step				
			8.				The impression of
							"over-
							development" of
							this part is also
							resolved by this
							way.

DS 440 – Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants

3 4.78 - 4.93	These articles are mainly dealing with radiation monitoring; not with sampling systems. It would be better to bring these under another title such as "Radiation monitoring support systems"	For clarity. The comment resolution form for Step 7a refers to the resolution of the comment on 4.47-4.93 (see above) and thus might also be considered in Step 8.		X	See resolution of comment 2.
4 4.115; 1st bullet	" For example, to maintain negative pressure in controlled areas flowrate intake air <u>c</u> ould be less than extraction flowrate air;"	Due to our comment in Step7a on this para, "For example," was added in Step 8 (which responds to our former concern). However, the "should" should be replaced by "could" (in order not to impose this example solution).	X		

Resolution of China comments

DS 440 – Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants

		COMMENTS BY REVIEWER			RESC	DLUTION	
Reviewer:			Page 1of 14				
Country/Org	anization: CH	INA –	Date: 2017/10/28				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Figure 1	The second item of Definition: An auxiliary system may provide services such as electricity, <u>service gas, water,</u> <u>compressed air, conditioning air,</u> <u>communication equipment, lifting and</u> <u>lowering items, fuel and lubricants.</u>	Correspond with the section 1.2	X			
2	2.5	Original text: 2.5. The AS&SS systems to be addressed in this safety guide are stepwise determined on the basis of their definition in paragraph 2.2, and whether or not they are addressed in existing safety guides or safety guides being revised. In particular, heat transport systems (SSR-2/1 (Rev. 1), Req. 70) are partially addressed in the revision of NS-G-1.9 [2], fire protection systems (SSR-2/1 (Rev. I), Req. 74) are covered in [3], and radiation protection systems (SSR-2/1 (Rev. 1), Req. 81 and 82) are addressed	Be consistent the context	X			

		in NS-G-1.13 [4]. Proposal: 2.5. The AS&SS systems to be addressed in this safety guide are stepwise determined on the basis of their definition in paragraph 2.2, and whether or not they are addressed in existing safety guides or safety guides being revised. In particular, heat transport systems (SSR-2/1 (Rev. 1), Req. 70) are partially addressed in the revision of NS-G-1.9 [2], fire protection systems (SSR-2/1 (Rev. 1), Req. 74) are covered in NS-G-1.7 [3], and radiation protection systems (SSR- 2/1 (Rev. 1), Req. 81 and 82) are addressed in NS-G-1.13 [4].				
3	3.8	For passive designs, most of the safety systems rely on the driving forces of buoyancy, gravity, stored energy sources and <u>natural convection</u> .	Natural convection should be included.		X	Either to mention driving forces of buoyancy responsible for natural circulation, or to mention natural circulation but not both.
4	3.10	"Load combinations created by internal and external hazards should also be included in the design basis of the SSC of AS&SS", the recommendable load combinations table (specific or typical) should be listed, if possible.	Too vague to implement.	X		Accepted with modification: to delete the sentence" Load combinations created by internal and external hazards

						should also be included in the design basis of the SSC of AS&SS" and to keep para. 3.11.
5	3.10 and 3.11	3.11. could be canceled or be combined in the 3.10.	The contents of 3.11 overlap 3.10		Х	See resolution of comment No.4.
6	3.15	The list of internal hazards in section 3.15. include "Electromagnetic interferences", however, this hazard is not shown in NS-G-1.11 <i>Protection</i> <i>Against Internal Hazards other than</i> <i>Fires and Explosions in the Design of</i> <i>Nuclear Power Plants</i> (2004). Therefore, some detailed requirements of electromagnetic interferences should be explicit.	"New" definition should he interpreted.		X	The revision of NS- G-1.11 and NS-G-1.7 under DS494 includes Electromagnetic interferences in the list of hazards to which the present draft refers.
7	3.45	"In particular, an AS&SS should not serve both a safety system and a safety feature for a DEC with core melting, unless duly justified." The sentence "unless duly justified" should be explicitly clarified.	Lack of clear explanation.		Χ	It is recognized in SSR-2/1 (Rev.1) that it is impracticable in some cases to ensure the independence between safety systems (used for DBA) and safety features for DEC, e.g. containment. "Unless duly justified" means here the justification that the independence

						is impracticable. For the meaning of justification, please refer to the IAEA Safety Glossary (2016).
8	3.82	Original text: 3.82. As a complement to a number of investigations related to fabrication, testing, inspection, evaluation of the operating experience, PSA should be used with deterministic safety assessment in demonstrating a very low probability of early or large releases for postulated design extension conditions with core melting. This should include the reliability of involved part of AS&SS supporting a safety function, e.g., heating, ventilation and air conditioning (HVAC) systems and other aspects usually considered in Level 2 PSA.	More exact and be consistent with the SSR-2/1.	X		
		Proposal:				
		3.82. As a complement to a number of investigations related to fabrication, testing, inspection, evaluation of the operating experience, PSA should be used with deterministic safety				

		assessment in demonstrating a very low probability of early or large radioactive releases for postulated design extension conditions with core melting. This should include the reliability of involved part of AS&SS supporting a safety function, e.g., heating, ventilation and air conditioning (HVAC) systems and other aspects usually considered in Level 2 PSA.				
9	3.56	 Original text: 3.56. Following the above recommendations: In the event of a design basis accident, systems necessary to perform or to support a safety function should be assigned in SSG-30 safety class 1 or 2; 	Some SSCs belonged to AS&SSs may be assigned in safety class 3, for example, according SSG-30, parts of process and post-accident sampling system as design provision may be assigned in safety class 3.		X	Please note that this recommendation is related to a part of a system ensuring a safety function during design basis accidents.
		 Proposal: 3.56. Following the above recommendations: In the event of a design basis accident, systems necessary to perform or to support a safety function should be assigned in SSG-30 safety class 1, 2 or 3; 				In addition, nowhere in SSG-30, such kind of recommendation exists. Instead, "Requirement 27: Support service systems "Support service systems that ensure the operability of equipment

					forming part of a system important to safety shall be classified accordingly"
10	4.12 4.13 4.14	 Original text: 4.12. Communication systems essential to the safe operation should be designed and routed in order to have the capacity to provide effective intra-plant communications (internal communication system) and effective plant-to-off-site communications (external communication system) during normal plant operation, AOO, accident conditions, and relevant internal or external hazards. 4.13. The internal and the external communication systems should have a backup power source. 4.14. Communication systems which essential to the safe operation and emergency communication system ensuring a safety function (safety category 3) should have an appropriate safety classification. 	Because section 4.12 contains the normal operation state, we suggest revising this paragraph as general requirements for all plant conditions, including normal operation, AOO, accident conditions and so on. Section 4.13 is the requirements of the emergency communication systems during AOO and accident conditions, which should have an appropriate safety classification and a backup power source.	X (only for 4.14)	Para. 4.14 changed in : Communication systems which are essential to safe operation of the nuclear plant should have an appropriate safety classification.
		Proposal:			

		4.12. Communication systems should be designed and routed in order to have the capacity to provide effective intra- plant commutations (internal communication system) and effective plant-off-site communications (external communication system) during normal plant operation, AOO, accident conditions, and relevant internal or external hazards.				
		4.13. Communication systems which essential to the safe operation and to ensure a safety function (safety category 3) during AOO and accident conditions should have an appropriate safety classification and a backup power source.				
11	4.17	 Original text: Local plant alarm for accident conditions whose impact is limited to one part of the plant. Proposal: Local alarms for accident conditions whose impact is limited to one part of the plant. 	Maybe, "local alarms" is more appropriate.		X	The recommendation concerns one part of the plant; so: - "Local <u>plant</u> alarm" should remain
12	4.27	Original text:	The cooling of the ventilation system is not all through the ventilation cycle. The ventilation	Х		Accepted with a more concise formulation:

		The ventilation systems performing cooling by <u>air renewal</u> (circulation/recirculation). Proposal: The ventilation systems performing cooling by <u>air renewal</u> (circulation/recirculation) and cooling <u>coil.</u>	system is also cooled by the cooling coil.			The ventilation systems performing cooling by air renewal or cooling coil.
13	4.28	Original text: As the ventilation systems are addressed in the section 4.5, only the water cooled components and the chilled water system are concerned here after. Proposal: As the ventilation systems are addressed form item 4.110 to 4.179, only the components cooling water system and the chilled water system are concerned here after.	In this doc1nnent, the design requirements of the ventilation systems are addressed form item 4.110 to 4.179. Here, using "the components cooling water system" is more appropriate. Because this part describes two systems, the components cooling water system and the chilled water system.		X	Accepted with modification for better wording: As the ventilation systems are addressed the sub-section (Air conditioning systems and ventilation systems), only the component cooling water system and the chilled water system are concerned here after.
14	4.39	Original text:	The word "by" before "the extreme design conditions" is unnecessary, because	Х		

		 The performance of the chillers of CDWS should be based on: the extreme design temperature of the CCWS water when CDWS is cooled by CCWS or by the extreme design site conditions when cooled by air, and Proposal: 	CDWSs have safety function and normal operation function.			
		 The performance of the chillers of CDWS should be based on: the extreme design temperature of the CCWS water when CDWS is cooled by CCWS or the extreme design site conditions when cooled by air, and 				
15	4.74	Delete this paragraph.	This requirement is included in Para. 4.60	X		
16	4.115	Original text: • in maintaining the pressure of rooms located in controlled areas below the atmospheric pressure in order to prevent the dispersion of radioactive substances into the atmosphere in normal operating conditions. For example, to maintain negative pressure in controlled	Ventilation terminology		X	Acceptedwithmodificationforbetterformulation byreplacing "should" by"could" since it is anexample:tomaintaintomaintainnegativepressure incontrolledareas,

		areas flowrate intake air should be less than extraction flowrate air;			intake air flow rate <u>could</u> be less than exhaust air flow rate.
		 Proposal: in maintaining the pressure. of rooms located in controlled areas below the atmospheric pressure in order to prevent the dispersion of radioactive substances into the atmosphere in normal operating conditions. For example, to maintain the negative pressure in controlled areas, the supply air rate should be less than exhaust air rate; 			Also for consistency with the resolution of the 4th comment from Belgium.
17	4.120	Original text: 4.120. The design of the HVAC systems participating in the limitation of radioactive releases should filter the exhausted air by pre-filters, high- efficiency particulate air (HEPA) filters and, if necessary, by iodine filters before being discharged to the stack. The efficiency requested for the HEPA and iodine filters have to be consistent with the authorized radioactive releases in normal operation and AOO and with radiological objectives in accident conditions.	Ventilation terminology	X	Accepted with modifications (more correct formulation): The efficiency requested for the HEPA and iodine filters <u>has</u> to be commensurate <u>with</u> the authorized radioactive releases in normal operation and AOO and with radiological objectives in accident conditions.

		Proposal: 4.120. The design of the HVAC systems participating in the limitation of radioactive releases should filter the exhaust air by pre-filters, high-efficiency particulate air filters (HEPA) and, if necessary, by iodine filters before being discharged to the stack. The efficiency requested for the HEPA and iodine filters have to be commensurate to the authorized radioactive releases in normal operation and AOO and to the radiological objectives in accident conditions.				
18	4.122	 Original text: Monitoring of the air temperature and automatic isolation of the air flow; Provision of automatic protection by means of a water sprinkler to cool the outside of the iodine filter vessel; Provision of a water spray system inside the charcoal vessel with a manual hose connection. In designing such a system. it should be recognized that if the flow rate of the water is too low, the reaction between 		X	Consistency DS494.	with

		overheated charcoal and water can result in the production of hydrogen. To prevent this, a high water flow rate should be used				
		Proposal:				
		 Detecting of the air temperature or combustion products and automatic isolation of the air flow; Provision of automatic protection by means of a water sprinkler to cool the outside of the iodine filter vessel; (delete) Provision of a water spray system inside the charcoal vessel with a fixed firefighting water pipeline or manual hose connection. In designing such a system, it should be recognized that if the flow rate of the water is too low, the reaction between overheated charcoal and water can result in the production of hydrogen. To prevent this, a high water flow rate should be used 				
19	4.123	Original text:	Ventilation terminology	Х		
		• Fire detectors, carbon monoxide gas sensors (preferably after the filters) or				

		temperature sensors (before the filters) should be installed inside the ducts before and after the filter bank.				
		 Proposal: Fire detectors, carbon monoxide gas sensors (preferably in the downstream of the filters) or temperature sensors (preferably in the upstream of the filters) should be installed inside the ducts in the and downstream of the 				
20	4.125	Original text: 4.125. The design of the HVAC systems maintaining the ambient conditions (temperature, humidity, contamination and new air) necessary for the operation of components important to safety, the personnel accessibility and the habitability of the control room should take into account the basic atmospheric conditions and the extreme atmospheric conditions	More exact	X		
		(e.g., temperature, humidity, and their duration) defined for the design of the NPP.				

