

Revision of 7 closely interrelated Safety Guides on the Operation of Nuclear Power Plants: NS-G-2.2 to 2.6, NS-G-2.8 and NS-G-2.14 (DPP DS497 indice 2)

**DS497B – NS-G-2.3: 31 comments / Accepted (fully or partially): 23 (74%) / Rejected: 8 (26%)**

Some comments are multiple: one part can be accepted and another rejected; hence, total of “accepted” and “rejected” is not equal to number of comments

<b>Country or Organization</b>	<b>Number of comments</b>	<b>Accepted</b>	<b>Rejected</b>
<b>USA</b>	3	3	0
<b>FRANCE</b>	1		1
<b>WNA/CORDEL</b>	2		2
<b>ENISS</b>	14	12	2
<b>GERMANY</b>	5	2	3
<b>GERMANY for WASSC</b>	6	6	
<b>WNTI</b>	0		

COMMENTS BY REVIEWER					RESOLUTION			
Reviewer: <b>Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)</b> (with comments of GRS) Country/Organization: <b>Germany</b>					Pages: 3 Date: 9 October 2020			
Relevance	Comment No	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.	2.19.	Before being put into operation, plant modifications should be tested and checked to demonstrate <u>compliance with the design intent</u> is, and the correct configuration of the plant is maintained.	“Design intent” is an ambiguous technical term with several different meanings. As this may cause confusion, we propose to avoid this term, even it is used in SSR 2/2. Here, it should be checked that the “as built” situation meets the design.  The same for Paras 4.16, 7.15, 7.16	X			
2	2.	2.3 Line 7	...No modification to a nuclear power plant, whether temporary or permanent, should affect the plant’s ability to be operated safely in accordance with the assumptions and intent of the design, <u>as well as with the state of the art safety requirements.</u>	Intentions of the original design may be affected. But it is important to fulfill in case of modifications state of the art safety requirements.			X	1. Out of the scope of the DDP. 2. Proposal not clear. 3. Proposal already written in this para, lines 3-4, but not only: See paras 1.6, 2.12, 2.15, and <b>4.9</b> . Etc.
2	3.	3.14	In assessing the consequences of a modification for design safety, the original design organization, architect engineers and/or construction organization <u>or originally involved independent experts</u> should be consulted, as appropriate, in order to provide assurance that the design basis will	Or as not ever organization has to be consulted in parallel, assessment by originally involved independent experts /reviewer should also be possible as alternative			X	1. Out of the scope of the DDP. 2. ‘originally involved independent experts’ are already included in ‘the original design organization, architect engineers

			be preserved following the modification.					and/or construction organization'; indeed, 'originally involved independent experts' are probably contractor or subcontractor of such organizations, with the expected requirements: See para 3.13.
1	4.	4.14 Line 15	... (f) A safety assessment and, if applicable, proposed modifications to the operating limits and conditions, if any; <u>(ff) — A description how operating procedures will be adapted and emergency operation procedures, if necessary;</u> (g) An analysis of adverse environmental conditions or operating conditions, including any implications in terms of radioactive waste, contamination, radioactive releases and exposure to radiation;	Operating and accident management procedures are very important, we suggest to include them as well			X	For emergency procedures, please see paras 4.29, 6.11, 7.8 and 7.17.
2	5.	4.16	When modifications, <u>including installation of new and additional SSC's</u> , are first proposed, their compatibility with the original design intent should be assessed. Modifications relating to plant configuration should meet the requirements for the design of nuclear power plants established in SSR-2/1 (Rev. 1) [2]. In particular, the capability to fulfil the fundamental safety functions (see	It is necessary to make sure additional equip-ment (e.g. additional safety train) is included as well	X			

			Requirement 4 of SSR-2/1 (Rev. 1) [2] is not to be degraded.				
--	--	--	---	--	--	--	--

