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)

NS-G-2.6: 106 comments / Accepted (fully or partially): 58 (55%) / Rejected: 48 (45%)

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

Country or Organization	Number of comments	Accepted	Rejected
ENISS	1	0	1
Finland	49	28	21
Germany	33	21	12
Hungary	2	1	1
Japan	2	1	1
South Africa	4	2	2
Pakistan	15	5	10

COMMENTS BY REVIEWER				RESOLUTION			
Guide: NS-G-2.6 Reviewer: B. Mauhin (Tractebel) Country & Organization: ENISS			Page 2 Date: 29/05/2019				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for rejection
1.	8.8 (b) (iii)	(iii) A high voltage test area with controlled access or mobile insulation measurement equipment and dielectric test equipment allowing insulation check on the field, as appropriate.	Generally, insulation and voltage tests of LV and MV equipment is performed on the field, without or with a minimum dismantling. For the most, moving equipment to a local Hipot area is difficult and time consuming; local consignation, area control and test with a minimum dismantling is more convenient. It is also possible to perform hipot tests in the workshop with the mobile equipment. Regarding HV large equipment, these last are generally not possibly moveable to the workshop, tests are not frequent and it is more convenient to call specialized laboratories to perform such tests.			Yes	This publication is the Safety Guide, not a guide for the maintenance performance. Such detail information is not necessary in the context of the safety (nuclear safety) guide.

COMMENTS BY REVIEWER				RESOLUTION			
Guide: NS-G-2.6 Reviewer: M-L Järvinen Country & Organization: Finland - STUK			Page 3 Date: 28/05/2019				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for rejection
1.	General	IAEA should consider developing a process for simultaneous development or revision of several safety guides. Lessons learned from the revision of the Safety Requirements after Fukushima Dai-ichi accident 2011 should be used in developing this process.		Yes	The team have been working like this. Lessons learned from the revision of the Safety Requirement were followed. DPP was developed based on this experience.		
2.	General	IAEA should consider presentation of the recommendations for maintenance only in one safety guide. The new safety guide for ageing management and LTO, SSG-48 presents current, updated recommendations for maintenance. The safety guide NS-G-2.6 and SSG-48 are overlapping.				Yes	SSG-48 presents maintenance programme only from ageing and LTO point of view. In paragraphs 4.10 and 4.19 there is a clear reference to NS-G-2.6. 2.10. Ageing management consists of design, operations and maintenance actions to prevent or to control, within acceptable limits, the ageing of SSCs. Ageing management is an interdisciplinary activity that involves engineering, maintenance, surveillance, equipment

							qualification, in-service inspection, safety analysis and other relevant plant programmes. IAEA Safety Standards Series No. NS-G-2.6, Maintenance, Surveillance and In-service Inspection in Nuclear Power Plants [10], provides guidance on maintenance, surveillance and inspection practices. 4.19. Maintenance programmes that are consistent with NS-G-2.6 [10] should be in place and should be properly implemented for ageing management and for the evaluations for long term operation of applicable in-scope SSCs.
3.	General	Development of procedures for accidents in NS-G-2.2 is overlapping and may be conflicting with SSG-54. The new accident management guide SSG-54 should be considered also in other relevant safety guides in this set. IAEA should consider presentation of the recommendations only in one safety guide.				Yes	Comment not relevant for NS-G-2.6.

4.	General	Core management section is overlapping in NS-G-2.5 and in DS488. IAEA should consider presentation of the recommendations only in one safety guide.				Yes	Comment not relevant for NS-G-2.6.
5.	General	It is not clear from the guidance which safety requirements are covered by each safety guide. There should be a transparent and systematic way of presented the covered safety requirements in each safety guide. As a part the allocation of the requirements made for DPP DS497 should be utilized.		Yes	Paragraph 1.2 modified to address the DPP 497 recommendations.		
6.	General	Safety-security interface should be implemented to all of the safety guides in a systematic manner. Some guides do net even mention the word security. The set of safety guide demonstrate the need for guidance on the management of the safety-security interface. Presently the safety guides give references to security guides and vice versa. However, there is not always a suitable guide to reference for instance for safety-security interface in change management. The utilization of the synergies of implementation of safety security interface should be emphasized. There is need for a specific guidance on safety security interface management.				Yes	Addressed consistently with the DPP scope. In addition, it is in contrary with comments No. 2, 3, 4 and 5. Please, see paragraphs 2.9.A and 4.11, and answer in the resolution table of the NS-G-2.4 for this comment.
7.	General	The terminology should be harmonized. There are several examples of the harmonization needs in the safety guide specific comments. The examples concerning the term risk are collected for safety guide NS-G-2.6. However similar review should be made for all of the safety guides and the use of term risk should be systemized.				Yes	This is out of the scope of the DPP. The word “risk” (or risks) is used 42 times in the NS-G-2.6, all without any conflict with the interpretation of the term in the IAEA Safety Glossary. In

