

**DRAFT GUIDE DS440 “DESIGN OF AUXILIARY SYSTEMS AND SUPPORTING SYSTEMS FOR NUCLEAR POWER PLANTS” step 7a**  
**ENISS Comments**

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: ENISS		Page 1 of 7					
Country/Organization: ENISS		Date: 16 May 2017					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	4.38.	<u>Depending on the design,</u> CDWS lines penetrating the containment <del>can</del> <del>should</del> be provided with automatic containment isolation features meeting the single failure criterion. <del>This part of the CDWS system should be safety classified (safety category 1) and should meet the corresponding design requirements.</del>	It should not be so restrictive on the design of containment penetration in this SSG, since there is one dedicated SSG on the subject. Classification category and class to be applied are design dependent.			X	This is a recommendation; therefore it has to be formulated with “should”. In the revision of para. 4.38, we refer to the NS-G-1.10 which recommends at least one isolation valve. The sentence related to the safety classification is maintained. Therefore, the revised paragraph 4.38 reads: CDWS lines penetrating the containment should be provided with appropriate automatic containment isolation features [12]. This part of the CDWS system should be safety classified

							(safety category 1) and should meet the corresponding design requirements.
2	4.69.	<p><del>Depending on the design, Sampling lines connected to systems located inside the containment should be provided with automatic containment isolation features. These containment isolation features should be safety classified (safety classification appropriate with the safety function of safety category 1) 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).</del></p>	<p>It should not be so restrictive on the design of containment penetration in this SSG, since there is one dedicated SSG on the subject. Classification category and class to be applied are design dependent.</p>			<p>X The following revision is proposed to be consistent with SSR-2/1 (Rev.1), requirement 56, NS-G-1.10 and to consider the different cases of sampling lines:</p> <p>Sampling lines connected to systems located inside the containment should be</p>	<p>Consistency with SSR-2/1 (Rev.1), NS-G-1.10 and consideration of different cases of sampling lines.</p>

						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.	
3	4. 115 2 <sup>nd</sup> bullet	<ul style="list-style-type: none"> <li>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. To maintain negative pressure in controlled areas flowrate intake air should be less</li> </ul>	The precision should be provided because during accidental conditions, maintaining air flow direction between rooms should not lead to increase radioactive releases due to an increase of extraction flowrate.		X in maintaining an air flow leading from rooms with a lower contamination towards rooms with higher contamination, as		This bullet is under the paragraph 4.115 which addresses all plant conditions. For accident conditions, it might be impracticable to achieve the recommendation for

		<p>than extraction flowrate air;</p> <ul style="list-style-type: none"> <li>in maintaining an air flow leading from rooms with a lower contamination towards rooms with higher contamination <u>during normal operation and anticipated operational occurrences (AOO)</u>;</li> </ul>			<p>practicable for accident conditions.</p>		<p>specific events; hence, we added: “as practicable for accident conditions”.</p>
4	4.117	<p>The <del>precise</del> list of iodine risk rooms, including rooms where active <u>hot</u> liquid is <u>likely to be released</u> <del>routing</del> during accident conditions should be considered in the design as well as adequate criteria for the confinement function of these rooms under the various accident conditions.</p>	<p>The temperature of the liquid has an impact on the radiological consequence, so efforts should be concentrated on those rooms with active hot liquid.</p>		<p>X Ok but remove hot The list of iodine risk rooms, including rooms where <u>systems containing active liquid are likely to release significant iodine activity</u> during accident conditions should be considered in the design as well as adequate criteria for the confinement function of these rooms under the various accident conditions.</p>		<p>Hot is removed because it is not well defined; in addition, the recommendation should remain enough general.</p>
5	4.124.	<p>The design of the HVAC systems participating to the limitation of radioactive releases <del>should be adequate to the iodine risk and notably</del> should take into account the <del>suction</del> of winds</p>	<p>The link here with iodine risk is not necessary, because it focusses on one risk and is not comprehensive; radioactive</p>		<p>X The design of the HVAC systems participating to the limitation of</p>		<p>More concise and improved wording.</p>