		COMMENTS BY REVIEWER				RESOLUTION			
		Reviewer: <b>Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)</b> (with comments of GRS and BASE) Country/Organization: <b>Germany</b> for WASSC				Page 1 of 2 Date: 8 October 2020			
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection	
2	1	1.11	The repair and replacement of equipment and components as part of the maintenance of the plant <u>leading to new components (e.g. unavailability of spare parts)</u> are <u>within</u> <del>outside</del> the scope of this Safety Guide, <del>except where a</del> <u>Other</u> replacement or repair of equipment or components <del>leads to new components (e.g. unavailability of spare parts) are outside this Safety Guide.</del> Recommendations on such maintenance are provided in DS487E [6].	For clear reference of “Recommendations on such maintenance ...”	X				
2	2	2.3	Modifications are also required to conform to the design requirements and to the plant configuration documentation <u>which has been revised as part of the modification programme</u> throughout the plant lifetime.	It might be useful to mention here that the revision of relevant documentations is part of the modification programme.	X				
3	3	2.3	The management of plant modifications is required to be consistent with the control of plant configuration: see Requirement 10 and para. 4.38 of SSR-2/ <u>2+</u> (Rev. 1) [1].	correction	X				
2	4	2.5	(a) Operating experience, <u>including national and international operating experience</u> ;	Not only the operating experience at the plant but also relevant experience at other plants	X	According to SSR-2/2 (Rev.1)			

				should be considered.	para 5.27			
3	5	4.9	(a) The modification complies with all relevant requirements established in SSR-2/2 (Rev. 1) [12] for all relevant plant states.	correction	X			
1	6	4.9	(e) The occupational exposures from the implementation of the modification, and the occupational exposures and public exposures (including potential exposures due to accidents) as a result of the modification are <u>below approved limits and</u> as low as reasonably achievable.	The reasonably achievable exposures as a result of a modification may be higher than the approved limits which might make the planned modification unjustifiable.	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: P. Malesys, S. Edwards		Page 1 of 1					
Country/Organization: WNTI		Date: 9 October 2020					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		No comment					

COMMENTS BY REVIEWER				RESOLUTION			
Country/Organization: <b>France</b>		Date: 13 October 2020 (after the deadline)					
Comm ent No.	Para/L ine No.	Proposed new text	Reason	Accepte d	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	4.26	<p>4.26. Software faults are <b>errors in the logic, which means their effect is deterministic; their effect may appear often systematic rather than random only when the design is so bad that the output depends on unspecified conditions such as : system parameters not properly taken into account, process transients which may influence the computing load in bad designs, inadequate resource sharing with other software running on the same hardware, dependency to specific calendar dates or to the time spent since the power-on, etc</b></p> <p><b>As design errors are by definition replicated in redundant systems using the same design, leading to <del>and therefore the possible common mode failure of computer based safety systems that employ redundant systems using identical versions of the software is required to be considered: see para. 6.37(e) of SSR 2/1 (Rev. 1) [2].</del> the best design and verification practice should be used to avoid them. SSG-39 provides adequate guidance for this.</b></p>	<p>This article should be consistent with SSG-39 and should not mention SSR-2/1 6.37(e) which is not related to the same topic. Moreover “is required” is not relevant in a guidance.</p> <p>Software faults are design faults, and therefore are replicated in redundancies, as any kind of design fault. To avoid this, the best design and verification practice are needed, as provided by <u>SSG-39</u>.</p> <p>The wording « often systematic » is confusing, as the effect of design errors may seem random only when the design is so bad that the output depends on unspecified conditions : in this case, variations of these unspecified conditions may affect the outputs in a seemingly random way. »</p>			X	<ol style="list-style-type: none"> <li>1. The para 4.24 refers to ‘design’ and to SSG-39.</li> <li>2. The para 4.26 only focuses on software faults and the reference: para 6.37(e) is relevant in this regard.</li> <li>3. Original text (black text).</li> <li>4. Out of the scope of the DDP.</li> </ol>