							the IAEA Safety Glossary, “risk” is mentioned 93 times! Words used have to the extent possible been checked against the IAEA Safety Glossary. And see comment below.
8.	General comment	Risk related terms are used inconsistently. For example, the following expression and terms are used without exact definition: - general risk assessment (para 4.26) - additional risk assessment (4.9.B) - risk assessment (5.22.D, 5.22.E) - risk analysis considerations (8.4) - risk considerations (2.2, 5.12) - risk informed (2.15, 8.3, 10.3.A) - risk significance (10.3.A) - safety significance (5.18.A) - impact on plant reliability (10.8) - risk impact/impact on risk (2.10, 4,21) - negative impact on the reliability (3.2A) - safety impact (4.19) - impacts on system reliability (6.12) - impact on plant reliability (10.8) - effects on reliability and risk (8.2) In addition, it is stated in para 5.22.E that “Probabilistic safety analysis (PSA) should be considered to support the risk assessment”. This implies that both a qualitative and quantitative risk assessment is required, or what is meant by risk assessment?				Yes	Definitions for risk related items can be found in the IAEA Safety Glossary, including those for the PSA applications. In addition, there are many IAEA publications dedicated to the safety analysis using risk assessment methodology. In this Safety Guide the intention was to keep consistency between the various IAEA publications dedicated to the matters of risk considerations.
9.	General comment	PSA should be used to optimize and manage the risk of on-line (power operation)				Yes	There is no need to add something

		maintenance, surveillance programme (frequency/ intervals) and outage (incl. refuelling) risks.					additional on the PSA application for maintenance. Application of PSA methodology is adequately presented in the current version of Safety Guide.
10.	General comment	The page numbering presented in “contents” is incorrect and does not correspond to the actual section numbers of the document.		Yes	Fonts, paragraph numbering, spelling, etc. will be checked and corrected by IAEA staff in the final editing process.		
11.	General comment	Section for “Abbreviations and definitions” should be presented in this safety guide.	Section for Abbreviations and definitions is not included.			Yes	The terminology used in the IAEA Safety Guide s is consistent with the IAEA Safety Glossary. All the definitions and explanations can be found there. The abbreviations should be disclosed in the text at the first use.
12.	General comment	Regular surveillance of civil engineering related operational parameters (e.g. cracks, deformations, structural leaks) by operating personnel acts as a supporting practice for maintenance.	e.g. 9.45/p. 79	Yes	The proposed text has been included as the paragraph 9.18 (A).		
13.	General comment	Terminology relating to SSCs should be unified across all sections or the use of different terms be justified clearly and clarified. See sections 10.1, 10.2, 10.4 for example.	Terminology regarding SSCs changes between different sections, e.g. terms “plant item(s)”, “equipment”, “components”, “systems” are used separately but			Yes	Full check done in according to the comment. Terminology used in the Safety Guide depends on the context of the text

			can be defined as SSC.				presented." SSCs" are mainly used when general aspects of MS&I programme are considered (§3.1 The operating organization is required to prepare and implement a programme **of MS&I for those SSCs** which are important to safety). When consideration is related to the detailed aspects of MS&I performance (maintenance or ISI) the "equipment" or "components" are used (§6.11 Histories of past MS&I should be used for supporting relevant activities, upgrading programmes, and optimizing the performance and improving the **reliability of equipment).**
14.	General comment	Reference to MS&I activities for safety related structures, other than containment surveillance, should be presented.	Only containment surveillance activities for safety related structures is presented in this safety guide (section 9.12).			Yes	Full check done in according to the comment. The Section 9 "Additional considerations specific to surveillance" covers

							broad scope of the items to be included in the surveillance programme, including containment, structural integrity of the primary coolant system, reactor pressure vessel components, high energy piping and associated piping restraints, etc.
15.	General comment 1.3 p.12	Should the scope of MS&I activities be for all SSCs, not only safety related.	Section 9.1 states SSCs as the scope of the surveillance programme, not only safety related.			Yes	There is no contradiction between paragraphs 1.3 and 9.1. Focus is made on the SSCs related to safety.
16.	General comment	Evaluation of structural properties (e.g. strength, humidity) and ageing assessment of safety related concrete containment structures using test specimens created during construction phase and stored in corresponding environmental conditions.	Addition to e.g. section 9.2 for condition surveillance of structures.	Yes	The proposed sentence added as the separate bullet in 9.1.		
17.	General comment	TOC to be updated		Yes	Fonts, paragraph numbering, spelling, etc. will be checked and corrected by IAEA staff in the final editing process.		
18.	General comment	Shall should be used only for quotations from the requirements documents. At the moment shall is used in the guidance text Para. 8.15A and 8.15.B.		Yes	The “shall” have been replaced by “should”.		
19.	General comment	List of abbreviations and definitions shall be added				Yes	See comment 11.