		effects on building <u>and HVAC systems</u> . <del>that can impact the pressure inside iodine rooms.</del>	releases should be reduced in general.		radioactive releases, <u>in particular iodine risk</u> , should take into account winds effects.		
6	4.126.	<p>When part of a HVAC system is a support system required to permit to a safety system to ensure its safety function (safety category 1 or 2) in case of DBA, it should have an appropriate safety classification and consequently meet the <u>associated</u> following design requirements <u>such as</u>:</p> <ul style="list-style-type: none"> <li>• Redundant design to satisfy the single failure criterion;</li> <li>• Powered by the on-site emergency AC power system;</li> <li>• Protection against internal and external hazards. Notably, the redundant trains should be physically or geographically separated and the components should be seismic resistant. <u>More particularly</u>:</li> <li>• <del>Ventilation system should be designed to prevent smoke and heat from external fires from entering buildings containing items important to safety;</del></li> <li>• <del>Intake and exhaust ventilation should be protected against external explosion;</del></li> <li>• Inspection and periodic test;</li> <li>• Components designed, manufactured, commissioned and tested according to acceptable quality standards;</li> </ul>	List of examples; for our point of view it is too prescriptive, whereas it should be technology neutral. Note that not all the sites are concerned by external hazards like fires and explosion.			X	<p>- Addition accepted for wording improvement.</p> <p>- However, removal of the two bullets is rejected because this is a recommendation based on the good practices in different Member States and should be as general as possible and not specific to sites where fire and explosion risks are limited.</p>

		<ul style="list-style-type: none"> <li>• Components designed and manufactured according to acceptable design codes.</li> </ul>					
7	4.127.	<p>The HVAC system layout choice should not impair fire protection capabilities and should be designed to avoid the risk of fire spread. In particular,</p> <ul style="list-style-type: none"> <li>• ventilation systems should not compromise building compartmentation;</li> <li>• sufficient isolation by rated fire dampers <u>or fire resistant ductwork</u> should be installed if an HVAC duct has to cross areas belonging to different fire compartment or alternatively parts of the ventilation system (e.g. connecting ducts, fan rooms and filters) that are situated outside the fire compartment should have the same fire resistance as the crossed compartment;</li> <li>• the temperature or pressure effects <u>due to fire and HVAC operation during a fire</u> <del>on the components of an HVAC system</del> should not compromise the separation provided by fire barriers;</li> <li>• the intakes for the fresh air supply should be located away from the exhaust air outlets and smoke vents of fire compartment to the extent necessary to prevent the intake of smoke or combustion</li> </ul>	Proposal of precision or requirement to be linked with fire hazard (not generic recommendation).	X			

		products and the malfunction of items important to safety.					
8	4.128	when an HVAC system insures a safety function, <u>depending on safety analysis</u> , its operability should be maintained in case of fire in adjacent fire compartments. This requires that the counterpart located in other fire compartments is independent and fully separated of part impacted by the fire	This recommendation depends on the safety analysis. For instance, if the redundant HVAC system is located into the adjacent compartment, this requirement may be confirmed. But for instance it can be acceptable to lose a whole SAB, redundant safety functions being supplied by another SAB.			X	This recommendation is consistent with general fire recommendations. In addition, if the concerned HVAC system is credited in the safety analysis, this is done either because the system ensures a safety function or because it worsens the consequences of the accident. In the first case, saying ensures a safety function is enough. In the second case, the system does not perform a safety function. Conclusion: “depending on safety analysis” or “credited in safety analysis” is not necessary.
9	4.135.	The functions of the engineered safety feature ventilation system (ESFVS) of the controlled area should be to maintain required ambient conditions for personnel access and SSCs	This recommendation needs to be precise.		X The functions of the engineered safety feature ventilation system		More concise and improved wording.