		Proposal:				
		4.125. The design of the HVAC systems maintaining the ambient conditions (temperature, humidity, contamination and fresh air) necessary for the operation of components important to safety, the personnel accessibility and the habitability of the control room should take into account the basic atmospheric conditions and				
		the extreme atmospheric conditions				
		(e.g., outdoor temperature, humidity, and their duration) defined for the				
		design of the NPP.				
21	4.132	Original text:	Ventilation terminology	Х		
		4.132. In particular rooms such as the battel) room, component that can				
		release hydrogen in case of leak or				
		stored fuel room, the rate of air renewal should be sufficient to avoid the				
		accumulation of flammable or				
		explosive gas or fuel-vapor mixtures				
		and maintain the flammable gas				
		limit. In addition, each electrical battery				
		room that contains batteries which may				
		generate hydrogen during operation				
		should be provided with a separate				
		ventilation exhaust arranged to				

		discharge directly to the outside of the building				
		Proposal: 4.132. In particular rooms such as the battery room, component that can release hydrogen in case of leak or stored fuel room, the rate of air renewal should be sufficient to avoid the accumulation of flammable or explosive gas or fuel-vapor mixtures and maintain the flammable gas concentration below the flammable limit. In addition, each electrical battery room that contains batteries which may generate hydrogen during operation should be provided with a separate exhaust ventilation system arranged to discharge directly to the outside of the building.				
22	4.136	Original text: 4.136. The ESFVS system of the controlled area should provide a direct radiological confinement function; it participates to the compliance with the radiological objectives. Proposal:	The "system" is repetitive	X		

		4.136. The ESFVS of the controlled area should provide a direct radiological confinement function; it participates to the compliance with the radiological objectives.			
23	4.165	Original text: 4.165. Part of the VNSCA that is needed to a system achieving a safety function (safety category 1 or 2) in case of DBA should have an appropriate safety classification and meet the associated design requirements (redundancy, emergency power supplied, protection against the internal and external hazards, the periodical tests, quality assurance, and, designed and fabricated according acceptable design codes).	X		
		Proposal: 4.165. Part of the VSNCA that is needed to a system achieving a safety function (safety category 1 or 2) in case of DBA should have an appropriate safety classification and meet the associated design requirements (redundancy, emergency power supplied, protection against the internal and external hazards, the periodical			

		tests, quality assurance, and, designed and fabricated according acceptable design codes).			
24	4.170	Original text: 4.170. The functions of the main control room ventilation system (CRAVS) are to maintain the operation of safety components and to maintain habitable the main control room in normal operation, AOO and accident conditions as well as in the event of smoke, explosive and toxic gases, and radioactive contamination of the external environment. This is ensured in maintaining suitable ambient conditions (temperature, humidity, clean and new air) and concentration of airborne radioactive substances to levels compatible with the habitability of the main control room and the operation of the components.	X		
		Proposal: 4.170. The functions of the main control room ventilation system (CRAVS) are to maintain the operation of safety components and to maintain habitable the main control room in normal operation, AOO and accident			

		conditions as well as in the event of smoke, explosive and toxic gases, and radioactive contamination of the external environment. This is ensured in maintaining suitable ambient conditions (temperature, humidity, cleanliness and fresh air) and concentration of airborne radioactive substances to levels compatible with the habitability of the main control room and the operation of the components.				
25	4.184	Original text: • emergency generator area, <u>SBO</u> <u>Diesel area.</u> Proposal: Delete "SBO Diesel area" • emergency generator area,	The SBO diesel area shall be provided to station blackout lighting, not the emergency lighting. When the emergency electrical power unviable, the personnel can enter the SBO diesel area to start the diesel. Besides, the DC system charger is connected to the emergency power system. So it is not necessary to install the emergency lighting.	X		
26	4.186	Original text: The alternate power supply should provide sufficient level of visibility, at least, in the main control room, the	We can't figure out the meaning of this paragraph, in according with the 4.187 and 4.188, this section		Х	Accepted with the modification by highlighting the case of SBO:

		supplementary control room and the emergency preparedness and response centre. Proposal: The emergency lighting system should provide sufficient level of visibility, at least, in the main control room, the supplementary control room and the emergency preparedness and response centre. This lighting system should be supplied by emergency power and DC batteries.	describes the requirements about the level of lighting and power supply for the emergency lighting system. Because section 4.183 requires emergency lighting system should be immediately available in case of loss of off-site power supply until the emergency power supply, so this lighting system maybe also supplied by DC batteries.		In case of SBO, sufficient level of visibility should be provided, at least, in the main control room, the supplementary control room and the emergency preparedness and response centre, and in the locations where operator actions are necessary.
27	4.243	 Original text: Cooling water system which can be external or included in the emergency power source; Proposal: Cooling water system; 	Latter part of the sentence is be difficult to understand and is needless.	X	Accepted with the following modification of the bullet for clarity: - Cooling water system, which can be external or integrated

					in the emergency power source.
28	4.247	 Original text: 4.247. Usually, each emergency diesel generator is fined with a short term fuel oil tank fed from a main storage fuel oil tank while combustion turbine is fed directly from the fuel oil storage system through fuel oil forwarding pumps. The short term fuel oil tank is sized to permit at least two hours operation at full load. Proposal: 4.247. Usually, each emergency diesel generator is fitted with a short term fuel oil tank fed from a main storage fuel oil tank while combustion turbine is fed directly from the fuel oil storage system through fuel oil forwarding pumps. The short term fuel oil tank sized to permit at least two hours operation at full load. 	The rule for the size of the short term fuel oil rank in different standard: ANS 59.51, Each diesel shall be equipped with one or more day tank whose capacity is sufficient to maintain at least 60 minutes of operation after reaching the low level alarm set point. URD: Each day tank shall have enough capacity to operate its associated standby power source for at least 4 hours at its maximum rated capacity and shall be designed so that when the level is reached where fuel is automatically added, enough fuel remains in the tank to operate the unit for at least 60 minutes at its maximum rated capacity. RCC-E: Each diesel engine is provided with the fuel oil tank mounted on its fuel feed pumps. This tank, which	X	More general and concise formulation expressed in terms of objective to be achieved (operator intervention to restore oil level) rather than giving figures: The short term (also called daily tank) fuel oil tank should be sized to permit the operation at full load during a time compatible with operator intervention to restore oil level.
			reeds the diesel engine by		

			gravity and is itself fed from the storage tank by transfer pumps, has sufficient capacity to sustain full-load diesel engine operation for 60 min in the event of failure of the fuel transfer pumps. NB (china): Each day tank shall be designed so that when the low level alarm set point is reached, enough fuel remains in the tank to operate the unit for at least 60 minutes at its 110% capacity.			
29	4.249	Original text: 2.249. Each emergency power source should be fitted with Proposal: 4.249. Each emergency power source should be fitted with		X		
30	4.258	In case of a double walled storage tank is being used, and the annulus between the two walls should be equipped with a leak detection system.	Nearly all of the fuel oil storage tanks of NPP EDG in China were installed in the DG building, and use single walled tank. The double walled tank was		X	Accepted with modification for clarification by underscoring the case where double walled storage tank is used :

			usually used in underground storage oil tank of petrol filling station. In case of a double walled storage tank is being used, and the annulus between the two walls should be equipped with a leak detection system. So in our opinion the use of double walled storage should be not a mandatory requirement. The above opinions are consistent with NRC & ANS regulatory and standards (such as ANSI/ANS-59.51- 1997 and RG 1.137.R2)			In case double walled storage tank (e.g. underground tank) is being used, the annulus between the two walls should be equipped with a leak detection system.
31	4.266	Original text: 4.266. The lubrication system should be fitted with protective measures (e.g., relief ports) to prevent unacceptable explosions and to mitigate consequences of such events; Proposal: 4.266. The lubrication system should be fitted with protective measures (e.g., relief ports) to prevent unacceptable	More exact, the relief ports are used for preventing over- pressure.	X		

		over-pressure and to mitigate consequences of such events.				
32	4.272	Deleted	Station blackout (SBO) means the complete loss of alternating current (ac) electric power to the essential and nonessential switchgear buses in a nuclear power plant (i.e., loss of offsite electric power system concurrent with turbine trip and unavailability of the onsite emergency ac power system). The major contributor to overall station blackout risk is the likelihood of losing off-site power and the duration of power unavailability. The next most important contributor to station blackout risk for a given plant is low EDG availability. As we can know from current research documents, LOOPS caused by fire, flood, or seismic activity are not expected to occur with sufficient frequency to require explicit criteria and are not		X	The alternate AC Power Source is designed to withstand at least the design basis earthquake (please refer to para. 5.21A of SSR-2/1 (Rev.1)). According to the recommendation in para. 3.9 (Section 3), the supporting system should comply with the same requirements as the supported system.

r				
		considered. So station		
		blackout does not assume a		
		sojemio octivity		
		seisinic activity.		
		Alternate AC Power is used		
		to cope with severe-accident		
		(SBO) only and not for		
		(SDO) only, and not for		
		design basis accidents.		
		Features provided for		
		sovere aggident protection		
		severe-accident protection		
		(prevention and mitigation)		
		only need not be subject to		
		single foilure eniterion to		
		single failure criterion to		
		safety-related equipment		
		and quality assurance		
		roquiromonts		
		requirements, nor		
		environmental qualification		
		(including seismic		
		qualification) requirements		
		qualification) requirements		
		based on design basis.		
		So the essential AS&SS of		
		the Alternate AC Power		
		Course should get		
		source snould not		
		necessarily be resistant to		
		the Design Basis		
		Eartnquake.		

	The above opinions are		
	and above opinions are		
	consistent with NRC &		
	NUMARC code and		
	standards. The		
	corresponding descriptions		
	are shown as follows:		
	• 10 CFR 50.2		
	Station blackout means the		
	complete loss of alternating		
	current (ac) electric power		
	to the essential and		
	nonessential switchgear		
	buses in o nuclear power		
	plant (i.e., loss of offsite		
	electric power system		
	concurrent with turbine trin		
	and unavailability of the		
	and individual only of the		
	material Station blackout		
	system). Station blackou		
	abes not include the loss of		
	available ac power to buses		
	fed by station batteries		
	through inverters or by		
	alternate ac sources as		
	defined in this section, nor		
	does ilassume a concurrent		
	single failure or design basis		
	accident.		
	• NUMARC 87-00-		
	1991		

		1		
	LOOPS caused by fire,			
	flood, or seismic activity ore			
	not expected to occur with			
	sufficient frequency to			
	require explicit criteria and			
	ore not considered Seismic,			
	fire, and flooding events			
	include accident scenarios			
	for which current licensing			
	requirements specify			
	protective measures. For			
	<i>example, the potential for o</i>			
	fire-induced station			
	blackout is extremely remote			
	due to the effectiveness of			
	current fire protection			
	programs and 10 CFR 50			
	Appendix R separation			
	requirements imposed on			
	shutdown systems. NRC			
	analysis concludes that fire-			
	induced station blackout is			
	not o generic concern, citing			
	o station blackout frequency			
	of less than 1x10-5 per			
	reactor-year for most plants.			
	Consequently, station			
	blackout events that may			
	occur at a particular site			
	involving fire initiators are			
	not likely to occur. The			
	seismic and flooding issues			
	o station blackout frequency of less than 1x10-5 per reactor-year for most plants. Consequently, station blackout events that may occur at a particular site involving fire initiators are not likely to occur. The seismic and flooding issues			

	are similar to the fire risk		
	concern regarding the		
	notential for causing station		
	blackout The Class IF		
	nower system is currently		
	designed to withstand		
	acignica avanta A a a result		
	seismic evenis. As a result		
	ine potential for setsmically		
	induced or flooding-induced		
	station blackout is on the		
	same order as fire-induced		
	events, and are not		
	addressed in this document.		
	• SECY-90-016-1990		
	The preferred method of		
	demonstrating compliance		
	with 10 CFR 50 63 (station		
	blackout rule) is through the		
	installation of a spara (fall		
	canacity) alternate as power		
	source of diverse design that		
	source of alverse design that		
	is consistent with the		
	guiaance in Regulatory		
	Guiae 1.155. Besiaes, the		
	staff believes that features		
	provided for severe-accident		
	protection (prevention and		
	mitigation) only (not		
	required/or design basis		
	accidents) need not be		
	subject to (a) the 10 CFR		
	50.49 environmental		

			qualification requirements, (b) all aspects of 10 CFR Part 50, Appendix B quality assurance requirements, or (c) 10 CFR Part 50, Appendix A redundancy/diversity requirements. The reason for this judgment is thti1 the staff does not believe that severe core damage accidents should be design basis accidents (DBA) in the traditional sense that DBAs have been treated in the past.			
33	4.284	 Original text: 4.284. EFDS components should be classified on the basis of their functions and their role as barriers, and should meet the associated design requirements, in particular to be subject to periodic testing and inspection. The following EFDS equipment is usually safety classified: Equipment monitoring reactor coolant system leaks; Monitoring equipment credited in flooding analysis; Equipment necessary for containment isolation; 	For many NPPs design, the equipment monitoring reactor coolant system leaks is just for normal operating conditions, and is not required to be safety class. Equipment containing radioactive materials, like some piping, can be defined as design provisions (SSG- 30).		X	Rejected. However, the first bullet is modified as follows for clarification: - equipment monitoring reactor coolant system leaks if it is the only mean used for that purpose;

Proposal: 4.284. EFDS components should be classified on the basis of their functions and their role as barriers, and should meet the associated design requirements, in particular to be subject to periodic testing and inspection. The following EFDS equipment is usually safety classified:			
 Equipment monitoring reactor coolant system leaks; (delete) Monitoring equipment credited in flooding analysis; Equipment necessary for containment isolation; Equipment containing radioactive materials and may lead to unacceptable radiological consequences in case of failure (leakage or rupture). 			