20.	General comment	Strategy for spare-parts and procurement is missing				Yes	Spare parts matters including procurement are adequately presented in the Section “Spare parts and stores” (§§8.21-840).
21.	2.2	“taking into account risk considerations and PSA”	”risk considerations” is too general expression. PSA should be used to assess/minimize the risk level and duration of the maintenance during power operation. This is especially important if several components are taken out-of-service simultaneously.	Yes	The text has been modified by insertion “PSA”, despite that the risk consideration also assumes PSA application.		
22.	2.2./3-6	Types of maintenance 2.2 A considerable part of all maintenance activity is performed while the plant is shut down; however, maintenance may be planned and executed under power operation provided that adequate defence in depth and redundancy is maintained (see paragraph 3.2(a)), taking into account risk considerations.	Among other things also redundancy is included in systems assigning application functions important to safety (SSR-2/1). This is taken into account when designing failure tolerant system to fulfill the required failure criteria.	Yes			
23.	2.5 p.15	Systematic approach to maintenance	Header “Systems approach to maintenance” should be corrected.	Yes			
24.	2.9.A p.16	e.g. - concrete NDE (non-destructive examination) methods; radiography, ultrasound, ground penetrating radar - concrete drill core samples; chemical	The list should contain tools considered for safety related structures.	Yes			

		analysis, petrography					
25.	2.9	… should include, but ~~is~~ not be limited to	typo	Yes			
26.	2.12	that a plan for mitigating ~~the effects of~~ ageing effects can be prepared and implemented	clarity	Yes			
27.	3.2.A /1-4	3.2.A. The operating organization should ensure that the programme of MS&I activities for SSCs important to safety is based on maintaining the independence between the redundancies, systems and subsystems and between the levels of the defence in depth and an adequate reliability of each level during operation.	I&C system architecture is partitioned into a number of interconnected subsystems and components which provide the required redundancy. E.g. these subsystems might have requirement to be independent from each other (as far as possible).			Yes	The proposed idea is not clear and need additional explanations. The defence in depth aspects have been discussed several times during the review process. Final text for the DID matters for all safety guides was proposed by L Reiman, discussed and agreed at the previous CS meeting.
28.	3.6	… delegate ~~to other organizations~~ the work of implementing the MS&I programme or any part thereof to other organizations …	clarity	Yes			
29.	4.26 p.28	housekeeping and cleanliness;	typo Section text "housekeeping and cleanliness;" should be corrected.	Yes			
30.	4.35	For special tasks, depending on the nature of the work to be performed, its importance for the safety of the plant, the potential risks involved and the safety pre- cautions that are consequently necessary, maintenance personnel should receive a special briefing in addition to the aforementioned training. Relevant personnel should also be appropriately trained and qualified in the quality assurance requirements applicable to	Please clarify. strange sentence?	Yes	The beginning of the sentence has been modified to make it clearer: **In some cases, in particular when such work has never been done before or is very rare**, depending on		

		their duties.			the nature of the work to be performed, its importance for the safety of the plant, the potential risks involved and the safety pre- cautions that are consequently necessary, maintenance personnel should receive a special briefing in addition to the aforementioned training. Relevant personnel should also be appropriately trained and qualified in the quality assurance requirements applicable to their duties.		
31.	5.1		Mistake in earlier correction of text	Yes			
32.	5.9 (i) p.32	"… worker may be required…"	"craftsperson" should be changed to "worker", which is more general description.	Yes			
33.	5.22.G	It is stated that, "The reviews should identify and take into consideration possible risks". Does this imply the use of PSA/risk assessment? If so, this should be explicitly stated.	Please clarify.			Yes	The PSA application to the risk assessment for the outage management is clearly presented in the paragraph 5.22.E.