COMMENTS BY REVIEWER				RESOLUTION			
Country/Organization: WNA/CORDEL Date: <del>09/10/2020</del> 11 October 2020 (after the deadline)							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	4.9 f)	The modification can be performed without adversely affecting the safety of the plant and will not introduce new hazards <b>that cannot be controlled in a safe manner.</b>	What is important if that if new hazards are introduced, they can be controlled in a safe manner. For example, the installation of new electrical equipment/cabinet may introduce fire hazard in a room where such hazard was not present before. Still, if adequate provisions are implemented to control the related risk, there is no valid reason to reject the modification solely on this basis.			X	What ever the example you select, the idea is to not introduce new hazards when a modification is implemented. If your proposal is added here, it means that the sense all this sub para will be different: you add a risk and you want to control it (in a safe manner). Therefore, is the considered modification complied with the system specifications and relevant safety requirements? Is the modification in the scope of... See para 4.1?
2	4.9 i)	The impact of potential external events <del>and the consequences of inadequate qualification of the structures, systems and components to withstand them</del> has been assessed and/or analysed.	Such recommendation does not seem appropriate for several reasons. If inadequate qualification is discovered, not only the impact on the capability to withstand external hazards should be assessed or analysed. If inadequate qualification is discovered, a non-conformance sheet should be			X	This bullet point only means that SSCs are resistant to the impacts of external events based on a safety assessment which demonstrates that SSCs are qualified for operational use; if not, further safety assessment might be necessary: this is the reason why it is written:

COMMENTS BY REVIEWER				RESOLUTION			
<b>Country/Organization: WNA/CORDEL</b> Date: <del>09/10/2020</del> 11 October 2020 (after the deadline)							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			<p>open and there should be an existing procedure in the management system to be applied for the treatment of non-conformances or of non-conforming items. This is true not only in the frame of a modification but at any time during the construction, commissioning and operation phases of the plant.</p> <p>If new knowledge about external events show that existing SSCs are not adequately qualified with regards to the new level of hazard, effectively then, an analysis should be conducted to decide whether these SSCs can still be used without modification of whether modifications, replacement or extension of qualification should be engaged.</p> <p>But it would not be reasonable to recommend that for any modification proposed, upfront analyses should systematically be performed assuming that the new SSCs introduced by the modification would not be adequately qualified !!!</p>				‘consequence of inadequate qualification’.



## COMMENTS BY REVIEWER

RESOLUTION  
ENISS

Reviewer: ENISS

Page 1 of 7

Country/Organization : ENISS

Date: 6 October 2020

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	2.6	Modifications are required to be characterized on the basis of their safety significance (see para. 4.39 of SSR-2/2 (Rev. 1) [1]), and should be designed and implemented in a time frame that is consistent with this safety significance. A categorization system should be in place for modification on the basis of their safety significance. Suggested system for categorizing modifications is shown in Appendix I. <del>Reasonably practicable safety improvements should be implemented in a timely manner. If a modification cannot be implemented promptly, adequate temporary modifications should be considered, and if necessary, implemented until the permanent modification is fully implemented.</del>	Second part of this paragraph speaks about quite different requirement and should therefore be deleted.	X			
2	2.10	<del>All M</del> <u>All modifications that have no safety significance should also be documented in proportion to their safety significance.</u> In cases where this is not readily apparent, the absence of any safety significance should be demonstrated by the operating organization.	The amount and detail of documentation should depend on the safety significance of the modification.	X			