Resolution of ENISS comments

DRAFT GUIDE DS440 "DESIGN OF AUXILIARY SYSTEMS AND SUPPORTING SYSTEMS FOR NUCLEAR POWER PLANTS" step 7a

ENISS Comments

		COMMENTS BY REVIEWER			RES	OLUTION	
Reviewen	: Mikko Lemme	etty	Page 1 of 2				
Country/C	Organization: El	NISS	Date: 16 May 2017				
Comment	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but	Rejected	Reason for
No.					modified as follows		modification/rejection
1	4.23	Safe, permanent,	The requirement for direct		Х		Accepted but
		acoustic, and two-way voice links	two-way links does not				modified as follows to
		should be provided with the public	improve safety. Even if				recognize the need to
		authorities: These links should	the plant dedicates				have direct links as
		be direct "station to station"	emergency				practicable and to
		telephone links since no dialing is	communications lines,				improve the
		necessary. These links should be in	they will be, in most				formulation:
		a network that remains operable even	cases, routed through an				
		during a large-scale disruptions of	IP network which may or				Safe, permanent,
		the electricity grid or of the	may not be part of the				acoustic, and two-way
		commercial internet infrastructure.	internet.				voice links should be
		The number of telephones or other	If the requirement				provided with the
		terminal devices in each location	specified here is followed				public authorities: If
		should be commensurate with the	literally, the emergency				practicable, these links
		expected telephone traffic.	response center will be				could be direct
			cluttered with ca. 12				"station to station"
			direct line telephones,				telephone links since
			without any improvement				no dialing is
			to communications				necessary. These links
			reliability.				should be in a network
							that remains operable
							even during large-
		COMMENTS BY REVIEWER		RESOLUTION			
-----------	------------------	--	---	------------	--	---	---
Reviewen	: Mikko Lemme	etty	Page 1 of 2				
Country/0	Organization: El	NISS	Date: 16 May 2017				
							scale disruptions of the electricity grid or of the commercial internet infrastructure. The number of telephones or other terminal devices in each location should be commensurate with the expected
2	4.130	For example, operation of HVAC equipment and fire dampers could be controlled by two diverse means of detection operating in series <u>if the</u> improvement of the fire safety is larger than the risk caused by the increased frequency of the inadvertent loss of ventilation	Increasing the likelihood of fire detection also increases the risk of inadvertent actuation and consequently, loss of cooling and ventilation provided by HVAC. Such improvements need to be balanced.			X	 telephone traffic. Addition rejected for the following reasons: The addition provided is confusing because the objective is to decrease the spurious shutdown of the ventilation (e.g. closure of fire dampers) that can be detrimental to the safety of the plant (e.g. loss of the cooling of a room where are located safety

COMMENTS BY REVIEWER		RESOLUTION		
Reviewer: Mikko Lemmetty	Page 1 of 2			
Country/Organization: ENISS	Date: 16 May 2017			
Country/Organization: ENISS	Date: 16 May 2017		equipment and loss of this equipment due to the increase of ambient temperature). To decrease the frequency of spurious shutdown of the ventilation, two diverse fire detectors operating in series can be installed. The decrease of the frequency of the spurious loss of the ventilation will have an adverse impact on fire protection in increasing the probability of non- shutdown of the ventilation <u>in case</u> of fire	
			 .,.	
			- providing more detailed explanation in	

	COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Mikko Lemmetty			Page 1 of 2					
Country/Organization: ENISS			Date: 16 May 2017					
							the example is not	
							relevant.	
							Finally, it was decided	
							to remove the sentence	
							related to the example.	

Resolution of Finland comments

Form for Comments

Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants (DS440)

		COMMENTS BY REVIEWER		RESOLUTION			
Reviewer: N Country/Or	Marja-Leena J ganization: S'	lärvinen ΓUK/Finland	Page of Date: 20.11.2017				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	3.16	The SSC of AS&SS should be protected against impacts of high energy hazards (internal missiles, pipe whipping, heavy load drops) or designed to withstand their loads and the loads caused by explosions as well;	Please clarify the sentence is confusing.Explosions are high energy phenome thus the approach to the design is different.Some of the explosions should be practically eliminated.		X		Accepted with modification of the first bullet in order to take into account other comments: The SSC of AS&SS should be protected against impacts of high energy hazards (internal explosions, internal missiles, pipe whipping, jet impingement, heavy load drops) or designed to withstand their loads.
	4.7	Different kinds of alarms can be transmitted: fire and other evacuation alarm, general alarm,	Is the trailing comma erroneous or are there items still missing from the list?		X		Accepted with modification as follows: Different kinds of alarms can be transmitted, for examples, fire, first aid, evacuation

							alarms and general alarm.
	4.28	As the ventilation systems are addressed in the <u>subsection 4.5"AIR</u> <u>CONDITIONING SYSTEMS AND</u> <u>VENTILATION SYSTEMS"</u> , only the water cooled components and the chilled water system are concerned here after.	The subsection "AIR CONDITIONING SYSTEMS AND VENTILATION SYSTEMS" of section 4 is not numbered.		X		See also resolution of China's comment No. 13
1	4.55	provide the information needed to ensure the confinement of radioactive substances located in the the controlled areas outside containment; and	typo Double "the" word should be removed	X			
	4.67	seismic resistance of a sampling line until the <u>external</u> isolation valve should be consistent with	"Second isolation valve" does not express the location of the valve (inner/outer), which is of importance in this context. Please use "external" or "outer" instead of "second".			X	The isolation valves concerned here are the isolation valves of the RCS pressure boundary. For better clarity, the para. 4.67 was modified as follows: The safety classification and the seismic resistance of a sampling valve until the second isolation valve of the RCS

	1.10				pressure boundary should be consistent with ones of the system sampled.
	4.68	Downstream the isolation valves, the PPASS providing samples from safety components should be considered as ensuring a safety function of safety category 3 and should have an appropriate safety classification.	Please elaborate what is meant by "safety components" as it is not a generally defined term. Please also elaborate which isolation valves are referred to (e.g. sampling system's isolation valve).	X	Accepted with the following modification for clarity and more general formulation: Downstream the isolation valves of the RCS pressure boundary, the PPASS should be considered as ensuring a safety function and should have an appropriate safety classification.
2	4.69	 As in post-accident condition, it may be necessary, as applicable, to sample the primary coolant so as to check the boron concentration, to measure the primary <u>coolant</u> activity and to determine the composition of the primary coolant fission products. 	There is a need to measure "primary coolant activity" not primary activity. In some plant configurations, sampling systems connected to RCS may/should be expected to have also RCS isolation valve(s), and these may be partly different from the	X	Accepted with the link to US comments. The reason of presenting containment isolation valves is not to increase the volume of the draft safety guide but because the recommendations

			containment isolation valves. (In addition, is it necessary to add volume by presenting the containment isolation valve requirements in this section as they concern systems in general, not only sampling isolation?)		apply to the sampling lines.
3	4.83	For the personnel protection, a continuous monitoring of the atmosphere of the containment should be provided to allow personnel intervention and to deliver alarm for personnel evacuation notably further <u>prior</u> to a fuel handling accident.	Clarity Please reconsider the word "prior" in stead of "further".	X With the following wording for clarity: For the personnel protection, a continuous monitoring of the atmosphere of the containment should be provided to allow personnel intervention and to deliver alarm for personnel evacuation notably in case of a fuel handling accident.	The alarm for personnel evacuation cannot be generated prior to the accident! The recommendation is modified as follows for clarification: For the personnel protection, a continuous monitoring of the atmosphere of the containment should be provided to allow personnel intervention and to deliver alarm for personnel evacuation notably in case of a fuel handling accident.

4.1	111	"ARAVS" -> ?	The acronym "ARAVS" is mentioned here but not in the rest of the chapter. Instead "ETBVS" is mentioned and explained later on. Maybe worth considering using one acronym throughout the chapter for consistency.	X		
4.1	115	 For example, to maintain negative pressure in controlled <i>areas flowrate intake air</i> should be less than <i>extraction flowrate air</i>; in maintaining an air flow going from rooms with a lower contamination risk towards rooms with higher contamination risk, as practicable for accident conditions; 	 Please clarify: 1) The text uses definitions "flowrate intake air" and "extraction flowrate air". The wording in these two definitions is unclear and inconsistent. Should these be for example "intake air flowrate" and "exhaust air flowrate"? 2) Why is the text in red? 	Accepte d and correcte d.	X	Accepted with modifications in line with the resolution of the Chinese comment No.16.
4.1	125	The design of the HVAC systems maintaining the ambient conditions (temperature, humidity, contamination	Please clarify:		X	"contamination" replaced by

	and new air) necessary for the operation of components important to safety, the personnel accessibility and the habitability of the control room should take into account the basic atmospheric conditions and the extreme atmospheric conditions (e.g., temperature, humidity, and their duration) defined for the design of the NPP.	The text says: " HVAC systems maintaining the ambient conditions (temperature, humidity, contamination and new air) The word "contamination" in the list of ambient conditions is a bit strange as I think "maintaining the ambient conditions" is something that is preferred, while contamination is not preferred. Please consider other wording for the description of "maintaining ambient conditions". Seems that contamination is not one of the features of preferred ambient conditions that should be maintained.			"acceptable activity level"
4.134	"Emergency core cooling system rooms" "Residual heat removal system rooms"	For clarity, please consider adding the word "system". Please apply throughout the document. "RHRS" instead of "RHRS system"	X		To be implemented throughout the draft.

		The word system is already in the acronym.			
4.162 1 st bullet	The CSWS should be designed: ☐ taking into account that during transfer of spent fuel in the fuel storage pool, a damaged fuel clad could induce releases of radioactive gases and aerosols in some area of the containment, (DS440, Rev 1) 44	Please use "fuel cladding" instead of "fuel clad" Commonly used definition	Х.		To be implemented throughout the draft.
	 for reducing in normal cold shutdown states the radioactivity of gaseous releases to the environment below the authorized limits and to keep them as low as reasonably achievable, for participating to the containment <i>isolation (safety category 1), isolating</i> <i>devices should have an appropriate</i> <i>safety classification)</i> in case of high level radioactivity within the containment in accident conditions; for improving efficiency of hydrogen control system in the containment. 	The use/number of brackets is inconsistent	Х		
4.203		This contains details on a much more technical level than the rest of the section.	Х.		To replace second by redundant.

-						-
			Also the paragraph is not unambiguous and clear. ensured either by a safety brake acting on the drum or by a <i>redundant</i> hoisting mechanism.			
4	4.213	 chemistry for reactor coolant and other systems to minimize the production of corrosion product <u>s</u>	Plural is needed for "corrosion products"	X		
	4.263	When the emergency power source receives a start signal, the cooling water system should change automatically of operating mode (standby conditions to the cooling water configuration).	What does the sentence in brackets mean?	•	X	Accepted with the following modifications for clarification: When the emergency power source receives a start signal, the cooling water system should automatically provide the required cooling (switching from standby conditions to required cooling conditions)

4.267	In addition, the capacity of lube oil storage at the site should permit to ensure more long term operation <u>until recovery of the supply of lube</u> <u>oil to the site</u> .	The term "more long term" is vague. Please add: <u>until recovery of the</u> <u>supply of lube oil to the</u> <u>site</u>		X	Accepted with the following modifications (long term instead of more long term): In addition, the capacity of lube oil storage at the site should permit to ensure long term operation until recovery of the supply of lube oil to the site.
4.270	A weather event, another external event or internal event should not damage an essential auxiliary system of the emergency power source and an essential auxiliary system of the Alternate Power Source.	Please clarify: Is this the same as "Any external or internal event"?		X	Accepted with the more general formulation: Any postulated external or internal hazard should not damage an essential auxiliary system of the emergency power source and an essential auxiliary system of the Alternate Power Source.
4.284	Extra list ";" should be removed	typo	Х		
4.297		Please clarify:		Х	Х

	Storms inducing the loss of off-site power and a loss of ultimate heat sink, <u>Earthquake induced</u> the loss of off-site power and ultimate heat sink.	Should this sentence be made clearer to indicate that the UHS is actually lost? E.g. Storm-induced loss of off-site power and ultimate heat sink or loss of the ultimate heat sink due to flooding. Earthquake inducing the -> Earthquake-induced?			 Storm-induced loss of off-site power and loss of the ultimate heat sink, earthquake- induced loss of off- site power and loss of ultimate heat sink.
ANNEX 1	CDWS: Essential Chilled Water System	For consistency	Х		
ANNEX 1	Several inconsistent uppercase/lowercase	For consistency	X		
ANNEX 1	CCF missing from list	For consistency	Х		

Resolution of Germany comments

Draft Specific Safety Requirements ''DS440, Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants", Status: STEP 8, Comments by Member States

	Reviewer: Fed Safety (BMUE	COMMENTS BY REVIEWER Reviewer: Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) (with comments of Ministry of the Environment of Baden-Württemberg and GRS) Pages 3 Country/Organization: Germany Date: 2017-11-22					RESOLUTION			
	Country/Organ	ization: Ger	many	Dat	e: 2017-11-22					
Rele- vance	Comment No.	Para/Line No.	Proposed new text		Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reje ction	
2	1	3.16	Layout and design provisions should be provided to protect the SSC of AS&SS and its associated systems against the effects of the <u>considered</u> internal hazards, <u>for example</u> :	1.	It should be made clear in this paragraph that the layout and design provisions for the SSC of AS&SS have to be made only for internal hazards that have been identified to have relevant effects. The list in this paragraph is not necessarily complete, so it would be better to denote its items as examples.		X		Better wording Accepted with modifications as follows for better wording: Layout and design provisions should be provided to protect the SSC of AS&SS and its associated systems against the effects of the postulated internal	

			COMMENTS BY REVIEWER			RESOLUT	TION	
	Reviewer: Fed	eral Minist	ry for the Environment, Nature Conserv	ation, Building and Nuclear				
	Salety (DIVIO	b) (with com	intents of Ministry of the Environment of E	Pages 3				
	Country/Organ	nization: Ger	many	Date: 2017-11-22				
Rele- vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reje ction
								hazards, for example:
2	2	3.30	Depending on the design, the failure of some AS&SS has the potential to lead to accident conditions,	To avoid misunderstandings, the phrase should be changed.	Х			
2	3	4.63.	 For example, PPASS should, as applicable: allow verification in normal operation that the boron concentration of the refueling water storage tank water, <u>the accumulator water and the water in the additional borating system is adequate to guarantee core subcriticality in case of relevant accident conditions; and</u> 	The added system and components are of particular safety significance regarding boron concentration.		X		These are limited examples. Additional borating system would not be included in all the designs. therefore, the comment is accepted with the following modification: • allow verification in normal operation that the

		COMMENTS BY REVIEWER				RESOLUI	TION	
	Reviewer: Fed	eral Ministr	y for the Environment, Nature Conserv	ation, Building and Nuclear				
	Safety (BMUE	S) (with com	ments of Ministry of the Environment of B	aden-Württemberg and GRS)				
	Country/Orgor	ization: Cor	many	Pages 3				
Rele-	Comment	Para/Line	Proposed new text	Beason	Accepted	Accepted but	Rejected	Reason for
vance	No.	No.	Toposed new text	Keason	Ассерии	modified as follows	Rejected	modification/reje
								ction
								DOFOII
								n of the
								refueling
								water
								storage tank
								water, the
								accumulator
								water is
								adequate to
								guarantee
								core sub-
								criticality in
								case of
								relevant
								accident
								conditions;
								and
2	4	4.85.	As applicable, activity measures in	It is a common design		Х		Accepted with
			the main steam pipes, blow-downs	feature that a high 16 N-				modified
			of the SGs and condenser should	activity level in steam				wording:
			be provided to monitor secondary	lines automatically shuts				As applicable,
			side activity continuously and	down the reactor.				activity
			provide operator's alarm and if					measures in

	Reviewer: Fed	eral Ministr	COMMENTS BY REVIEWER y for the Environment, Nature Conserv	ation, Building and Nuclear		RESOLUI	TION	
	Safety (BMUE	B) (with com	ments of Ministry of the Environment of E	aden-Württemberg and GRS)				
				Pages 3				
.	Country/Organ	ization: Ger	many	Date: 2017-11-22				D
Rele- vance	No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reje ction
			<u>appropriate automatically activate</u> <u>safety functions.</u>					the main steam pipes, blow-downs of the SGs and condenser should be provided to continuously monitor secondary side activity, provide operator's alarm and automatically activate safety functions_as necessary
1	5	4.111 a (new)	Design provisions should be implemented in such a way that HVAC components allow the decontamination of potentially contaminated surfaces.	HVAC components like ducts, fans or valves which operate in a environment of potential radioactive substances must be easy to			X	Not specific to HVAC components.
				decontaminate.				