34.	5.22.K	, starting from plant ~~construction~~ design	FME should be started already during the design as many of the choices having impact on the issues listed are made during the design phase.	Yes			
35.	6.13	…In addition to the internal feedback of experience, lessons learned from other power plants and hazardous industries (e.g. aviation, ~~rail~~ off-shore industry and chemical) should be considered important contributions to the further improvement of MS&I programmes…	In the following paragraph: off-shore industry as an example rather than rail	Yes	"Offshore industry" included. Instead of "rail", "railway" was put in the text.		
36.	7.8	… - a long construction or maintenance phase may induce unforeseen ageing mechanisms	Please add: - a long construction or maintenance phase may induce unforeseen ageing mechanisms			Yes	The proposal is more relevant to the SSG-48, to point out the factors affecting the mechanisms of ageing.
37.	7.9	Delete and make reference to PSR	Periodic safety review (PSR) Para. 7.9 deals with PSR and appropriate references should be made to PRS guidance instead of rewriting the description of one of the 14 elements of PSR.	Yes	No changes have been made to the original text. Reference to the Safety Guide SSG-25 Periodic Safety Review for Nuclear Power Plants has been included.		
38.	7.12	7.12 The periodic functional tests should include, but should not be limited to, the following: (a): Tests of all basic safety related functions.	Please clarify: It is not determined what are "basic" … functions. E.g. standard IEC60880 uses term "safety function" (referring to NS-R-1 Glossary): every safety function shall be	Yes			

			coverable by periodic testing.				
39.	8.	Please harmonize the terminology user in the safety guide? How is safety significance defined? What is the difference between safety significance and risk significance? The subtitle of Ch.8 is “Prioritization by Safety Significance”. However, the term “significance” is not used in the paras in Ch.8?				Yes	Common words are used throughout the guide.
40.	8.15.A	Tools, gages, instruments, and other measuring and test equipment used for activities affecting systems important to safety shall be controlled, calibrated at specific periods, adjusted, and maintained to required accuracy limits. Selection of measuring and test equipment shall be based on the type, range, accuracy, and tolerance needed to accomplish the required measurements for determining conformance to specified requirements.	Is this quotation from requirements? If so show it clearly and make the reference. Otherwise use should instead of shall.	Yes	See comment 18.		
41.	8.15.B	Measuring and test equipment shall be calibrated, at prescribed times or intervals and whenever the accuracy of the measuring and test equipment is suspect. Calibration shall be against and traceable to certified equipment or reference standards having known valid relationships to nationally recognized standards, or to international standards known to be equivalent to and verified against corresponding nationally recognized standards. Where no such standards exist, the basis for calibration shall be defined	Is this quotation from requirements? If so show it clearly and make the reference. Otherwise use should instead of shall.	Yes	See comment 18.		
42.	8.34	Particular attention should be paid to retention of the original identification of items during	Clarity, please add: to ensure connection to	Yes			

		storage, to ensure connection to the procurement records.	the procurement records.				
43.	8.41 REPAIR AND REPLACEMENT	Repair and replacement of SSC usually has stages like planning, execution, procurement, testing and recommissioning. These should be performed taking into account the procedures described in the plant's management system for MS&I activities (see e.g. para 4.17 …).	It is a good practice to divide repair/replacement process into stages/substages. This in turn may help to identify the tasks to be managed.			Yes	The Safety Guide is not maintenance manual. The repair and replacement matters are discussed in the context of their relation to safety. Planning of MS&I activities are described in the paragraphs 4.17-4.24.
44.	8.55 p.66	Before any SSC is returned to operation after maintenance, tests should be performed to confirm that maintenance objectives are achieved, required functions of SSC are maintained, normal operation limits and conditions of related system are satisfied and safe plant operation is verified. This procedure should include testing of connected systems and other systems in the work area that may have been affected by the maintenance action.	Paragraph partially re-written because of grammatical errors.	Yes			
45.	8.55	… tests and adequate inspections should be performed…	Please add inspections. May be the subtopic "Post-maintenance Testing" should be expended as well.			Yes	The paragraph 8.55 is dedicated to the post-maintenance testing. The testing matters related to the maintenance are presented in the paragraphs 5.28, 8.53, and 8.54.
46.	9.19	… the surveillance of individual SSCs should be determined primarily on the basis of requirements presented in the operating license and secondarily on their relative	Please add: the primary basis for the surveillance of the individual SSC should be the operating			Yes	Primary is safety. The licensing conditions and requirements are

		importance to safety. …	license.				based on the safety considerations.
47.	10.11 p.82	Should the heading be changed to "hydrostatic pressure and leakage testing" to differentiate from section 9.12 surveillance measures.	Containment is not listed as pressure retaining system.			Yes	There is no confusion with the heading as it is written. Hydrostatic pressure tests on the primary pressure boundary are the elements of surveillance programme. See paragraph 9.12.
48.	10.2.A 10.3 p.80	Section 10.2 states "In-service" and section 10.3 "in-service"	Terminology should be unified and corrected.	Yes			
49.	10.27	The competence of qualification body should be ensured e.g. by accreditation	Please add: The competence of qualification body should be ensured e.g. by accreditation Qualification body should be competent to its task	Yes	New paragraph 10.26.A has been inserted.		