		important to safety in normal operation, AOO and accident conditions ( <u>rooms in which access is needed in accidental conditions being defined by safety analysis</u> ).			(ESFVS) of the controlled area should be to maintain required ambient conditions for personnel access <b>if necessary</b> , and SSCs important to safety in normal operation, AOO and accident conditions.	
10	4.142	The functions of the FBVS should be to maintain a suitable ambient temperature range and controlled environment for personnel access and engineered safety feature components in normal operation, anticipated operational occurrences and accident conditions ( <u>rooms in which access is needed in accidental conditions being defined by safety analysis</u> ).	This recommendation needs to be precise (same as previous one).		X The functions of the FBVS should be to maintain a suitable ambient temperature range and controlled environment for personnel access <b>if necessary</b> , and engineered safety feature components in normal operation, anticipated operational occurrences and accident conditions.	More concise and improved wording.
11	4.161.	The CSWS should limit the radioactive releases to the environment in order to meet the radiological objectives in case of fuel handling accident within the containment. The cases to be considered should include an outage with opened <u>personal</u>	This recommendation needs to be precise.		X The last sentence to be written in a general way. The cases to be considered should	More concise and more general wording.



		<u>airlocks (and opened equipment hatch if fuel handling is authorized in this condition).</u>			include an outage with an open containment.		
12	4.224	<u>Depending on the design,</u> lines of gaseous effluents penetrating the containment should be provided with automatic containment isolation features meeting the single failure criterion. <del>This part of the EFDS system should be safety classified (safety category 1) and meets the associated design requirements.</del>	It should not be so restrictive on the design of containment penetration in this SSG, since there is one dedicated SSG on the subject. Classification category and class to be applied are design dependent.			X See revision of NS-G-1.10, pages 47-50	The paragraph 4.224 is consistent with the requirement 56 of SSR-2/1 and the recommendations provided in the revision of NS-G-1.10 (DS482) regarding containment penetrations and isolations.
13	4.283	The following part of the EFDS should be considered to ensure a safety function and should have an appropriate safety classification: <ul style="list-style-type: none"> <li>• EFDS drainage system sump used for the leak detection <u>in a safety study of the SAR</u> <del>of a safety system</del> when it is the only mean for such leakage detection;</li> <li>• Part of the EFDS system <del>where a drain backflow due to a malfunction of active component or a blockage</del> <u>used in hazards studies of internal</u> can induce a flooding <del>damaging safety equipment</del>;</li> <li>• Area of the EFDS system where a connection can induce and <span style="background-color: yellow;">d</span> inadvertent transfer of contaminated fluid to non-contaminated drainage. <u>if its failure in normal operation</u></li> </ul>	Classification category and class to be applied are design dependent. So specific recommendations should not be provided.		X The whole paragraph is revised as follows:  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	The whole paragraph was rewritten in order to be more general and to reconcile the reviewer proposal and the original recommendations.	

		<u>leads to offsite radiological consequences.</u>			usually safety classified: <ul style="list-style-type: none"> <li>• equipment monitoring reactor coolant system leaks;</li> <li>• Monitoring equipment credited in flooding analysis;</li> <li>• Equipment necessary for containment isolation.</li> </ul>		
14	4.284	<u>Depending on the design,</u> EFDS lines penetrating the containment should be provided with automatic containment isolation features meeting the single failure criterion. <del>This part of the EFDS system should be safety classified (safety category 1) and meets the associated design requirements.</del>	It should not be so restrictive on the design of containment penetration in this SSG, since there is one dedicated SSG on the subject. Classification category and class to be applied are design dependent.			X	The paragraph is clarified with reference to NS-G-1.10.
15	4.285	<del>With the exception of the EFDS lines penetrating the containment and the EFDS part insuring a safety function,</del> the EFDS part <del>containing radioactive effluents</del> <u>carrying activity and its failure in normal operation leads to offsite radiological consequences</u> should be considered as important to safety with a corresponding safety classification.	SSG 30 on classification do not impose safety category as there activity in the fluid; without the precision propose it could be understood radioactivity in the fluid impose safety classification.		X EFDS components <u>carrying activity and whose failure leads to offsite radiological consequences</u> should be considered as important to safety with a corresponding safety classification.		More concise and more general wording.