			COMMENTS BY REVIEWER			RESOLUT	ION	
	Reviewer: Fed	eral Minist	ry for the Environment, Nature Conserv	ation, Building and Nuclear				
	Safety (BMUB	B) (with com	ments of Ministry of the Environment of B	aden-Württemberg and GRS)				
				Pages 3				
	Country/Organ	ization: Ger	many	Date: 2017-11-22				
Rele-	Comment	Para/Line	Proposed new text	Reason	Accepted	Accepted, but	Rejected	Reason for
vance	No.	No.				modified as follows		modification/reje
								ction
1	6	4.126	When part of a HVAC system is a			X		Accepted, but
			support system required to permit to a					put as a bullet
			safety system to ensure its safety					in 4.162
			function (safety category 1 or 2) in					(related to
			case of DBA, it should have an					containment
			appropriate safety classification and					ventilation
			consequently meet the associated					system).
			design requirements such as:					•
			 Components designed 					
			manufactured commissioned and					
			tested according to acceptable					
			quality standards:					
			quality standards,					
			• Components designed and					
			manufactured according to					
			acceptable design codes.	The new requirement is a				
			• <u>Ventilation system should have</u>	The new requirement is a				
			means to protect the containment	standard design feature of				
			against excessive negative	safety significance.				
			pressure.	Passive operating				
				components are to prefer.				
1	7	4.268 a	The air starting system should be	In the case of a diesel start		X		
		(new)	designed in such a way that several	failure a fast repetition of				Just to modify
			starts are possible without refilling	starts must be possible.				"needed" in
			the compressed air tanks.					"necessary".
								-

	Reviewer: Fed	eral Ministr	COMMENTS BY REVIEWER ry for the Environment, Nature Conserva	ation, Building and Nuclear		RESOLUI	TION	
	Safety (BMUE	B) (with com	ments of Ministry of the Environment of Ba	aden-Württemberg and GRS)				
	Constant/Oracon	:		Pages 3				
Pala	Country/Organ	Doro/Line	Proposed powtext	Date: 2017-11-22	Accorted	A coopted but	Dejected	Passon for
vance	No.	No.	T toposed new text	Reason	Accepted	modified as follows	Rejected	modification/reje ction
								The end of 4.268 is modified as follows: [], combustion air intake and engine exhaust, electrical systems, and air starting. In particular, the air starting system is designed in such a way that several starts are possible without refilling the compressed air tanks.

Resolution of India comments

Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants (DS 440)

	Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants (DS 440)										
COMN	COMMENTS BY REVIEWER										
Reviev	ver:										
Countr	y/Organisa	tion : INDIA	Date :28/12/2017								
Com	Page/	Proposed new text	Reason	Accep	Accepted,	Rejected	Reason for				
ment	Para/Li			ted	but modified		modificatio				
No.	ne				as follows		n /				
	No.						Rejection				

1.	8/2.1	Clarification:	i. It assumes that all the requirements		Х	According
		The Para says that:	of SSR 2.1 from Req. 59-82 are			to the DPP,
		A nuclear power reactor has the	related to auxiliary systems while			a definition
		following main (or primary)	SSR 2.1 suggests that Reg. 69-76 are			of auxiliary
		systems: the reactor core, the reactor	related to Support and Auviliary			systems and
		coolant system and the containment	Sustained to Support and Auxiliary			supporting
		structure and containment system	Systems			systems was
		and their associated safety systems	ii. Req 60 & 61of IAEA SSR 2.1 is on			missing. We
		and safety features (SSR-2/1	control System and Protection			started by
		(Rev.1), Req. 43 to 58). By	System which are not auxiliary			defining
		exclusion, the remaining systems	systems			auxiliary
		are considered as auxiliary systems	iii. Likewise Req 65, 66 are on MCR and			systems and
		(SSR-2/1 (Rev.1), Req. 59 to 82) to	SCR which are not treated as			then
		associated features General	auxiliary systems			supporting
		definition and extent of the auxiliary	iv The draft guides talks about the items			systems.
		systems are given in the following	listed as Reg 69-76 of IAEA SSR 2.1			In line with
		sections	usith one addition of Treatment of			that
			with one addition of freatment of			definition.
		Clarification is required on the	radioactive waste.			the systems
		correctness of scope of this guide.	v.Req 68 is on Emergency power			concerned
			supply			by the
						requirement
						s 59 through
						82 are
						auxiliary
						systems or
						supporting
						systems.
						The scope
						of the safety

			guide was then limited
			to examples
			systems/
			supporting
			systems that
			are
			important to
			safety and
			not addressed in
			other safety
			guides
			providing
			recommend
			ations to
			fulfil the
			s 59 through
			8 <i>39</i> through 82
			02.

2.	13/3.16/	The SSC of AS&SS should be	Jet impingement is an important	Х		See also
	First	protected against impacts of high	internal hazard to be protected against.			comment
	Bullet	energy hazards (internal missiles,				No. 1 from
		pipe whipping, jet impingement,				Finland.
		heavy load drops) or designed to				
		withstand their loads and the loads				
		caused by explosions as well				

3.	13/3.16/	A single hazard should not have the	This criteria needs to be applied to	Х	Slightly
	Last	potential for a common cause failure	DEC without significant fuel		modified
	Bullet	between AS&SS supporting safety	degradation conditions too.		formulation
		systems designed to control design			in order to
		basis accidents, and safety features			underscore
		required in the event of Design			the case of
		Extension Conditions including			design
		accidents with core melting.			extension
					conditions
					with core
					melting:
					A single
					hazard
					should not
					have the
					potential for
					a common
					cause
					failure
					between
					AS&SS
					supporting
					safety
					systems
					designed to
					control
					design basis
					accidents,
					and safety
					teatures
					required in

			the event of design extension conditions, in particular design
			in particular
			design
			accidents
			with core
			melting.

4.	20/3.76	Suggestion:	The OESC which would house	X	The added
		The design should be such that	operators/responders during an		sentence is
		AS&SS supporting safety systems	accident (SA) when MCR/SCR/Local		not relevant
		or safety features for DEC should	Points are not available may be		in this
		not be shared between units of a	common for all NPPs at one site.		paragraph ,
		multiple unit nuclear power plant.			which
		However OESC may be common to			provides
		all units at multiple unit NPPs			recommend
					ations.

5.	24/4.19	The paging system should reach all	This facility should be available from	Х	Accepted
		areas of the plant and be audible	SCR too as under certain accident		with the
		over the whole site, both inside and	conditions MCR may not be available.		following
		outside the buildings. The design	In such case necessary announcements		modificatio
		should be such that it is possible to	can be made from SCR.		n related to
		use this system from the main	This would also be in line with the 4.7		the
		control room and SCR, the main	of the draft guide.		supplement
		control room having a priority over	-		ary control
		other available control points.			room:
		-			The paging
					system
					should
					reach all
					areas of the
					plant and be
					audible over
					the whole
					site, both
					inside and
					outside the
					buildings.
					The design
					should be
					such that it
					is possible
					to use this
					system from
					the main
					control
					room and
					the
					supplement

			ary control
			room, the
			main
			control
			room
			having a
			priority over
			other
			available
			control
			points

6.	26/4.31	In addition to the heat loads to be considered, the heat transport system capability should be ensured taking into account the design temperature limits of the heat sink and suitably <u>pessimistic</u> <u>conservative</u> considerations (calculation performed with appropriate allowances for	The terminology used in IAEA SSR 2.1 is "Conservative". Therefore the same may be used in this guide.	X		
7.	21/3.81	In this respect, PSA should be considered as a good tool to assess the consequences risk of the loss of AS&SS on the supported system or function.	PSA provides the risk estimates, which is a product of frequency and consequence. However, the required analytical input for 'consequence' is derived from deterministic analysis.		X	Accepted with better wording: In this respect, PSA should be considered as a good tool to assess the likelihood and the consequenc es of the loss of AS&SS on the supported system or function.

The additions are indicated in <mark>red colour with yellow</mark> highlight. Strikethrough represents proposed deletion.

Resolution of Japan comments

COMMENTS BY REVIEWERReviewer: Japan NUSSC memberPage of 6Country/Organization: Japan/NRADate: 26 Dec., 2017					RESOLUTIO	ON	
Comm ent No.	Para/Li ne No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification
1.	2.7./ the last	However, in this safety guide, <u>mainly</u> only those systems important to safety are considered.	Clarification related to the scope of this safety guide. The list of AS/SS includes systems not important to safety (e.g. communication systems and lighting systems).			X	Communication systems and lightning systems are important to safety according to the definition in the IAEA Safety Glossary (2007). They are subject to SSR-2/1 (Rev.1) requirement 37 and requirement 75 respectively.
2.	3.31.	When considering multiple failures leading to DEC, the failure of AS&SS related to supporting safety systems or safety features should be taken into account.	Clarification. "Multiple failure DEC" is not clearly defined. Duplication: "SS" includes "supporting"		Х.		Accepted with modification for better wording: When considering multiple failures leading to DEC, the failure of AS&SS that

Japan comments on DS440 "DESIGN OF AUXILIARY SYSTEMS AND SUPPORTING SYSTEMS FOR NUCLEAR POWER PLANTS"
Review Countr	er: Japar y/Organi	COMMENTS BY R NUSSC member zation: Japan/NRA	EVIEWER Page of 6 Date: 26 Dec., 2017		RESOLUTIO	ON	
Comm ent No.	Para/Li ne No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification
							support safety systems or safety features should be taken into account.
3.	3.74.	Define "cross-connection".	The definition is needed because the word is new and nowhere to be found in this safety guide and other Safety Standards.		Х		"cross- connection" can be replaced by "inter- connection"
4.	3.76.	Each unit of a multiple unit nuclear power plant The design should have its own be such that AS&SS related to supporting safety systems or safety features for DEC should have its own not be shared between units of a multiple unit nuclear power plant.	To keep a consistency with SSR-2/1 (Rev. 1) requirement 33. "Safety features" doesn't need to be limited like "for DEC" according to IAEA Safety Glossary 2016.			Х	The proposed formulation is not clear, and safety features in 3.76 are meant for DEC, and not in general.
5.	4.47.	The following recommendations provide guidance to fulfil requirements 71 and 82 of SSR-2/1 (Rev. 1).	Requirement 82 of SSR-2/1 (Rev. 1) is addressed in NS-G-1.13, as stated in para 2.5, and the subtitle does not include "MONITORING". The role and the function of sampling system are clearly different from those of monitoring system. This difference should	Rev. 1) is X ed in para X ot include X sampling X n those of X		Х	Monitoring should be part of this safety guide. Please refer to the resolution of Belgium

Review Country	er: Japar y/Organiz	COMMENTS BY R NUSSC member zation: Japan/NRA	EVIEWER Page of 6 Date: 26 Dec., 2017	RESOLUTION			
Comm ent No.	Para/Li ne No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification
			be clearly and separately stated in each documentation. Moreover, some recommendations under the subtitle "EXTENT OF THE AUXILIARY SYSTEMS AND SUPPORTING SYSTEMS" should be deleted to avoid duplications between DS440 and NS-G-1.13.				comments No. 2 and No.3.
6.	4.49.	The PPASS should be capable to provide the water liquid and gaseous samples, during	Editorial.	Х			
7.	4.70.	The system should be designed and constructed so that radiological dose to the plant workers is as low as reasonably achievable (ALARA).	Duplication with para 4.71.			Х	Paragraphs 4.70 and 4.71 are not the same, in the sense that para. 4.70 is general and para. 4.71 is detailing the measures to achieve 4.70.
8.	8. $\begin{array}{c c} 4.78.\\ 4.94.\\ 4.94.\\ 4.78 - 4.83, 4.85, 4.87 - 4.91 \text{ and} \\ 4.94.\\ \end{array}$ The same comments as #5 in para. 4.47.				X	Please refer to the resolution of comment No. 5.	