COMMENTS BY REVIEWER				RESOLUTION			
Guide: NS-G-2.6 Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of RSK and GRS) Page 16 Country & Organization: Germany Date: 08/05/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for rejection
1.	1.8 Line 4	… Section 4 provides recommendations and guidance on such organizational aspects as organizational structure, planning ~~and safety management~~, administrative control, application of management system, and training and qualification of personnel…	Paragraph 4.29: "Quality Assurance" in the current version of Safety Guide NS-G-2.6: "Maintenance Surveillance and In-service Inspection in	Yes			

			Nuclear Power Plants" was replaced by "Application of management system for MS&I activities" in DS497E. With the proposed new text, paragraph 1.8 would suit better the new structure of chapter 4.				
2.	2.6	A systematic approach to evaluation should be taken to establish which maintenance tasks are to be performed, on which SSCs, and at what intervals, in order to optimize the use of resources allocated for maintenance and to ensure the safety and availability of the plant. …	Is the optimization aiming at the availability or the safety of the NPP? The safety aspect should also be taken into account in the "systematic approach to evaluation", not only the availability of the plant. Otherwise there would be a risk that the evaluation would only focus on optimizing the allocated resources with respect to the availability of the plant. It should rather be so, that safety and compliance with regulatory requirements are the leading factors in the evaluation.	Yes			
3.	2.6 Line 4	….. In addition to maintenance based on a time interval, the maintenance activities should be carried out based on the SSCs' condition ~~and~~ in order to ensure the ability to perform their safety functions. …	The ability to perform the safety functions of SSC's can indeed be seen as a criterion for a MS&I activity, but it should rather be the goal/aim of the activity.	Yes			
4.	2.10.A	The optimization of maintenance should be	It should be ensured that	Yes			

		used with the objective that the available resources are sufficient to maintain the safe operation of the plant and that they are efficiently deployed in the best way~~, to maintain the safe operation of the plant~~. …	the operating organization is allocating sufficient resources such that the necessary maintenance activities for SSC, with importance to safety, can be performed. The focus should not only lie on deploying the available resources in the best way. If the allocated resources are not sufficient, then this should be identified in the evaluation of the MS&I programme.				
5.	3.8	Vendors staff and contractors should be subject to the same standards as plant staff, particularly in the areas of professional competence, adherence to procedures and evaluation of performance. Suitable steps should be taken to ensure that contractors conform to the ~~technical~~ standards and the safety culture of the operating organization.	Besides technical standards, there could also exist non-technical standards (e.g. of organizational kind) to be followed by contractors.	Yes			
6.	4.7	~~Deleted (R.4.31)~~ Following any abnormal event, the operating organization is required to revalidate the safety functions and the structural and functional integrity of any SSCs that may have been challenged by the event. Necessary corrective actions are required to include maintenance, surveillance and in-service inspection, as appropriate.	Paragraph 4.7 was removed. It is not clear what is meant with reference R4.31 here and where in DS497E the revalidation of SSC's after abnormal events is addressed. Therefore we suggest the following text.			Yes	Paragraph 4.7 has been removed as it is complete quotation of the requirement SSR-2/2 Revision 1, paragraph 4.31.
7.	4.9.A Line 4	…. Supplementary work (e.g. c~~C~~leaning and painting) in the plant and any work outside the plant (e.g. construction, excavation or dredging near the coolant water intake) that may affect safety should also only be	Clarification	Yes			

		performed with the authorization of the operations management. …					
8.	4.9.B	Non-routine maintenance activities (infrequently performed, unforeseen repairs, not covered by typical maintenance procedures, etc.) should be carried out based on ~~in such a way that the~~ safe working procedures ~~can be discussed~~ and additional risk assessments ~~carried out as required~~ prior to any work being undertaken. …	What is meant with "discussed"? The text is not clear and could lead to misunderstanding.	Yes			
9.	4.13 Line 6	… In each case the plant management ~~should retain~~ is required to maintain primary responsibility for implementing the MS&I programme Ref.[1].	It is strongly suggested to maintain the current text from NS-G-2.6 as it is. "Should" is not sufficient here. The plant management is responsible. This requirement should be maintained, because in para 4.12, the establishing of an on-site group (for implementation of the MS&I programme) was removed. This could lead to an increased involvement of external personnel (e.g. from suppliers or contractors) in MS&I activities. It should be stated clearly that the plant management stays responsible even if internal plant resources are not (or only to a small extent) part of the MS&I entity.	Yes			
10.	5.4	… should be performed in accordance with	Clarification	Yes			