## DS440 Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Country/Organization: Republic of Korea / Korea Institute of Nuclear Safety Date: May 8, 2017							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.2	AS&SS provide services that may include electricity, service gas, <a href="#">cooling water</a> , compressed air, <a href="#">conditioned air</a> , <a href="#">communication equipment</a> , <a href="#">lifting and lowering items</a> <del>fuel</del> and lubricants which are <del>important</del> <a href="#">essential</a> for the operation and safety of the plant. ...	To clarify the services related to the AS&SS which addressed in this safety guide		X AS&SS provide <a href="#">essential</a> services that may include electricity, service gas, water, compressed air, <a href="#">conditioned air</a> , <a href="#">communication equipment</a> , <a href="#">lifting and lowering items</a> fuel and lubricants which are <u>important</u> for the operation and safety of the plant		More complete and better wording.
2	1.7	Paragraph 1.7 is omitted.	Correct paragraph number 1.8 to 1.7.	X			
3	2.7	Applying the stepwise gap approach to the definition of paragraph 2.2, and taking into account the requirements of SSR-2/1 (Rev.1), the list of AS&SS to be considered in this safety guide is the following: ... • <del>Heat Ventilation and Air Conditioning Systems</del> <a href="#">and Ventilation Systems</a> (SSR-2/1 (Rev. 1), Req. 73); ...	To keep the consistency with SSR-2/1 (Rev. 1)		X  Conditioning Systems <a href="#">and Ventilation Systems</a> , addressed in this safety guide under “ <a href="#">Heating, Ventilation and Air Conditioning</a> ” (SSR-2/1 (Rev. 1),		Consistency with the wording used after in this safety guide.

		<ul style="list-style-type: none"><li>• <a href="#">AC Sources Support Systems (SSR-2/1 (Rev. 1), Req. 68)</a>;</li></ul>	AC sources support systems are also considered in this safety guide and it's related to SSR-2/1 (Rev. 1) Req. 68.		Req. 73); ... <ul style="list-style-type: none"><li>• <a href="#">AC Sources Support Systems (emergency power sources support systems and alternate AC power source systems) (SSR-2/1 (Rev.1), para. 6.45)</a></li></ul>		
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**DS 440 (Version STEP7a) - Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants**

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Several contributors from Bel V		Page 1 of 7					
Country/Organization: Belgium/Bel V		Date: 19/05/2017					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	2.2 and 2.4	<b>General comment:</b> § 2.2 gives a definition of auxiliary systems; § 2.4 gives a definition of supporting systems and this § 2.4 seems to indicate that supporting systems are a subset of auxiliary systems. We are not sure that this distinction is consistently used throughout the document. At several places even other wordings are used, where we think that shortly “AS&SS” (mentioned in § 2.4) can be used. We will give further on some examples of this general comment.	Suggestion for a check of consistency throughout the document.	X			
2	3.9 to 3.15	At several places SSC to be replaced by “ <b>SSC of AS&amp;SS</b> ” or even shorter by “ <b>AS&amp;SS</b> ”.	SSC without further specification is too wide given the specific scope of this SSG.	X			
3	3.15; 4 <sup>th</sup> bullet	“... common cause failure between AS&SS <del>supporting safety systems</del> designed to ...”	To apply consistent wording (illustration of General Comment 1)			X	Please note that the AS&SS meant here are those that support safety systems; therefore “supporting safety systems” should be kept.
4	3.20	“Any SSC <b>of AS&amp;SS</b> whose failure ...”	Shortly “Any SSC ...” is too wide for this SSG	X			

5	3.21	“For each hazard, components <b><u>of AS&amp;SS</u></b> whose operability ...”	Shortly “ ...components ...” is too wide for this SSG	X			
6	3.22	To be deleted	This is a very general requirement, not specific for AS&SS. It can be considered to be covered by 3.27 (referring to [6] and [9]).			X	Please note that although it is general, this recommendation should be kept because it applies also to AS&SS. In addition, like other recommendations of this type, it provides a general bases for the specific recommendations provided in Section 4.
7	3.23	To be deleted or to be modified as follows “Short term actions <b><u>related to AS&amp;SS and</u></b> necessary to meet ...”	As presently written, this is a requirement for the “supported” system, not for the supporting system.	X Second option: “Short term actions <b><u>related to AS&amp;SS and</u></b> necessary to meet			