Review Country	er: Japar y/Organi	COMMENTS BY R n NUSSC member zation: Japan/NRA	EVIEWER Page of 6 Date: 26 Dec., 2017		RESOLUTIO	ON	
Comm ent No.	Para/Li ne No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification
9.	4.97.	A CAS should provide a continuous supply of compressed air to pneumatic instruments and actuators supporting components ensuring a safety function, in sufficient quality, cleanliness, volume flow and pressure with specifying minimum number of actuation of each accumulator, in every design condition.	Actuation number for each accumulator should be specified.			Х	Please refer to para. 4.101. The concern of capacity is addressed there.
10.	4.99.	If CAS provides air for important to safety and not important to safety components, the important <u>not</u> to safety components should be able to be isolated from the CAS <u>not</u> important to safety components.	It is not important to safety components to be isolated.			X	Please note that the isolation is between the components of CAS important to safety and the components of CAS that are not important to safety. The proposed formulation does not correctly reflect the recommenda- tion.

Review Countr	er: Japan y/Organiz	COMMENTS BY R NUSSC member zation: Japan/NRA	EVIEWER Page of 6 Date: 26 Dec., 2017	RESOLUTION			
Comm ent No.	Para/Li ne No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification
11.	4.111.	The safety requirements of a HVAC system depend on its safety functions. <u>HVAC systems have</u> mainly two functions, i.e. limiting radioactive release and limiting introduction of airborne radioactive substances through <u>HVAC systems. Therefore, I</u> it is usual to distinguish the following categories : • The HVAC systems or part of these systems participating in the limitation of radioactive releases <u>outside the radiation controlled</u> <u>area</u> , in particular by filtering <u>airborne radioactive substances</u> in the air in specific areas: This category includes notably the engineered safety feature ventilation System (ESFVS) of the controlled area, the fuel building ventilation system (ARAVS), the containment sweeping ventilation system, and annulus ventilation system if applicable; • The HVAC systems	Clarification. The main purpose of this para should be to describe there are two major functions for HVAC systems before paras 4.112 thru. 4.116 concerning details of them.		X		Modifications have been introduced since in addition to the limitation of radioactive releases and the limitation of introduction of airborne radioactive substances, the HVAC has to maintain within building others important ambient conditions (e.g. temperature and humidity).

Review Countr	yer: Japan y/Organiz	COMMENTS BY R NUSSC member zation: Japan/NRA	EVIEWER Page of 6 Date: 26 Dec., 2017		RESOLUTIO	ON	
Comm ent No.	Para/Li ne No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification
		COMMENTS BY REVIEWER r: Japan NUSSC member Page of 6 /Organization: Japan/NRA Date: 26 Dec., 201 Para/Li ne No. Proposed new text Reason maintaining the ambient conditions required for the space where systems and components important to safety are installed and the space where the Control Room habitability is required so that airborne radioactive substances in the air aren't be introduced: This category includes notably the electrical building ventilation system, the diesel generator building ventilation system, entilation system (CRAVS) and on-site emergency response facilities' ventilation systems.					Accepted with modifications: The safety requirements of a HVAC system depend on its safety functions. <u>HVAC</u> systems have mainly two functions, the limitation of radioactive releases and the maintenance of the ambient conditions (temperature, humidity, radioactivity) required for systems and components

Review Countr	ver: Japar y/Organiz	COMMENTS BY R NUSSC member zation: Japan/NRA	EVIEWER Page of 6 Date: 26 Dec., 2017		RESOLUTIO	ON	
Comm ent No.	Para/Li ne No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification
							important to safety and the accessibility or habitability of rooms. <u>Therefore</u> , it is usual to distinguish the following categories: • The HVAC systems or part of these systems participating in the limitation of radioactive releases • The HVAC systems maintaining the ambient conditions required for

Review Countr	er: Japar y/Organiz	COMMENTS BY R NUSSC member zation: Japan/NRA	REVIEWER Page of 6 Date: 26 Dec., 2017	RESOLUTION				
Comm ent No.	Para/Li ne No.	Proposed new text	Reason	Accepted Accepted, but modified as Rejustry follows		Rejected	Reason for modification	
							systems and components important to safety as well as the habitability of Control Room <u>s</u> and on-site emergency response facilities: This category includes notably the electrical building ventilation system	
12. 4.115. Move para 4.115 after 4.112. Restructuring By doing so will describe radioactive re thru 4.116 w limiting in		Move para 4.115 after 4.112.	Restructuring paras 4.112 thru 4.116. By doing so, first, para 4.112 and 4.113 will describe the functions for limiting radioactive release, and then para 4.114 thru 4.116 will describe the functions for limiting introduction of airborne			Х	Please consider this rejection as consequence of resolution of comment No. 11.	

Review Countr	er: Japan y/Organiz	COMMENTS BY R NUSSC member zation: Japan/NRA	EVIEWER Page of 6 Date: 26 Dec., 2017		RESOLUTIO	ON	
Comm ent No.	Para/Li ne No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification
			radioactive substances to maintain ambient conditions.				
13.	4.115. (new4. 113)/L 5-6, L12	For example, to maintain negative pressure in controlled areas flowrate <u>of</u> intake air should be less than <u>extraction</u> -flowrate <u>of</u> <u>exhaust</u> air; The radioactivity of the <u>exhaust</u> air <u>extracted</u> from the controlled area.	Editorial and for better wording consistent with other paras.	X X			
14.	4.113. (new 4.114.)	The HVAC systems should ensure one or more of the following functions to limit introduction of airborne radioactive substances as appropriate: • To maintain the ambient conditions of rooms in terms of temperature, humidity and airborne radioactive substances; • To monitor and limit the gaseous radioactive releases during normal operation, anticipated operational occurrences (AOO) and accident conditions;	Clarification. The 2 nd bullet to be deleted because the new 4.113 already describes the same phrase and this para only describes the function to limit introduction of airborne radioactive substances.			Х	Please refer to the resolution of comment No. 11.

Review Countr	er: Japar y/Organiz	COMMENTS BY R NUSSC member zation: Japan/NRA	EVIEWER Page of 6 Date: 26 Dec., 2017	RESOLUTION			
Comm ent No.	Para/Li ne No.	Proposed new text	Reason	Accepted Accepted, but modified as Rejected follows		Rejected	Reason for modification
		• To protect the personnel and/or equipment from risks coming from inside or outside the buildings.					
15.	4.116.	The personnel and/or the equipment should be protected against some risks coming from inside the buildings (more particularly anoxia, fire propagation and explosion in rooms were combustible gas can be produced) and from outside buildings (more particularly external explosion, volcanic gases, ash, etc., forest fire and extreme weather conditions as well as toxic gases by accident).	Adding some examples of external hazards to be considered in the design from the Japanese practices.		X		With more concise formulation: The personnel and/or the equipment should be protected against some risks coming from postulated internal hazards (e.g. anoxia, internal fires and explosions) and from postulated external hazards (e.g. extreme weather conditions, toxic gases)

Review Countr	er: Japan y/Organiz	COMMENTS BY R NUSSC member zation: Japan/NRA	EVIEWER Page of 6 Date: 26 Dec., 2017		RESOLUTIO	ON	
Comm ent No.	m Para/Li Proposed new text		Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification
16.	4.174.	The design of the CRAVS should permit to isolate the main control room for avoiding the introduction of <u>smoke</u> , <u>explosive and toxic</u> gases, <u>and radioactive</u> <u>contamination of the external</u> <u>environment due to external events</u> via the intake vents.	Adding the introduced substances besides toxic gases consistent with para 4.170.		X		With modification for more clear and concise formulation: The design of the CRAVS should permit to isolate the main control room for avoiding the introduction of any substance, which can be harmful to the personnel or the equipment.

Resolution of Pakistan comments

TITLE DS-440

Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants

		COMMENTS BY REVIEWER	RESOLUTION				
Reviewer:	Tauqeer H	lussain, CNS					
Page of							
Country/Org	ganization:	Date:					
Comment	Para/Line	Proposed new text	Reason	Accepte	Accepted, but	Rejected	Reason for
No.	No.			d	modified as		modification/rejecti
					follows		on
1.	3.71/	layout should:	Provision of space for		Х		For better
	Page19	• make provision for construction,	access of personnel				formulation:
		assembly, installation, erection,	during				• make provision for
		<u>COMMISSIONING/OPERAT</u>	commissioning/operation				construction,
		<u>IONS</u> , maintenance,	of plant may be				assembly,
		decommissioning, and	considered.				installation,
		demolition;					erection,
							commissioning,
							operation,
							maintenance,
							decommissioning
	4 1 60 4 17	1			37		and demolition;
2.	4.160,4.17	meet the associated design	Maintenance and		X		For better
	1,/ Do co. 42.45	requirements (redundancy,	inspections are essential				formulation:
	Page 45,45	emergency power supplied,	requirements of plant				F] (1
		protection against the internal and	design.				[] meet the
		external nazards, the periodical tests,					corresponding design
		WAINTENAINCE, INSPECTION,					(redundancy
		quality assurance, and, designed and					emergency power

	fabricated according	acceptable			supplied,	protection
	design codes.)				against in	hozorda
					external	nazarus,
					periodic	testing,
					quality	assurance,
					maintenan	ce,
					inspection	and, design
					and	fabrication
					according	acceptable
					design cod	les).

Resolution of Poland comments

Form for Comments

"Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants" (DS440, Rev 1)

COMMENTS BY REVIEWER Reviewer: PGE EJ 1 Sp. z o.o. Country/Organization: POI AND					RES	OLUTION	
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reje ction
1.	Paragraph 4.115, page 37	Some words are in red color.	Editorial	Х			
2.	Paragraph 4.202, page 49	Different font sizes are present.	Editorial	Х			
3.	Paragraph 4.284, page 60	There is missing text in one bullet.	Editorial	Х			

Resolution of UK comments

ſ	COMMENTS BY REVIEWER Country/Organization: FRANCE + GERMANY / AREVA NP					RESO	LUTION	
	Date: November 3, 2017							
	pages							
[Comme	Para/Li	Proposed new text	Reason	Accepted	Accepted, but	Rejected	Reason for
	nt No.	ne No.				modified as follows		modification/rejection

ADE	ganar	Consistancy between safety standards and	Consistency with DS/191	V	It is room	ognized that
	gener	Consistency between safety standards and	consistency with DS461	Λ		
VA	ai	wording	should be improved (general		the wor	raing could
NP			consideration for the design		be in	nproved.
			could even be common to		Secti	on 3 was
			both guides).		deve	eloped in
					coordin	nation with
			DS440 should use the same		the deve	elopment of
			wording used in SSR-2/1		DS482	Section 3
			when requirements are the			
			same (lots of rewording to			
			express the same		The	comment
			requirements as SSR-2/1)		regai	rding the
					con	sistency
			Wording should be more		hetwe	een "main
			consistent within the		SVS	stems"
			document between various		"su	nported
			paragraphs or even within a		Su	apported
			single noncomply main		sysu	
			single paragraph. main		rejected	because we
			systems, supported systems,		did no	t mean the
			systems, support systems,		same s	systems. In
			AS&SS, equipment, SSC		partici	ular, main
					syste	ems was
			The text is sometime quite		intro	duced to
			vague : Example # 3.3 "may		disting	uish these
			vary", # 3. 7 "with		syste	ems from
			appropriate margins"		auxiliary	y systems in
					the de	finition of
					auxiliar	ry systems
					and s	upporting
					SV	stems.

ARE	gener	Ordering the provisions in a structured	Certain sections of DS440		Х	Please specify your
VA	al	manner	read like a succession of			comment.
NP			items without logic and			
			some redundancies. DS440			However, in order
			often contains "good			to improve Section
			practices" that are generic			3, a new paragraph
			and not specific to the			is added after the
			system, but without			existing para. 3.12.
			completeness.			in order to make the
						link with the
						recommendations
						that follow.
ARE	2.7	Remark:	The grounding and lighting		Х	These systems are
VA		One important AS&SS is the grounding	protection is an important			addressed in SSG-
NP		and lightning protection system, especially	system; a reference should			34 and SSG-39.
		for electrical and I&C systems. Details	be included in this			One of the principal
		referring this system are described in SSG-	document.			directing this safety
		34 for electrical and SSG-39 for I&C.				guide is to avoid
						addressing systems
						addressed
						elsewhere.
						Moreover, this
						safety guide is not
						intended to deal
						with all AS&SS,
						but only with some
						examples.

ARE	3.6	The safety class of AS&SS systems or	Safety classification of the	Х		
VA		components should be assigned with due	AS&SS should also be			
NP		consideration of the safety class of the	consistent with the safety			
		systems or components served by them, and	function for which it is			
		of the safety function ensured by the	required, and should not			
		systems or components served by them for	only be determined by the			
		which operation of the AS&SS systems or	safety classification of the			
		components is required, and the	supported system: eg if the			
		consequence of the failure of the AS&SS.	supported system has			
		-	enough autonomy to reach			
			controlled state without the			
			supporting system, and			
			needs the supporting system			
			only to reach the safe			
			shutdown state, the			
			supporting system should be			
			classified as a system			
			required to reach the safe			
			shutdown state.			

ARE	3.7	Each system providing an essential service		Х	Better formulation
VA		should have the capacity, duration	'Autonomy' is more		and footnote to
NP		autonomy, availability, robustness and	appropriate than 'duration'.		explain the meaning
		reliability in accordance to the safety	Reliability, availability and		of autonomy:
		function and to meet the maximum demands	robustness are not linked to		
		of its dependent systems with appropriate	maximum demands of the		Each system
		safe ty margins	dependent systems but to		providing an
			importance of the safety		essential service
			functions of the supported		should have the
			systems.		capacity, autonomy,
			Safety margins refer to the		availability,
			safety studies.		robustness and
					reliability in
					accordance with the
					safety function and
					the maximum
					demands of its
					dependent systems
					with appropriate
					margins.