	Line 3	properly approved written documents (e.g. procedures or drawings) appropriate to the circumstances.					
11.	5.14.A	In the planning process, consideration should be given to potential combination~~.~~ with other MS&I activities on the same equipment, redundant equipment or trains, or with other MS&I activity on similar equipment in proximity with regards to the availability of all necessary resources. The hazards associated with multiple MS&I activities on the same equipment, or redundant equipment or trains, or in close proximity should be accounted for.	The risks of multiple MS&I works should also include redundant equipment or trains, for this may cause an unintentional risk.	Yes			
12.	5.34.A	Independent assessments should include reviewing, checking, inspecting, testing, surveillance, internal audits~~,~~ and audits performed by external organizations ~~and surveillance~~…	With reference to the IAEA Glossary "surveillance" should be mentioned in line with the other activities and not as a self-standing issue. The use of the term "surveillance" only for the checking of the radioactive and fissionable material (safeguards) is not in line with the glossary. See also 2.11-2.12A for the use of "surveillance" in this document.	Yes			
13.	5.36 Line 18	… ~~The assessment should also try to identify whether any practice/tool/ has been able to increase MS&I effectiveness (organization, performance, duration, reduced MS&I induced hazards).~~	Our suggestion is to delete this sentence - it is nearly identical with the last bullet point of 5.37.			Yes	The sentence proposed for deletion includes a broader scope of items to be considered in the assessment process. Nearly identical as in the last bullet of 5.37 but yet not identical.

14.	6.6	Acceptance criteria for MS&I can be based on the as-manufactured specific standards. They should be established before the start of the programme and should be submitted to the regulatory body for review when required. When new or revised standards are developed or introduced, they should be agreed with the regulatory body.	In this and in some more following paras the acceptance by the regulatory body to changes as well in the programme as the acceptance criteria is missing. There should be an additional independent check, whether this omission is justified. Please compare with NS-G-2.6, the proposed wording is from it.			Yes	Please, see DDP: "All references to the involvement of regulators in the operational activities (commissioning, maintenance, operation, modification, etc.) currently available in the operational safety guides should be deleted."
15.	6.8 Line 8	… Any such plant item should remain non-operational until a justification of the deviation has been completed and approval of the operating organization and, if required, of the regulatory body, has been obtained.	Approval of the regulatory body is missing! Please compare with NS-G-2.6, the proposed wording is from it.			Yes	Please, see DDP: "All references to the involvement of regulators in the operational activities (commissioning, maintenance, operation, modification, etc.) currently available in the operational safety guides should be deleted."
16.	6.9 Line 20 New item	(h) Notification of the regulatory body, if required.	Approval of the regulatory body is missing! Please compare with NS-G-2.6, the proposed wording is from it.			Yes	Please, see DDP: "All references to the involvement of regulators in the operational activities (commissioning, maintenance, operation, modification, etc.) currently available in the operational safety guides should be deleted."
17.	After 6.13	6.14 In addition to the internal feedback of	The number of the para is	Yes			

		experience, lessons learned from other power plants and hazardous industries (e.g. gas and oil, aviation, rail and chemical) should be considered…	missing. Editorial change (reference to gas and oil industry).				
18.	9.30	The established frequency and extent of surveillance should be periodically re-evaluated to verify that they are effective in maintaining the SSCs in an operational state. Where appropriate, PSA based methods can be used to optimize surveillance. Procedures should be established for ensuring that these re-evaluations are carried out and that any necessary changes are approved by the appropriate authorities. In these re-evaluations, the following points should be considered: …	Approval of the regulatory body is missing! Please compare with NS-G-2.6, the proposed wording is from it.			Yes	Please, see DDP: "All references to the involvement of regulators in the operational activities (commissioning, maintenance, operation, modification, etc.) currently available in the operational safety guides should be deleted."
19.	9.40 Line 7	… test or experiment is performed. The procedure should be submitted to the regulatory body for prior approval, as required…	The acceptance by the regulatory body to changes as well in the programme as the acceptance criteria is missing. There should be an additional independent check, whether this omission is justified. Check NS-G-2.6 for wording.			Yes	Please, see DDP: "All references to the involvement of regulators in the operational activities (commissioning, maintenance, operation, modification, etc.) currently available in the operational safety guides should be deleted."
20.	7 / Subtitle of chapter 7	Structures, Systems and components for abnormal operating conditions and accident conditions	The subtitle implies that only abnormal operating conditions are addressed in chapter 7. But this chapter refers also to accident conditions (e.g. in para 7.5B).	Yes	STRUCTURES, SYSTEMS AND COMPONENTS FOR ACCIDENT CONDITIONS		
21.	7.1 Line 3	… Examples of such SSCs are ~~reactor containment vessels,~~ emergency electric power sources, isolation valves and safety	We suggest to delete "reactor containment vessels" in this part of			Yes	Majority of containment surveillance tests are performed during the