8	3.29	“ ... the failure of some AS&SS has the potential to lead <b>to</b> accident conditions, ...”	Wording	X			
9	3.30	“ ... the failure of <b>AS&amp;SS</b> <del>auxiliary systems supporting safety systems or safety features</del> should be taken into account.”	Illustration of General Comment 1		X the failure of <b>AS&amp;SS</b> supporting safety systems or safety features-should be taken into account.”		Please note that the AS&SS meant here are those that support safety systems or safety features; therefore “supporting safety systems or safety features” should be kept.
10	3.32	“More detailed recommendations are provided in [7] <del>and its revision as DS494</del> to fulfill requirements 18-20 of SSR-2/1 (Rev.1).”	Unusual to refer to a DS*** document (since it is a draft, it is not yet known what will be the final outcome)	X			
11	3.34	“In order to achieve the adequate reliability of <b>AS&amp;SS</b> <del>auxiliary systems supporting safety functions</del> , the following factors should be considered:	Illustration of General Comment 1. According to § 2.4, “auxiliary systems supporting safety functions” is in fact the definition of “supporting systems” (thus SS only).		X “In order to achieve the adequate reliability of <b>AS&amp;SS</b> supporting safety functions, the following factors should be considered:		Please note that the AS&SS meant here are those that support safety systems; therefore “supporting safety systems or safety features” should be kept.

12	3.40	To be deleted	In this article, there is nothing related to AS&SS. It has not its place in this SSG.			X	Please note that this paragraph applies to AS&SS In addition, paragraph 3.41 needs paragraph 3.40 in order to be meaningful.
13	3.41 and 3.42	Remove the reference to “additional safety features”	Too vague terminology: “additional” to what?			X	Please note that “Additional safety features” is fully consistent with the wording used in paragraph 5.27 of Requirement 20 of SSR-2/1 (Rev.1) for the same meaning.
14	3.43	“ <u>SSCs AS&amp;SS</u> necessary to mitigate the consequences of an accident ...”	SSC without further specification is too wide given the specific scope of this SSG.		X SSCs of <u>AS&amp;SS</u> necessary to mitigate the consequences of an accident ...”		From our point of view, the recommendation is general and includes SSCs of AS&SS.
15	3.44	“In particular, an AS&SS should not serve both a safety system and a safety feature for a DEC with core melting, <u>unless duly justified.</u> ”	There might be exceptions were differentiation is not practicable.	X			
16	3.46	“Recommendations related to the reliability of the <u>AS&amp;SS</u> systems ...”	For better specification		X		“systems” after AS&SS has to be removed because it is not necessary.



17	3.49	To be deleted	This is a higher level recommendation, not specific for AS&SS.			X	Please note that this recommendation applies to AS&SS; in addition, for the sake of consistency with other safety guides being revised (e.g., revision of NS-G-1.10).
18	3.53 and 3.54	To be deleted	These are higher level recommendations, not specific for AS&SS. They can be considered covered by 3.56, referring to SSG-30.			X	Please note that this recommendation applies to AS&SS; in addition, for the sake of consistency with other safety guides being revised (e.g., revision of NS-G-1.10).
19	3.58	“The SSCs of the part of the <u>AS&amp;SS</u> <del>auxiliary systems supporting a safety function</del> should be qualified ...”	Same as for 3.34		X “The SSCs of the part of the <u>AS&amp;SS</u> supporting a safety function should be qualified		Please note that the AS&SS meant here are those that support safety systems; therefore “supporting safety systems or safety features” should be kept.