ARE	4.7	A wireless system can be used in normal and	Example of "satellite	Х		
VA		emergency conditions.	phone" to be deleted or			
NP			replaced by "e.g. DECT			
			phone". This point describes			
			the onsite telephone system.			
			The satellite function of			
			satellite phones will not			
			function inside any NPP			
			buildings. But the output			
			power of phone types could			
			be too high in regards of			
			EMC.			
			Acronyms:			
			DECT: Digital Enhanced			
			Cordless			
			Telecommunications			
			EMC: Electromagnetic			
			Compatibility			
ARE	3.8	For passive designs, most of the safety	Out of the scope since not		Х	Some of the
VA		systems rely on the driving forces of	related to the design of			systems in Section
NP		buoyancy, gravity, and stored energy sources.	AS&SS but to general NPP			4 pertain to para.
		This means that they contain no active	design			3.8
		components (for example: no pumps and				
		include valves that are operated by either air				
		pressure or direct current (DC) electric power				
		from batteries, or use check valves actuated				
		by the pressure differential across the valve).				
		These designs may induce much less need of				
		safety classified AS&SS to support the safety				
		functions.				

ARE	3.9		First part: Consistency with	Х	"required" replaced
VA		The reliability of a safety function depends	§2.1 + make difference from		by "necessary".
NP		not only on the main systems ensuring its	AS&SS		
		fulfilment but also on the reliability of	Second part: reliability of		The reliability of a
		AS&SS that are needed for the good	support system has impact		safety function
		operability of the supported systems	on the reliability of the		depends not only on
		required to support them in performing	safety function only if		the main systems
		this safety function. []	support system is required		ensuring its
			for the function (eg safety		fulfilment but also
			function required in the		on the reliability of
			short term while AS&SS not		AS&SS that are
			required in the short term		necessary to
			for operation of the main		support them in
			system or support system		performing this
			only used for DEC A		safety function.
			functions while main system		
			required for DBC and DEC-		
			A)		

ARE VA NP	3.9	should be commensurate with the reliability of the supported systems, i.e., the requirements of AS&SS should be consistent with those applied to the supported systems.	reliability and requirement of support system has to be commensurate to the main systems only for safety functions there are required for (see previous comment)	Х		
		Therefore, the reliability and design requirements of AS&SS should be commensurate with the reliability of the supported systems, i.e., the requirements of AS&SS should be consistent with those applied to the supported systems.and design requirements of the supported systems, for the safety functions they are contributing to ensure.[]				
ARE	3.9	[] Hence, the design of the AS&SS should	Same reason as previous		X	A design has to be
VA		be assessed with the same detail as for the	remark + "Assessed" refers			assessed anyway.
NP		main systems supported by AS&SS.	to a safety assessment not a			
			design objective			

ARE	3.10	The design basis for the safety classified SSC	SSC of AS&SS has not to	Х	Better wording by
VA		of AS&SS should include any condition	cover any DBA or DEC		replacing
NP		created by normal operation, anticipated	conditions but only those		"required" by
		operational occurrences, accident conditions	the AS&SS is required for.		"necessary":
		(design basis accidents (DBA) and design	SSC of AS&SS has not to		-
		extension conditions (DEC)) the AS&SS is	cover any load combination		The design basis for
		required for. Loads combinations created by	created by internal or		the safety classified
		internal and external hazards should also be	external hazard but only		SSC of AS&SS
		included in the design basis of the SSC of	combinations required by		should include any
		AS&SS when relevant.	the safety rules taking into		condition created
			account the safety functions		by normal
			of the AS&SS		operation,
					anticipated
			This § should be more		operational
			appropriate in PIE part		occurrences,
					accident conditions
					(design basis
					accidents (DBA)
					and design
					extension
					conditions (DEC))
					the AS&SS is
					necessary for.
					Loads combinations
					created by internal
					and external
					hazards should also
					be included in the
					design basis of the
					SSC of AS&SS
					when relevant.

ARE VA NP	3.11	Image: Design conditions and design loads should be derived, as appropriate, from combinations of bounding conditions determined for the relevant plant states or hazards.	To rewrite in a more easy way to understand !	X		Design conditions and design loads should be calculated, as appropriate, taking into account bounding conditions determined for each of the relevant plant states or hazards.
ARE	3.13	The design should prevent that failures of a	To be limited to one failure.	Х		Multiple failures
		ranure in an AS&SSS under the scope of this	Otherwise, the original			are not excluded.
NP		Safety Guide would lead to a postulated	sentence can lead to			
		initiating event. If this is not possible, or the	understand that multiple			
		design should include appropriate measures	failures should be			
		for the mitigation of this event, considering	considered			
		the effects of the failure of the AS&SS on				
		other plant systems.	Always possible to avoid			
			such situation but not in an			
			ALARP way.			
ARE	3.16	The SSC of AS&SS should be protected	No interest to point out		Х	Consistency with
VA		against impacts of high energy hazards	specifically "high energy			systems addressed
NP		(internal missiles, pipe whipping, heavy	hazards" which are not			in Section 4.
		load drops) or designed to withstand their	clearly defined. In addition			
		loads and the loads caused by explosions as	SSC shall not be			
		well;	systematically protected			
			against these hazard (one			
			redundancy could be lost)			

ARE VA NP	3.19	AS&SS needed to ensure the operation of systems required to mitigate Design Basis Accident conditions should be designed to withstand the design basis earthquake (DBE) and should be protected against the effects of other design basis external hazards and against common cause failure mechanisms that could be generated by those hazards.	In some countries, DBE not to be combined to DEC-A conditions and the protection of systems required to mitigate DBA against DEH is not required. Maybe 3.19 should be written in a less prescriptive manner, expressing that applicable design rules should include consideration of external hazards.		X	The alternate AC power source is designed to withstand at least the DBE (see SSR- 2/1 (Rev.1), para. 5.21A
ARE VA NP	3.20	Any SSC whose failure could compromise the operation of above AS&SS should be designed to withstand the design basis earthquake (DBE) and should be protected against the effects of other design basis external hazards and against common cause failure mechanisms that could be generated by those hazards.	Similar comment as for 3.19. In certain countries, the protection of systems required to mitigate DBA against DEH is not required		Х	See resolution of the previous comment.
ARE VA NP	3.21	Any SSC of AS&SS whose failure could initiate accident conditions should be designed to withstand the design basis earthquake (DBE) and should be protected against the effects of other external hazards and against common cause failure mechanisms that could be generated by those hazards.	It could be acceptable to initiate accident conditions by failure of AS&SS provided that mitigation means remains available		X	See resolution of the previous comment.
BAE	3.22	Amend text "integrity is required during and/or after the hazard	The equipment may have to work in both situations.	X		

ARE	3.24	Short term actions related to AS&SS and		Х	Permanent is used
VA		necessary to meet the dose limits and	"on site": SSR-2/1 only		here by opposition
NP		engineering criteria established for the	requires short term		to "non-
		supported system in the event of design basis	autonomy without relying		permanent", which
		accidents or design extension conditions	on off-site means (but does		is used in the
		should be accomplished with permanent on	not exclude on site mobile		requirements of
		site systems (SSR-2/1 (Rev.1), Reg. 17, para.	means)		SSR-2/1 (Rev.1).
		5.17).			Only equipment
					that can be ready in
					a time
					commensurate with
					the "short term
					actions" can be
					used. Therefore, the
					following
					formulation is
					proposed:
					For external
					hazards, short term
					[] should be
					accomplished with
					on-site systems that
					are ready to operate
					in a time
					commensurate with
					the time necessary
					for the short term
					actions (SSR-2/1
					(Rev.1), Req. 17,
					para. 5.17).

BAE	3.25	Additional sentence. "Where necessary, consideration should be given to support services reaching site in adverse conditions."	In some instances, (severe weather, evacuation) the time take to reach the site may be extended.		X	More clear formulation: Where necessary, consideration of external supplies should take into account the adverse conditions and damages caused by the external hazards.
ARE VA NP	3.26.	Compliance with SSR-2/1 (Rev.1), Req. 17, para. 5.21A requires that the SSCs ultimately necessary to prevent early or large radioactive releases be still operable in case of external natural hazards levels exceeding those considered for design taking into account the site hazard evaluation. This applies to AS&SS equipment whose operability is required for this purpose.	Consistency with SSR-2/1 (Rev.1), Req. 17, para. 5.21A	X		
ARE VA NP	3.27	For external flooding, this would mean that either all the structures hosting the above mentioned systems are located at an elevation higher enough than the design basis flood elevation, or that adequate safety features (e.g., water tight doors) should be are provided in the design to protect these structures SSCs and ensure that their safe ty functions mitigating actions can be maintained.	Sequence of tenses Safety features can also protect systems or components (not only structures)	X		

ARE	3.29	Accident conditions relevant for the design of	Wording	Х		
VA		the AS&SS should be those having the				
NP		potential to cause excessive important				
		mechanical loads and or-to jeopardize the				
		safety functions to which the considered				
		auxiliary system is participating to.				
ARE	3.35	In order to achieve the adequate reliability of	Consistency with SSR-2/1	Х		Please note that
VA		AS&SS supporting safety functions, the	req 24 and DS481			DS481 states only
NP		following factors should be considered:				"independence"
		- Safety classification and the associated				para. 3.51, and not
		engineering aspects' requirements for				"functional
		design and manufacturing;				independence".
		- Design criteria relevant for the systems				
		(e.g., number of redundant trains, seismic				
		qualification, environmental qualification,				
		power supplies);				
		- Consideration of vulnerabilities to				
		common cause failures by means of				
		diversity, physical separation, functional				
		independence;				
		[]				
ARE	3.36	The design should be such that the safety	Consistency with DS481	Х		
VA		functions of category 1 or 2, as defined in	At the level no need to enter			
NP		SSG-30 [8], for which a part of an AS&SS is	partially in the way single			
		needed in the event of design basis accidents	failure has to be applied			
		can be fulfilled despite the consequential	+ compliance to SSR-2/1			
		failures caused by the postulated initiating				
		event and a single failure postulated in any				
		part of the system or safety group needed to				
		accomplish the functions. Unavailability for				
		maintenance, testing or repair should be				
		considered in addition.				

ARE VA NP	3.37	The AC-internal emergency power source should be designed as to have adequate capability to supply power to electrical equipment needed to accomplish the safety functions in the event of design basis accidents. AS&SS equipment required to operate in accident conditions should be powered by the emergency or the alternate power supply source.	Internal emergency power source can provide AC or DC (batteries)	Х		
ARE	3.38	Vulnerabilities for common cause failures	Independency (i.e.		Х	Note that 3.38 is
VA		between the redundancies of the AS&SS	functional separation,			consistent with
NP		supporting safety systems should be	geographical or physical			DS482, which is at
		identified, and design or layout provisions	separation and diversity) has			more advanced
		should be implemented to make the	not to be considered within			stage of approval
		redundancies independent to the extent	the redundancies on a safety			and the
		practical.	system required to mitigate			recommendation is
		Adequate physical separation should be	a DBA accident			more complete (not
		implemented between the redundant trains of				only physical
		the safety systems to prevent common cause	The proposed is consistent			separation).
		failure due to the effects of hazards	with recommendation from			
		considered for design.	DS481			

ARE	3.43.	The additional safety features should be as	SSR2/1 6.44A, clearly states		Х	Please consider that
VA		far as necessary preferably power supplied	that that the alternative			para. 6.44A of SSR-
NP		by the alternate AC internal emergency	power source is meant to			2/1 (rev.1) can be
		power source.	address the " event of the			interpreted
			loss of off-site power			differently.
			combined with failure of the			
			emergency power supply "			The initial proposal
			therefore it does not mean			is consistent with
			that any DEC feature has to			DS481 (para. 3.56)
			be power supplied by this			and is also
			alternative source.			consistent with
			Internal emergency power			DS482 (see second
			source can provide AC or			part of para 3.58)
			DC (batteries)			
ARE	3.44	SSCs of AS&SS necessary to mitigate the	It is suggested to make	Х		Improved
VA		consequences of an accident with core	reference to SSR-2/1 rev.1			formulation:
NP		melting should be capable of being supplied	requirement 6.44B to clarify			
		by any of the available power sources (cf.	that 'any' reports to the			SSCs of AS&SS
		SSR-2/1 rev.1, requirement 6.44B).	'emergency power source'			necessary to
			or to the 'alternate power			mitigate the
			source.			consequences of an
						accident with core
						melting should be
						capable of being
						supplied by any of
						the available power
						sources (SSR-2/1
						(Rev.1), paragraph
						6.44B).

ARE	3.45	As far as practicable, independence between	Consistency with SSR-2/1	Х		
VA		safety systems and specific safety features	(Requirement 7 -			
NP		necessary to mitigate the consequences of an	Application of Defense in			
		accident with core melting should be	Depth §4.13A):			
		implemented in the design. In particular, an	"The levels of defense in			
		AS&SS should not serve both a safety system	depth shall be independent			
		and a safety feature for a DEC with core	as far as practicable to avoid			
		melting, unless duly justified.	the failure of one level			
			reducing the effectiveness			
			of other levels. In particular,			
			safety features for design			
			extension conditions			
			(especially features for			
			mitigating the consequences			
			of accidents involving the			
			melting of fuel) shall as far			
			as is practicable be			
			independent of safety			
			systems."			

vARE	3.50	The following recommendations contribute to	Consistency with SSR-2/1	Х		
VA		implement independence between levels of	(Requirement 7 -			
NP		defence-in-depth:	Application of Defense in			
		[]	Depth §4.13A):			
		- Vulnerabilities to CCF between those	"The levels of defense in			
		items should be identified and the	depth shall be independent			
		consequences assessed. Where the	as far as practicable to avoid			
		challenge to the safety function leads to	the failure of one level			
		unacceptable consequences, the	reducing the effectiveness			
		vulnerabilities to CCF should be removed	of other levels. In particular,			
		to the extent possible. In particular, safety	safety features for design			
		features designed to mitigate the	extension conditions			
		consequences of accidents with core	(especially features for			
		melting should be, as far as practicable,	mitigating the consequences			
		independent from equipment designed to	of accidents involving the			
		mitigate consequences of design basis	melting of fuel) shall as far			
		accidents;	as is practicable be			
			independent of safety			
			systems."			