		valves. …	the text: in normal operation it is well in use (confinement) and checkable (by ventilation system performance), thus it is not correct to place it here. Instead of this buildings (behaviour against external hazards), firefighting equipment etc. could be add.				outages (leak-rate tests, tests of penetration seals, structural integrity inspections, etc.).
22.	7.5.A 7.5.B	~~EQUIPMENT QUALIFICATION CONSIDERATIONS~~ ~~7.5.A. After equipment qualification programme has been established for the NPP, specific ongoing equipment qualification maintenance requirements should be identified for incorporation into existing plant maintenance programme. These requirements should establish methods and a schedule to be used for maintenance,(including equipment or component repair and replacement) surveillance (including testing) and ISI. Environmental monitoring should be used to determine the actual environment conditions to which equipment is exposed and the effects that it has on the equipment.. Equipment qualification status should be preserved using different administrative controls like installation and maintenance control, replacement control, modification control, condition monitoring, etc. For more detailed information see Ref. [17].~~ ~~7.5.B. When establishing EQ required maintenance, consideration should be given to the following items:~~ ~~- maintenance scope and periodicity are adequately identified to maintain the qualification throughout the plant life under~~	We suggest to delete these paras completely. Issues pointed here is a normal part of surveillance and in-service inspection (please compare to 2.16). Additionally, these paras. describe the re-qualification and not the qualification process. Do we have requirements for re-qualification of equipment described?			Yes	DPP 497 Requirement 13 – To address adequately Equipment Qualification in relation to activities needed during operation, including realistic performance targets under DEC conditions. The EQ matters were significantly reduced (in comparison to the original revision version) leaving only those related to the MS&I.

		~~normal, abnormal and accident conditions;~~ ~~- the equipment within the qualification programme is adequately identified when the work request is issued;~~ ~~- after maintenance work, qualified equipment is reinstalled in accordance with applicable installation requirements;~~ ~~- the installed equipment remains in its qualified condition after maintenance service (e.g. mounting bolts are torqued to the proper values, parts with limited life expectancy are replaced as required),~~ ~~- maintenance involves replacement of components necessary to preserve the qualified configuration~~ ~~- spare parts/ components used for qualified equipment are identical or equivalent to the original part/ component;~~ ~~- unforeseen mechanisms that may be causing equipment degradation are timely identified;~~ ~~- periodic inspections and maintenance actions for mechanisms not amenable to simulation during the qualification phase are identified.~~					
23.	8.9 Line 3	… Specific maintenance facilities, located within the controlled area, should be provided for radioactive and contaminated ~~plant~~ items. …	We guess that "items" are meant here	Yes			
24.	8.23.A	A~~n appropriate~~ qualification system ~~should~~ to be established for commercial grade items used in safety related SSC's ~~systems and components~~ should be appropriate and approved by the regulatory body, as required. Thorough, engineering-based process should be implemented for review, testing, and dedication of commercial-grade items for suitability in safety related SSC's ~~systems and components~~. The appropriate measures should be established to ensure that substandard	Structures should also be covered here, not only systems and components. Structures like (steel or concrete) support structures, spring hangers, dampers, snubbers etc. could also be subject to the issue of commercial grade items. Furthermore, depending	Yes	Text has been modified to cover structures. Regulatory Body is not included in the revised text.		*Please, see DDP: "All references to the involvement of regulators in the operational activities (commissioning, maintenance, operation, modification, etc.) currently available in the operational safety guides should be*

		items are not installed at nuclear power plants.	on the requirements of the individual States, the usage of commercial grade items could be subject to approval by the Regulatory Body.				*deleted."*
25.	9.38.B Line 5	… Testing should verify that the safety functions of a tested system or component ~~have been~~ are maintained.	Clarification. It cannot be assured that the safety functions have been maintained for the past. But it can be shown that during the testing the SSC has fulfilled the criteria.	Yes			
26.	9.40 Line 7	… such a test or experiment is performed. The procedure should be submitted to the regulatory body for prior approval, as required. More information…	The reference to the tasks of the Regulatory Body was deleted. It is suggested to maintain the current text from NS-G-2.6. It is not clear why it should be beneficial to remove the existing reference to the tasks of the Regulatory Body.			Yes	Please, see DDP: "All references to the involvement of regulators in the operational activities (commissioning, maintenance, operation, modification, etc.) currently available in the operational safety guides should be deleted."
27.	10.3.A Line 4	… The implementation of a risk-informed approach in the in-service inspection practice should be introduced carefully so that the benefits of a targeted risk informed approach can be understood by the in-service inspection ~~practitioners~~ specialists and the effectiveness of in-service inspection service and its results is maintained without a detriment to safety.	Term "practitioner" is used in the IAEA glossary only for medical personnel. Our suggestion is to replace it by "personnel" or "specialists".	Yes			
28.	10.10 Line 6	… This should in no way diminish the requirements on the frequency of examinations formulated in the relevant ~~design~~ codes	We suggest to delete "design", as rules may consider not only design, but as well operation of	Yes			