20	4.47 – 4.94	This part on sampling systems is to our opinion over-developed compared to other parts (e.g. the part on heat transport systems). See also our comment on 4.78 – 4.93.	For balance of different parts of the document			X	<p>Please note that the section is meant to provide all recommendations to fulfil Req. 71 and 82.</p> <p>Therefore, the recommendations were grouped in a way to address the sampling and monitoring.</p> <p>Also, separation in two sections dealing with sampling and monitoring respectively is not feasible without significant changes in the structure of process and post-processing sampling system section. This change may be done during the next step of review by Member States if it is requested.</p>
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21	4.34	<p>“Alternatively, the installation of completely separate safety trains, <b>including make-up</b>, is another solution for providing appropriate cooling provision in the short term and in the longer term.”</p>	For completeness	<p>X  Ask the question whether we should understand Alternatively, the installation of completely separate safety trains, including a make-up for each train, is another solution for providing appropriate cooling provision in the short term and in the longer term.”</p>	<p>More precise formulation.</p>
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22	4.40	“Some plant designs have heat transport systems for items important to safety <del>different</del> <b>separate</b> from those for the rest <b>items not important for safety</b> . If this is not the case, <b>adequately qualified</b> isolation of the part of the system ...”	For better wording  For further specification		X “Some plant designs have heat transport systems for items important to safety <b>separate</b> from those for <b>items not important for safety</b> . If this is not the case, <b>adequately classified</b> isolation of the part of the system ...”		For wording improvement.
23	4.49	“The PPASS should <b>be capable to</b> provide the water and gaseous samples, ...”	For better wording	X			
24	4.55; second but ast bullet	What are “... outside containment sensitive zones ...”?	Needs clarification		X ...in the controlled areas located outside the containment.		For more clarification.
25	4.65	“... the isolation valves of a sampling line should <b>be “fail closed”</b> fail in the closed position.	Better terminology		X The sampling line should have a closed fail safe position.		For wording improvement.

26	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			X	See answer to comment No. 20.
27	4.115; 1st bullet	“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. <del>To maintain negative pressure in controlled areas flowrate intake air should be less than extraction flowrate air;</del> ”	We propose to limit this bullet to the objective (having under pressure) and not to say how it has to be implemented. Therefore we propose to delete the second sentence.		X For example, to maintain negative pressure in controlled areas flowrate intake air should be less than extraction flowrate air;”		This sentence is meant to provide more detailed guidance by providing an example.
28	4.115; 2 <sup>nd</sup> bullet	“in maintaining an air flow <del>leading</del> <u>going</u> from rooms with a lower contamination <u>risk</u> towards rooms with higher contamination <u>risk</u> ;	Improved wording	X			
29	4.126; 4 <sup>th</sup> bullet	“Inspection and periodic test;” This is very short. We propose to refer to NS-G-2.6 on “Maintenance, Surveillance and In-service Inspection in Nuclear Power Plants” for further requirements.	To give further guidance	X			
30	4.127	“ ...HVAC system should not be compromised <del>d</del> the separation ...”	Typographical correction.	X			
31	4.162	“ ... a damaged fuel clad could induce <del>d</del> releases ...”	Typographical correction.	X			

32	4.176	There is need for further specification of the requirements for the ventilation system of the supplementary control room. Are the same specifications applicable as for the main control room? Or other (less demanding?)	For giving better guidance		X	<p>For clarification, in paragraph 4.111, 2nd bullet, supplementary control and on-site emergency response facilities have been added regarding habitability.</p> <p>The title before 4.170 has been changed to read:  “Main control room, supplementary control room and on-site emergency response facilities ventilation systems.”</p> <p>In addition, the following sentence was added in para. 4.176:  “The same recommendations provided for the main control room ventilation apply to the ventilation of the supplementary control room”.</p> <p>Finally, for the following paragraph 4.177 was added for the the ventilation</p>
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33	4.***	<p>There are no specifications on the ventilation for the “Emergency preparedness and response center”. They should be included or reference should be made to another SSG (if existing), where this is covered.</p>	<p>For giving more complete guidance</p>		Idem.	<p>ventilation of the on-site emergency facilities:  “The on-site emergency response facilities’ ventilation system should not be a common system shared neither with the main control room, nor with the supplementary control room. It should be such that the habitability of the on-site emergency response facilities is ensured, with a reasonable assurance, under a wide range of hazardous conditions, including extreme hazardous conditions not considered in the nuclear power plant design”.</p>
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34	4.192; 2 <sup>nd</sup> bullet	To be replaced by “If an evaluation of a load drop consequences shows that there would be no radiological risk to the worker, the environment or the population and that no structure, system or component is damaged, then the recommendations of this guidance are not to be implemented.”	This 2 <sup>nd</sup> bullet does not constitute an acceptable measure preventing any unintentional dropping of loads. We prefer the newly proposed sentence.		X • The second bullet should read “Otherwise, load drop evaluation confirming the absence of unacceptable consequences”.		Improved and more concise wording.
35	4.194	“Structural steelwork and mechanism <b><u>and components (chains, cables, wire ropes, etc.)</u></b> of <b><u>lifting</u></b> equipment <del>lifting</del> should be designed with a safety margin in comparison to the yield strength under the nominal load.”	For further specification  Correction		X “Structural steelwork and mechanism <b><u>and components (e.g., chains, cables, wire ropes, slings)</u></b> of <b><u>lifting</u></b> equipment should be designed with a safety margin in comparison to the yield strength under the nominal load.”		Improved wording.