ARE	3.52	The safety elassification class of any part of	Vocabulary : Classification	Х		
VA		an AS&SS required to support a system to	refers to the process of			
NP		ensure a safety function should be	allocating a safety class.			
		commensurate with the classification class of	Safety class of the AS&SS			
		the safety function ensured by the system	should be more consistent to			
		supported by this AS&SS for which it is	the safety function for			
		required for. In case part of an auxiliary a	which it is required than the			
		supporting system is supporting safety	safety class of the supported			
		systems or safety features of different safety	system: eg if the supported			
		classes, it should have the same safety	system has enough			
		classification class as the system or	autonomy to reach			
		component having the highest safety	controlled state without the			
		classification class.	supported system, and needs			
			the supporting system only			
			to reach the safe shutdown			
			state, the supported system			
			should be classified as a			
			system required to reach the			
			safe shutdown state			
			Auxiliary system replaced			
			by supporting system in			
			consistency with definition			
			given in §2.4			

ARE	3.53	According to Member States' practices,	Potential indirect		Х	Consistency with
VA		generally the effect of the failure of a SSC	radioactive releases induced			DS481, para.3.63
NP		should be considered both on the	by the failure of SSC are not			-
		accomplishment of the function, and on the	systematically taken into			
		level of the radioactive releases directly	account in the safety			
		induced. For items to which both effects are	classification in the			
		relevant, the safety class and the associated	practices mentioned			
		quality requirements needed to achieve the				
		expected reliability are defined with due	There is no quantified			
		account taken of those two effects. For items	expected reliability awaited			
		which do not contain radioactive material, the	from a specific safety class			
		safety class and the quality requirements are				
		directly derived from the consequences	Concerns only systems			
		assuming the considered safety function is	ensuring safety functions			
		not accomplished.				
ARE	3.54	Engineering requirements applicable to a	Single failure and	Х	Improved	
-----	------	---	-----------------------------	---	-----------------------	
VA		whole system or set of systems (e.g., single	independence can be		formulation:	
NP		failure criterion, independence, emergency	applied at the level of			
		power supplied) required to perform a	functions or of set of		Engineering	
		safety function should be commensurate with	systems to perform a safety		requirements	
		the consequences assuming the function is not	function		applicable to a	
		accomplished.			whole system or a	
					set of systems (e.g.,	
					independence,	
					emergency power	
					supply) necessary	
					to perform a safety	
					function should be	
					commensurate with	
					the consequences	
					assuming the	
					function is not	
					accomplished.	

ARE	3.55	The safety classification should be established	This § is contradictory with	Х	Consistency with
VA		in a consistent manner such that all parts of	§ 3.53 where it is explained		DS482. Also, the
NP		systems necessary for the accomplishment of	that safety classification		last part of the
		a single one safety function are assigned in	depends on two aspects:		sentence "or
		the same safety class or justification should	safety function performed		justification should
		be provided.	and direct radiological		be provided" is not
			consequences in case of		kept because
			failure of the SSC.		otherwise, we have
			Therefore two SSC of a		to add it in many
			same system required for a		other
			same safety function can		recommendations,
			have two different safety		and details on
			class -> at least need to add		safety classification
			"or justification should be		are provided in
			provided"; in addition, it		SSG-30.
			makes the requirement more		Finally, para 3.55
			consistent with DS 481		reads:
					The safety
					classification
					should be
					established in a
					consistent manner
					such that all
					systems necessary
					for the
					accomplishment of
					one safety function
					including the
					associated support
					systems are

						assigned in the same safety class.
ARE VA NP	3.60	The relevant environmental and seismic conditions that may prevail prior to, during and following an accident, the ageing of the SSC throughout the-its life time of the plant , synergistic effects, and margins should all be taken into consideration in the environmental qualification [9] and [10].	Lifetime of the SSC is not necessarily the life time of the plant		X	Consistency with DS481 and DS482. The recommendation does not mean the lifetime of the SSC is the same as for the plant.
ARE	3.61	Environmental qualification should be carried	Consistency with DS481: no	Х		
VA		out by means of or, as necessary, the	reason to be more detailed			
NP		compination of:	on this topic for AS&SS			
		- type testing on equipment manuagentative of that to be supplied:	than for RCSA			
		representative of that to be supplied;				
		equipment:				
		in similar applications;				
		engineering extrapolation of test data				
		or operating experience under				
		pertinent conditions.				
		of testing, analysis and the use of				
		experience, or by a combination of these.				

ARE	3.62	Environmental qualification should include	Local accumulation of	Х		
VA		the consideration, as appropriate, of such	radioactive aerosol is			
NP		factors as temperature, pressure, humidity,	included in radiation level			
		radiation levels and taking into account				
		local accumulation of radioactive aerosols,				
		vibration, steam impingement, flooding and				
		contact with chemicals. Margins and				
		synergistic effects should also be considered.				
		In cases where synergistic effects are				
		possible, materials should be qualified for the				
		most severe effect, or the most severe				
		combination or sequence of effects.				
BAE	3.64	Additional sentence	This is to allow for		Х	This addition rather
		"Where like-for-like replacement is not	obsolescence.			pertains to plant
		possible, the alternative equipment should be				modifications.
		adequately tested upon receipt and in-situ to				
		ensure complete compatibility and				
		functionality with existing equipment."				
ARE	3.69	For the design of safety classified SSC of	Codes or standards based on	Х		
VA		AS&SS, widely accepted or well-proven	large experience can also be			
NP		codes and standards should be used. The	a guarantee of a proven			
		selected codes and standards should be	design even if not widely			
		applicable to the particular concept of the	shared and accepted.			
		design and should form an integrated,	SSR-2/1 (Requirement 9)			
		comprehensive and consistent set of standards	uses the wording 'relevant'			
		and criteria. If different codes and standards				
		are used for different aspects of the same item				
		or area, their consistency should be clearly				
		demonstrated.				

ARE	3.74	Cross-connection of AS&SS providing	understanding	Х		
VA		essential services to each other or with lower				
NP		safety class of AS&SS of lower safety class				
		that could compromise the functionality of				
		those should be avoided, unless it can be				
		proven that the cross-connection is beneficial				
		in terms of safety. Where such cross-				
		connections are established, provision should				
		be made to enable the isolation of the				
		essential service from these other services if				
		necessary.				
ARE	3.76	The design should be such that AS&SS	Understanding: initial	Х		
VA		supporting safety systems or supporting	wording can lead to			
NP		safety features for DEC should not be shared	consider that both safety			
		between units of a multiple unit nuclear	systems and safety features			
		power plant.	refer to DEC			
ARE	4.38	CDWS lines penetrating the containment	Check valves can also	Х		
VA		should be provided with appropriate	ensure a quick isolation			
NP		automatic or passive containment isolation				
		features [12]. This part of the CDWS system				
		should be safety classified (safety category 1)				
		and should meet the corresponding design				
		requirements.				

ARE	4.44	The CCWS should achieve the main	Avoiding radioactive		Х	Although this
VA		following-functions:	releases into the UHS is an			CCWS function
NP		- To remove heat from equipment and	induced function of CCWS,			might not be
		transfer it to the ultimate heat sink in	which is more design			relevant in the
		operational states and accident conditions;	dependent, as well as to			context of heat
		 To ensure a protection against release 	avoid radioactive releases			transport, this
		of radiological contamination into the	outside the containment			function is
		ultimate heat sink.	Another way to proceed			important to be
			would be to list all the			mentioned because
			safety functions CCWS is			it is essential to be
			involved in but they are			considered during
			more design dependent			the design of the
						system.
ARE	4.54	The PPASS should perform monitoring of	No requirement to perform	Х		To be integrated in
VA		boron concentration in the RCS (during	boron sampling in post-			the revised version
NP		Normal Operation and if needed in accident	accident operations.			of the section on
		conditions for PWR, and after an ATWS				sampling and
		event for BWR) and gadolinium for PHWR.				monitoring.
ARE	4.58	The PPASS should be designed to function in	PPASS or at least some	X		
VA		all-DBA and during DEC for which related	systems that are parts of the			
NP		sampling samples or monitoring are needed	PPASS, such as reactor			
		(e.g., samples from both the gas and the	sampling system are not			
		water monitoring within the reactor	necessarily needed in DBA			
		containment during severe accidents).				

ARE	4.60	A systematic analysis should be performed by	Not always possible. See for	Х	Take only "As far
VA		a laboratory located within the plant. For	instance the sampling of the		as practicable":
NP		specific infrequent analysis, the use of a	SIS accumulators on PWR		1
		laboratory located outside the plant or outside			A systematic
		the site could be acceptable. In all cases, As			analysis should be
		far as reasonably practicable, the design			performed by a
		and arrangement of the PPASS should be			laboratory located
		such that the time span between the sampling			within the plant.
		and the analysis is minimized; this could be			For specific
		achieved by reducing distances or considering			infrequent analysis,
		fast transportation means of the samples.			the use of a
					laboratory located
					outside the plant or
					outside the site
					could be acceptable.
					As far as
					practicable, the
					design and
					arrangement of the
					PPASS should be
					such that the time
					span between the
					sampling and the
					analysis is
					minimized; this
					could be achieved
					by reducing
					distances or
					considering fast
					transportation
					means of the
					samples.

ARE VA NP	4.65	In order to control the radioactive releases, the sampling line should have a closed fail safe position.	Physically difficult to have closed fail safe position to avoid releases (e.g. with check valves) and allow sampling (not possible with check valve that close in case of a break downstream.	X	For clarification Accepted with the following formulation of 4.65: In case the sampling lines are equipped with power operated valves, these valves should have a closed fail safe position in order to control the radioactive releases.
					radioactive releases.

ARE VA NP	4.69	Sampling lines connected to systems located inside the containment should be provided with appropriate automatic containment isolation features [12]. For example, sampling lines from the RCS, the residual heat removal system, or the emergency core cooling system have at least two isolation valves.	Examples are not relevant for all plant design (e.g RHRS is outside containment on EPR)		X	Controversial examples have been removed. The paragraph reads: Sampling lines connected to systems located inside the containment should be provided with appropriate automatic containment isolation features [12]. For example, sampling lines from the RCS have at least two isolation valves.
ARE VA NP	4.109	. To increase reliability of the instrument air systems, ring topology and air distributors (headers) should be used. In case headers are used , redundant valves should be supplied by different air distribution headers.	Redundant valves can be supplied by different compressed air storage tanks (no need for headers) like GCT a on French CPY plants	Х		

ARE VA	4.122	Second bullet: "Monitoring of the air temperature or other measured value with	The measurement of temperature only may not be	Х	More concise formulation.
NP		reference to a combustion (e.g. carbon	the most appropriate		
		monoxide concentration) and automatic	monitoring. In general, this		Accepted for all
		isolation of the airflow"	smooth process does not		comments related to
			need an automatic action:		4.122 with the
			operator manual action		following
			could be sufficient		modification:
					Second bullet:
					- Monitoring of the
					air temperature or
					other measured
					value with
					reference to a
					combustion and
					isolation of the
					airflow;
					- Dedicated
					provision for fire
					suppression.

ARE	4.122	Third bullet: "Provision of automatic	The performance of such	Х	See resolution
VA		protection by means of a water sprinkler to	protection is not clear.		above for para.
NP		cool the outside of the iodine filter vessel;"	Activation of sprinklers		4.122
			outside the filter vessel is		
			delayed and would most		
			likely take place when the		
			fire would be spreading out		
			of the vessel. Therefore the		
			efficiency of the		
			recommended protection		
			measure is not clear.		
			Sprinkler system is typically		
			designed for the entire room		
			cooling and extinguishing		
			fire.		
BAE	4.122	Additional text.	HEPA filters are susceptible	X.	See resolution
		"Where such a water-spray system is in place,	to getting wet, and can		above for para.
		it is advisable to check that HEPA filters will	suffer complete failure.		4.122
		not be affected by the increased	This may also be a		
		humidity/water ingress."	consideration for other		
			paragraphs in the document.		
ARE	4.122	Fourth bullet: "To prevent this, a high	If the filled-in water mass is	X.	See resolution
VA		water flow rate should be used. The water	very high, the stability of		above for para.
NP		injected into the filter housing should be	the construction and		4.122
		drained or considered as an additional	connecting ducts/supports is		
		weight in the mechanical design"	endangered		

ARE	4.123	"Where combustible filters are used in a	The single HEPA filter		Х	The issue here is
VA		HVAC system (and these filters have a non-	banks should not be			the damage to the
NP		negligible fire load)"	protected by such measures:			filters (loss of
			the fire load is quite small,			filtering
			ignition is very unlikely and			capabilities) and not
			the complete filter central			the fire load
			would be very complicate if			presented by the
			filters are separated.			filters.
			Maybe a more clear			
			statement regarding fire			
			from inside/outside and			
			HEPA or iodine should be			
			given.			
BAE	4.213	Query	Is there a chemical formula	Х		Meaning Hydrogen.
	2 nd	What is dihydrogen concentration?	that could be quoted?			
	bullet		Dihydrogen compounds			
			include water.			