3	2.12	When modifications are proposed, they should be reviewed to ensure consistency with the corresponding design requirements and assumptions. Previous plant modifications and improvements <del>made on the basis of operating experience</del> should not be inadvertently negated by new modifications. It should be ensured that the various steps shown in Appendix II have been completed. Appropriate justification should be given for each modification and this should be assessed before the modification is made.	This cannot be OEF case only.			X	Maybe, but it is an important point which should stay written here.
4	2.13.	When a modification is necessary, the full consequences of this modification for the safety of the plant should be reviewed and the boundaries <b>and the impacts</b> of the modifications (including physical, system, control and the conditions of the environment where the modification will be made) should be defined. Many systems within a nuclear power plant are interrelated; consequently, a modification in one area might affect other areas. A full review should therefore be performed before the final definition of the areas in which modifications are to be applied. Wherever possible, experience from other plants at which similar modifications have been made should be taken into account.	Knowledge of the boundaries of the modifications is not enough to understand whether any undesirable effect and/or some risk exists.	X			
5	3.10	The operating organization should ensure that the appropriate revisions to plant documentation, personnel training and plant simulators necessitated by the modifications are	For the prioritization of simulators modifications, the more important criterion is the simulator's compliance with the reference unit, especially in the area of MMI	X			

		implemented in a complete, correct and timely manner as part of the modification programme. Modifications to plant simulators should be prioritized and implemented on the basis of their <u>scope and significance to ensure good quality training.</u>	and the technological systems functioning for ensuring quality training.				
6	4.9	The comprehensive safety assessment should demonstrate that the modified plant can be operated safely and that it complies with the system specifications and relevant safety requirements. Special consideration should be given to demonstrating the following: (a) The modification complies with all relevant requirements established in <u>SSR_2/1(Rev.1) [2] and SSR-2/2 (Rev. 1) [1]</u> for all relevant plant states.	More important and appropriate IAEA standard in this place is SSR_2/1(Rev.1) [2] Safety of Nuclear Power Plants: Design.  Document SSR-2/2 (Rev. 1) [1] is also relevant and thus it is recommended to have both of them here.	X			
7	4.14	Proposals for modifications submitted for independent review should be in accordance with the management system of the operating organization. The proposals should specify the functional requirements and safety requirements for the proposed modifications and should show how these are to be met. The amount of information needed will depend on the extent and complexity of the modification; however, at a minimum, submissions should include the following: (e) <u>Applicable codes, standards and relevant safety analyses updated sections of the safety analysis report;</u>  (l) A description of changes to the	It is sufficient and reasonable to rely on the relevant comprehensive safety analyses which contribute to the justification. The revision of entire SAR can be deferred until regular review time (e.g. PSR). It is noted that paragraph 10.4. is correct when it says “should be updated as soon as practicable” which is consistent with our proposed changes.  In this place is advisable to reflect paragraph 1.12. The information	X  For the 2 proposed changes			

		safety related plant maintenance <u>and ageing management arrangements</u> ;	on aging consequences, if any, would be also important.				
8	4.16	When modifications are <del>first</del> proposed, their compatibility with the original design <del>intent</del> <u>bases</u> should be assessed. Modifications relating to plant configuration should meet the requirements for the design of nuclear power plants established in SSR-2/1 (Rev. 1) [2]. In particular, the capability to fulfil the fundamental safety functions (see Requirement 4 of SSR-2/1 (Rev. 1) [2] is not to be degraded.	The compatibility with the original design should always be assessed.  The term <u>design intent</u> is not used in IAEA safety standards (neither in SSR2/1 or Glossary) and design bases is more appropriate.	X			
9	4.17	The modifications should, whenever possible, minimize the deviations from the original <del>intent of the</del> <u>design and its bases</u> . When such deviations are inevitable, the modifications should be evaluated to ensure that they meet the requirements established in SSR-2/1 (Rev. 1) [2]. It should be ensured that, once established, the revised design requirements are justified and maintained and made available to all parties involved in the implementation of the modification.	The term <u>design intent</u> is not used in IAEA safety standards (neither in SSR2/1 or Glossary) and design bases is more appropriate.	X			
10	4.18	The detailed design of modifications should include specifications for construction, installation, commissioning, equipment qualification and testing (including test acceptance criteria), <u>ageing control</u> and maintenance during operation and decommissioning.	Aging is very important and safety relevant phenomenon for NPPs which must be controlled. Any modification can have an impact to this area.	X			