36	After 4.201	We propose to add an additional requirement " <b><u>Handling equipment should be equipped with an emergency stop button to stop all motion.</u></b> "	For completion of the requirements		X <u>Handling equipment should be equipped with an emergency stop button to stop all motion, in addition to upper limit switch and normal stop motion device.</u>	More concise and improved wording.
37	4.207 and following	In the part on "Effluent systems ..." the aspect of leak detection is not covered.	We propose to cover this for completeness.		X	Leak detection addressed in the 3rd bullet of former paragraphs 4.213, 4.276, 4.80 and 4.283.

38	4.211	<p>“ ... in general include the collection, processing, recycling or release of radioactive waste produced by let-down, drainage, purge, venting, or leakage in the systems during normal operation., <b><u>as weel as operational waste.</u></b>”</p>	For completeness	<p>X in general include the collection, processing, recycling or release of radioactive waste produced by let-down, drainage, purge, venting, or leakage in the systems during normal operation., <u>as well as other operational radioactive waste.</u>”</p>	More complete formulation.
39	4.212; 1 <sup>st</sup> bullet	<p>“ ...those in contact with <del>the reactor-coolant</del> radioactive media ...”</p>	Scope should be larger than reactor coolant	<p>X The choice of the material for components in contact with radioactive media, in particular with the reactor coolant, so....</p>	Extension to other radioactive media is accepted; however, reactor coolant remains the main focus.

40	4.212; 2 <sup>nd</sup> bullet	<b><u>“Chemistry for reactor coolant and other systems, to minimize...”</u></b>	Reactor coolant is too narrow in scope	X <b><u>Chemistry for reactor coolant and other systems,</u></b> to minimize the production of corrosion products (e.g., dihydrogen concentration,...)	X	Slight modification by removing “in the RCS”.
41	4.236: 1 <sup>st</sup> bullet	<b><u>“collection, storage (with sufficient margin) and processing of solid waste, ...”</u></b>	For further specification	X Sufficient margin will be included in the former paragraph 4.208 as “storage <b>with sufficient margin</b> ” so to be considered for every type of storage.		More general because it is stated from the beginning that the storage should be with sufficient margin.

**Draft Safety Guide DS440 „Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants“, Version 1/ Step 7a**

COMMENTS BY REVIEWER					RESOLUTION			
Reviewer: <b>Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)</b> (with comments of GRS) Country/Organization: <b>Germany</b>					Pages: 3 Date: 2017-05-17			
Relevanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2	1	3.34	<ul style="list-style-type: none"> <li>• Layout provisions....</li> <li>• <u>Preference of passive components versus active components</u></li> <li>• Periodic testing and.....</li> </ul>	New: This is common accepted design principle. It should be added to complete the list.			X	Please note that we do not see so many passive components in AS&SS. In addition, we believe that a so systematic statement cannot be included in an IAEA safety standard. Finally, preference should be given to the passive or active system design which provides the highest reliability to fulfil or support the safety function.

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Relevanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	2	3.70	<ul style="list-style-type: none"> <li>• Ensure safe means to escape <u>and to get access for rescue</u>, with normal and emergency lighting</li> </ul>	Rescue of individuals is also important. This aspect should be added.	X			
2	3	4.7.	- A wireless system that can be used in normal and emergency conditions ( <u>e.g. satellite telephone</u> )	This is another important example for the diversity of communication items.	X			
2	4	4.7.	<ul style="list-style-type: none"> <li>• The off-site communication system that provides .....</li> <li>• <u>As a general rule any single failure may not adversely affect the communication</u></li> <li>• Other television systems to monitor ...</li> </ul>	New: Overall requirement.			X	Please note that the proposal is already reflected (as a rule) in Req. 37 of SSR-2/1. In addition, redundancy and diversity of communication means are reflected in para. 4.7.
1	5	4.15.	Effective communication should not be impeded by interference from other electronic or electrical equipment. <u>From the other side communication equipment (walkie-talkie) should not affect safety relevant items by interference as well.</u>	Both effects are possible and must be avoided.		X <u>However, wireless communication equipment should not affect important to safety items by interference.</u>		For wording improvement.