ARE	4.125	Add to the end: "of the NPP. For extreme	The extreme temperatures		Х	Extreme
VA		temperatures different operating modes of	are normally based on			atmospheric
NP		HVAC systems (e.g. switch to pure	10000 years return period.			conditions means
		recirculating mode where possible) may	Such unlikely temperatures			here maximum
		also be adequate measures. It may be	do not occur suddenly. For			atmospheric
		sufficient to provide justification, that in	such extreme temperatures a			conditions
		extreme conditions no cliff-edge leads to	recirculating air operation			considered in the
		the malfunction of the HVAC system or	mode during the day is an			design basis.
		acceptable room air temperatures are not	acceptable measure to			Therefore, the
		exceeded"	prevent an oversizing of			added text is not
			systems/equipment due to			relevant for this
			conservative assumptions			paragraph, and the
			for extreme temperatures.			only modification
			Anyhow: if the installed			consists in
			capacity is not sufficient it			replacing extreme
			is normally no problem that			by maximum.
			room temperatures rise a bit			
			within the acceptable limits.			
			But the systems should not			
			have cliff-edge effects (e.g.			
			air-cooled chillers with max.			
			condensing temperature			
			switch)			
ARE	4.176	Add a sentence: "control room. In case the	The supplementary control		Х	This addition does
VA		supplementary control room is only	room is only entered in case			not comply with
NP		entered in case of fire in the MCR a	of fire of MCR. It should			SSR-2/1 (Rev.1),
		justification for less protection measures	not be necessary to install			para. 6.41, and it is
		might be sufficient"	the same protection issues			a specific case.
			(toxic) as for MCR			

BAE	4.242	Additional Bullet	On multi-reactor sites, the		Х	As understood, this
		"Where applicable, the support system is to be	system may have to support			addition is not
		capable of supplying power to all grouped	all the reactors in case of a			consistent with
		reactors simultaneously"	"global" power outage.			SSR-2/1 (Rev.1),
						see 3.76.
ARE	4.245	The essential AS&SS required for the	The way the text is written	Х		More clear
VA		operation of the emergency power source	could let assume that the			formulation:
NP		should be considered as supporting systems of	single failure criterion shall			
		equipment ensuring a safety function of	be taken into account for the			Redundant design
		category 1. They should have the same safety	design of AS§SS of each			to satisfy the single
		classification as the emergency power source	emergency power source,			failure criterion
		and should meet the associated design	leading for instance to have			applied to the
		requirements:	two fuel oil storages or two			function to be
		- Redundant design to satisfy the single	cooling water systems for			performed
		failure criterion in consistency with	each diesel			
		the supported system;				
		- []				

ARE	4.251	Add:	For the dimensioning of the	Х	With the
VA		4.251. The quantity of oil stored within the	storage tanks exact values		modification for
NP		site should have the capability to ensure the	are needed.		clarity:
		operation of all emergency power sources of a			
		NPP further to a loss of off-site power supply			4.251. The quantity
		induced by an earthquake (no recovery of the			of oil stored within
		off-site power supply during a long time). The			the site should have
		exact duration of the recovery time of the off-			the capability to
		site power supply should be defined by the			ensure the operation
		national authorities or in other applicable			of all emergency
		rules and standards.			power sources of a
					NPP further to a
					loss of off-site
					power supply
					induced by an
					earthquake (no
					recovery of the off-
					site power supply
					during a long time).
). The quantity of
					fuel oil stored
					should be justified
					in terms of the
					recovery time of
					off-site power or
					the time necessary
					to resupply fuel oil.

ARE	4.258	Add:	Alternatives by		Х	See resolution of
VA		4.258. Each storage tank should be double	administrative measures			the Chinese
NP		walled, and the annulus between the two	should be included.			comment in which
		walls should be equipped with a leak				the para.258 was
		detection system. Alternative to the double				modified as
		wall and the leak detection system				follows:
		administrative measures, as a regular				In case of double
		inspection of the fluid level by the staff, could				walled storage tank
		be considered.				(e.g. underground
						tank) is being used,
						the annulus
						between the two
						walls should be
						equipped with a
						leak detection
						system.

ARE VA NP	4.271	Add: 4.271. The AS&SS of the Alternate AC Power Source should ensure their function	For the dimensioning of the storage tanks exact values are needed.		Х	With the modification:
NP		Power Source should ensure their function during a time consistent with the recovery time of an off-site power supply or, failing that, an emergency power source. The exact duration of the recovery time of the off-site power supply or emergency power supply should be defined by the national authorities or in other applicable rules and standards.	are needed.			4.271. The quantity of oil stored within the site should have the capability to ensure the operation of all emergency power sources of a NPP further to a loss of off-site power supply induced by an earthquake (no recovery of the off- site power supply during a long time).
						The quantity of fuel oil stored should be justified in terms of the recovery time of off-site power or the time necessary to resupply fuel oil.
BAE	Gener al	The document should be checked to ensure the first use of an abbreviated term is indicated (eg anticipated operational occurrences (AOO))		Х		

BAE	Gener	The grammar used in the document is not	Х		The document is
	al	consistent, but this may be due to translation			expected to go
		of the document.			through technical
					editing;
					contributions are
					from different
					Member States.

Resolution of USA comments

		Design of Auxiliary Systems and S	uclear Power Plants (DS440)					
		COMMENTS BY REVIEWER		RESOLUTION				
Reviewer:	Nuclear Reg	gulatory Commission	Page 1 of.4					
Country/Or	ganization:	United States of America	Date: 12/19/17					
Comment	Para/Line	Proposed new text	Reason	Accepted	Accepted, but	Rejected	Reason for	
No.	No.				modified as follows		modification/rejection	
	Content	In the "SCOPE" entry, under the "1.	Editorial	х				
		INTRODUCTION", add the dotted line						
		from "SCOPE" to 6 (Missing)						
	Figure 1,	The word "Communication" uses a	Editorial	х				
	Definition	different font. Please make the same.						
	box							
	Figure 1,	Revise the second bullet to read:	Figure I should be	х				
	Definition		compatible with					
	DOX	- An auxiliary system <u>can</u> provide	terminology used in					
		water compressed air or other gases	paragraphs 2.2 and 2.3					
		means of hybrication and						
		communication						
	3 10	Pavise to Read:	The basis for this			Y	The addition of "and	
	5.10.	Revise to Read.	modification is that it is			Λ	as appropriate" does	
		"3 10 The design basis for the safety	now consistent with the				not comply with	
		classified SSC of AS&SS should	Convention on Nuclear				$SSR_2/1$ (Rev. 1)	
		include any condition created by	Safety and associated				551(2/1)(10001)	
		normal operation anticipated	Vienna Declaration on					
		operational occurrences, accident	Nuclear Safety.					
		conditions (design basis accidents						
		(DBA) and, as appropriate, design						
		extension conditions (DEC)). Load						
		combinations created by internal and						
		external hazards should also be						
		included in the design basis of the SSC						
		of AS&SS."						

Comments Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants (DS440)

3.24	Revise to Read: "3.24. Short term actions related to AS&SS and necessary to meet the dose limits and engineering criteria established for the supported system in the event of design basis accidents or, as appropriate, design extension conditions should be accomplished with permanent systems (SSR-2/1 (Rev.1), Req. 17, para. 5.17)."	The basis for this modification is that it is now consistent with the Convention on Nuclear Safety and associated Vienna Declaration on Nuclear Safety.		X	See resolution of previous comment.
3.37	Revised beginning of sentence to read: "The AC/DC power source should"	There may be DC power sources.	X		Accepted as follows for more general formulation and consistency with the resolution of the related UK comment:: The internal emergency power source should
3.41	Revise to read: "3.41. The more likely combinations of PIEs and common cause failures (CCFs) between the redundancies of the safety systems should be analyzed. If there is a significant increase in risk, the vulnerabilities should be removed or additional design features should be implemented to cope with such situations."	No requirement for analysis of DEC to be comparable to DBAs.		X	The proposed modification "If there is a significant increase in risk" is quite vague, compared to "consequences exceed the limits for DBAs".

3.43	Revise to read: "3.43. Any additional safety features should be preferably power supplied by the alternate AC power source."	This revision is grammatically correct.	X		 With modification for better formulation: 3.43. Any additional safety features should be preferably power supplied by the alternate power source.
3.45	Revise to read: "3.45. Independence between safety systems and specific safety features necessary to mitigate the consequences of an accident with core melting should be implemented in the design. In particular, an AS&SS should not serve both a safety system and a safety feature for core melting, unless duly justified."	The use of the term DEC is not needed as there is nothing unique to a system independence when considering a goal to mitigate consequences of core melt.		X	There is a need to use the term DEC because the concerned safety feature is designed to cope with DEC.
4.6	Add to the end of the existing sentence the following: "Communication systems used for security force personnel and plant security protection is outside this scope."	Clarify the intent of 4.6 to avoid confusion.		X	To avoid raising additional issues regarding safety and security interface.
4.7	 Add an addition bullet: "Wireless radio system for normal and emergency communications." 	This new bullet makes the criteria consistent with paragraph 4.22.		X	See resolution of UK comment No.6.

4.22	Add to the end of the existing text the following: "Areas of wireless radio transmission that may cause serious electromagnetic interferences and have plant consequences, for example plant trips, should be clearly marked in the plant as radio exclusion areas."	The addition text makes paragraph 4.22 consistent with paragraph 3.15	X			
4.24	Add to the end of the existing sentence: ", including training simulator (if on site)."	On site simulators are often used to perform emergency drills.		X		For consistency:: including emergency drills.
4.34	Revise third sentence to read: "Sufficient water volume of coolant should be provided to ensure adequate cooling after all situations to be considered in accident conditions and adequate provisions should be made to replenish water volume and ensure long-term heat removal.	"Stock(s)" is not a common engineering term for this situation. The term "water volume" is an improved term	X			
3.56	 Revise the second bullet to read: "Systems implemented to cope with the loss of safety systems should be assigned in SSG-30 safety class 2 or safety class 3;" 	The basis for this modification is that it is now consistent with the Convention on Nuclear Safety and associated Vienna Declaration on Nuclear Safety.			X	Consistency with SSG-30.
3.76	Revise to read:	The basis for this revision is that the principle should			Х	Consistency with SSR-2/1 (Rev.1),

	"3.76. The design should be such that AS&SS supporting safety systems or safety features should not be shared between units of a multiple unit nuclear power plant."	apply regardless of inclusion of DEC.		Requirement 33, and Section 3 of this draft.
4.58	Revise to read: "4.58. The PPASS should be designed to function in all DBA and, as appropriate, during DEC for which samples are needed (e.g., samples from both the gas and the water within the reactor containment during severe accidents)."	The reason for this revision is that it makes it consistent with the Convention on Nuclear Safety and associated Vienna Declaration on Nuclear Safety.	X	In consistency with the resolution of the related UK comment.
4.54	Revise to read: "The PPASS should perform monitoring of <u>core poison</u> <u>concentrations</u> in the RCS (during Normal Operation and accident conditions for PWR <u>(i.e., boron)</u> , and after an ATWS event for BWR <u>(i.e.,</u> <u>sodium pentaborate)</u> and gadolinium for PHWR.	The revised sentence makes the criteria correct, as BWRs do not use Boron for reactivity control post ATWS. BWRs uses sodium pentaborate in this situation.	X	Accepted with the following modification without "core poison concentrations" to avoid misunderstanding related to "poison": The PPASS should perform monitoring of the concentration of soluble neutron absorbers in operational states and in accident

						conditions, as applicable.
4.63	 Second bullet: Revise to add PWR. "for PWRs, allow verification in normal operation that the boron concentration of the refueling water storage tank water is adequate to guarantee core sub-criticality in case of relevant accident conditions; and 	It is necessary to limit this bullet to PWRs, as BWRs do not have RWSTs.		X		Accepted with the following modification by giving examples: • for PWR, allow verification in normal operation that the boron concentration, e.g. in the refueling water storage tank water and the accumulator water is adequate to guarantee core sub-criticality in case of relevant accident condition
4.71	Deleted, ")", after PPASS.	Editorial	Х			
4.71	Add to the existing text:, "For Compressed air start systems for emergency diesel generator see 4.243."	This clarifies where to locate appropriate criteria.			X	For consistency with recommendations for other systems and for concise text.

4.156	 Revise the second bullet to read: the area containing the compartments of the main equipment of the RCS <u>(including Drywell for BWRs)</u>. That area is not accessible by personnel when the reactor is at power. 	This clarifies that BWRs have an area inside containment – drywell.			X	No added value.
4.157	 Add the following bullet to the existing text: For BWRs, within the containment, drywell is cooled during normal operation by a closed loop ventilation system designed to hold the average temperature in the drywell. 	This is added for completeness, as the BWR drywell cooling is missing.			X	The safety guide is meant to be, as far as possible, technology- neutral.
4.177	Revise to make the font consistent with remainder of the document.	Editorial	Х			
4.190	Following the existing text, add: "The overhead lifting equipment is not used for moving new or irradiated nuclear fuel or associated fuel instrumentation."	This revision clarifies that nuclear fuel is not moved using this system.			Х	For consistency.
4.202	Delete the underlining and correct the font to be consistent with the remainder of the document.	Editorial	X			
4.205	Revise the first sentence to read: "Handling equipment should be tested prior to the commissioning to its	This clarification improves the criteria for overloading.		X		More concise formulation:

	maximum expected load/weight (for example steam generator, reactor head, etc.), not to exceed its design limit."					Handling equipment should be tested prior to the commissioning to at least its maximum expected load.
4.215	Revise the last sentence to read: "For instance, (PWRs only),"	This clarifies that boron acid is only used in PWRs.		X		Modified as follows for clarification: For instance, in PWRs, the portions of circuits carrying
4.243	Add the following: "The Compress Air System and the emergency power support system - air starting systems are not shared or cross connected.	This revision clarifies that these are separate air systems (not shared or interconnected). This is consistent with paragraph 4.96.			X	The proposed revision is already at the beginning of para. 4.243.
4.284	Remove the last bullet with no text.	Editorial	Х			