11	4.29	<p>Consideration should be given to the need to revise procedures, training and plant simulators or training facilities as part of the implementation of the modification (see also para. 4.21 of SSR-2/2 (Rev. 1) [1]). The procedures to be considered for revision should include operating procedures for normal operation, emergency operating procedures, <u>severe accident management guidelines</u>, surveillance and maintenance procedures, and calibration and testing procedures.</p>	<p>If the procedures are listed here, it is justified to add also SAMGs.</p>	X			
12	7.17	<p>Before a modification at a nuclear power plant is put into operation, the following should be ensured:</p> <p>(a) All the documentation affected by the plant modification, such as <del>the safety analysis report</del>, operational limits and conditions, drawings, operating and emergency procedures, periodic maintenance and testing procedures, and equipment indexes (commonly used for system operation, tag-outs and maintenance) have been updated and are available. Documents should not be released for use until the modification has been completed.</p> <p>(b) The as-built configuration of modified systems has been verified, <u>design documentation and if affected also</u> the design basis document has been updated.</p>	<p>The Safety Analysis Report (SAR) is in many countries part of submissions necessary to apply for general Operating Licence (OL). SAR itself is not approved but it creates a base for regulatory body (RB) decision. If any documents are changed then OL must be withdrawn. Therefore it is sufficient and reasonable to introduce to RB just relevant comprehensive safety assessment (according paragraph 4.6 and subsequent) and the revision of entire SAR can be deferred until regular review time agreed with the RB.</p> <p>It is noted that paragraph 10.4. is correct when it says “should be updated as soon as practicable” which is consistent with our proposed changes.</p> <p>This paragraph should speak</p>	<p>X</p> <p>For the 2 proposed changes</p>			

			about design documentation too. The design basis document is not always touched by the modification				
13	Appendix II / first rectangle	Identifying and introducing the need for modifications Operating experience feedback Technical and documentation improvements Benchmarking New requirements Other reasons <b>To be completed or refer to 2.5</b>	This part should be consistent with paragraph 2.5. PSR should not be missing.	X  First box needs to be completed.			
14	Appendix II / second rectangle	<b>Definition and justification of modification</b> Extent, <u>practical reasonability rationale</u> and effect	A rationale of the modification should be provided in this step and also practical reasonability should be assessed or valued.			X	Already in the first step and more logical at this step ('need for modifications')

COMMENTS BY REVIEWERS					RESOLUTION			
Reviewer: <b>U.S. Nuclear Regulatory Commission</b>								
Country/Organization: U.S. Nuclear Regulatory Commission				Date: 14 October 2020				
Comment No.	Draft Safety Guide No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	DS497B	2.5	(h) Unavailability of spare parts	Proposed addition to align with para 1.11 regarding scope for this SG.	X			
2	DS497B	2.12	When modifications are proposed, they should be reviewed to ensure consistency with the corresponding design and functional requirements.	Suggested elimination of the word "assumptions" and inclusion of "functional." Assumptions are typically inherent in the safety analyses, not part of the defined roles that may be affected by modifications. Use of "functional requirements" instead clarifies that the key questions are "what is the plant configuration or	X			

				operating organization supposed to do?" and "what function is it supposed to perform?"				
3	DS497B	3.14	In assessing the effect of a modification on plant safety, the original design organization, architect engineers and/or construction organization should be consulted, as appropriate, in order to provide assurance that the design basis and functions will be preserved following the modification.	Suggested clarification		X	In assessing the consequences of a modification on plant safety, the original design organization, architect engineers and/or construction organization should be consulted, as appropriate, in order to provide assurance that the design basis and functions will be preserved following the modification.	
							Consequence to stay consistent with my answer on an ENISS comment in para 2.13	