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Relevanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2	6	4.46	<ul style="list-style-type: none"> <li>•The CCWS should be protected against overpressure....</li> <li>•<u>The pressure in the CCWS should be maintained so that in the case of a heat exchanger leakage row water can not enter the CCWS</u></li> <li>•<u>Means to detect debris inside of the closed cooling water heat exchanger and for cleaning heat exchanger pipes should be in place.</u></li> </ul>	These design aspects are missing.			X	<p>Regarding protection against overpressure, please refer to the last bullet of para. 4.46.</p> <p>Concerning your two other proposals, please consider that the different recommendations in para. 4.46 suggest that the CCWS should be designed also to ensure its role as a barrier against the dispersion of radioactive material (by being a closed loop) to the environment or</p>

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								the ingress of unsuitable chemicals in the RCS and associated systems. Finally, as for cleaning heat exchanger, it is more relevant to perform the cleaning from the raw water side. Therefore, the bullets proposed are detailed ones and might not be put at the same level as the ones of para. 4.46.
2	7	4.63	<ul style="list-style-type: none"> <li>allow verification in normal operation that the boron concentration of the refueling water storage tank, <u>accumulators, the residual heat removing and extra borating system</u> water is adequate to guarantee core sub-criticality in case of relevant</li> </ul>	Samples are taken from all components containing borated water. Particularly from the residual heat removing system before going in service.			X	Please note that it is not necessary to be exhaustive; as stated at the beginning of

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Relevanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			accident conditions; and....					paragraph 4.63, only examples are given.  Moreover, regarding check of boron concentration in the residual heat removal system, in some designs this check is made and the concentration adjusted only before starting the system.
2	8	between 4.91 and 9.42	<u>Monitoring should be provided to detect toxic or explosive gases at the site. Measure to protect personnel and equipment from hazardous gases should be in place.</u>	New. Important for nuclear plants near by chemistry plants or transport ways.			X	We believe that in these paragraphs, monitoring is related to radioactive hazards while the proposal is more relevant to HVAC (see e.g., 4.126 and



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								4.174).
2	9	4.170	<p>The functions of the CRAVS are to maintain the operation of safety components and to maintain habitable the main control room <u>and the supplementary control room</u> 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 <u>and supplementary</u> control rooms and the operation of the components.</p>	<p>The requirements should be also valid for the supplementary control room.</p>			X	<p>The CRAVS cannot be common to the main control room and the supplementary control room as per requirement 66 (please refer to paragraph 4.176 of the draft safety guide). In addition, following another NUSCC member comment, we accommodated the section on the ventilation of main control room, supplementary control room and on-site emergency</p>

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								response facilities and added short recommendations.
1	10	After 4.189	<u>Load suspending devices and their detachable should be marked or preferred constructed that confusion is prevented.</u>	New: Operating experience shows the importance of ergonomic aspects. Many of lifting events occur due to human error.			X	Please note that we believe that both comments 10 and 11 are relevant for man-machine interface and operation and they do not help, as they are written, for the design of overhead lifting equipment.
1	11	After 4.189	<u>The handling equipment operator should always attempt to have a clear view of the handling place. Otherwise, there should be a communication between the lifting device operator and local personnel.</u>				X	See resolution of comment 10.
1	12	After 4.294	<u>The drain system should be periodically tested and inspected. Notably, if the drains have an importance regarding flooding protection.</u>	New: If flooding protection depends on the availability one or more drains, then a free medium flow and the		X “and meet the associated design requirements, in		For the sake of more precise formulation.

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Relevanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
				functionality must be ensured.		particular to be subject to periodic testing and inspection” added after the end of second line of former paragraph 4.283.		