			NPP (Example - German KTA rules).				
29.	10.11 Line 9	…. Pressure and leakage testing should be used to ~~assure~~ confirm the leak tightness of pressure retaining SSCs during ~~manufacture~~ installation and operation…	Clarification We guess that term "assure" is not quite correct, leak tightness etc. can be confirmed by testing, not assured. We suggest also to replace "manufacture" by "installation", it makes more sense in terms of testing in this context.	Yes	Leak tightness of pressure retaining SSCs during construction and operation…		
30.	10.23 Line 5	… should be calibrated against applicable standards recognized by the regulatory body.	The reference to the tasks of the Regulatory Body was deleted. It is suggested to maintain the current text from NS-G-2.6. It is not clear why it should be beneficial to remove the existing reference to the tasks of the Regulatory Body.			Yes	Please, see DDP: "All references to the involvement of regulators in the operational activities (commissioning, maintenance, operation, modification, etc.) currently available in the operational safety guides should be deleted."
31.	10.25 Line 4	... should be defined in technical specifications and should be agreed upon between the operating organization and the regulatory body, as required. Account should be…	The reference to the tasks of the Regulatory Body was deleted. It is suggested to maintain the current text from NS-G-2.6. It is not clear why it should be beneficial to remove the existing reference to the tasks of the Regulatory Body.			Yes	Please, see DDP: "All references to the involvement of regulators in the operational activities (commissioning, maintenance, operation, modification, etc.) currently available in the operational safety guides should be deleted."
32.	10.33	… should be limited in time.	It could be beneficial	Yes			

	Line 3	Personnel certificates should be revoked when a certified individual ceases to work for the inspection organization which presented him or her for qualification, or when the inspection organization cannot produce documentary evidence of the certified individual's continuous satisfactory involvement in the qualified inspection process.	(also with respect to the law enforcement duties of the Regulatory Body) to define conditions under which a granted certificate can be revoked. Therefore, it is suggested to maintain the current text from NS-G-2.6.				
33.	10.39 Line 2	… exceeding the acceptance ~~standards~~ criteria, all…	Clarification	Yes			

COMMENTS BY REVIEWER				RESOLUTION			
Guide: NS-G-2.6							
Reviewer: Tamás Járfás			Page 27				
Country & Organization: Hungary / Paks II NPP			Date: 15/04/2019				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for rejection
1.	8.45-8.48	Corrective maintenance (8.45-8.48)	It is not understandable why this phrase "remedial" is used instead of "corrective". Generally, we use Corrective maintenance for repair work. We suggest to use this phrase.	Yes	The "remedial maintenance " is replaced by the "corrective maintenance" throughout the guide.		

COMMENTS BY REVIEWER				RESOLUTION			
Guide: NS-G-2.6							
Reviewer: Marianna-Haraszti-Papp			Page 27				
Country & Organization: Hungary / HAEA			Date: 15/04/2019				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for rejection
2.	8.42	8.41. In principle, components should be repaired or replaced before an equipment becomes unacceptable for further service due	In my opinion in this chapter, the first step should be to identify			Yes	The comment is not understandable. The Chapter is for repair

		to defects or obsolescence. Condition monitoring should help to reveal early symptoms of degradation (see para 2.3). Repair: Activity to restore the condition of systems and components, as well as buildings and building structures of the nuclear facility to the condition defined during design and described in the effective documentation. Replacement: Repair using an identical part.	repair and replacement.				and replacement. Identification of deficiencies is the subject of condition monitoring, surveillance and inspections.

COMMENTS BY REVIEWER **Guide: NS-G-2.6** Reviewer: Country & Organization: Japan / NRA			Page 28 Date: 09/05/2019	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for rejection
1.	5.34.A	Independent assessments ~~should~~ may include reviewing, checking, inspecting, testing, internal audits, audits performed by external organizations and surveillance (see Refs. [3] and [5]). Independent assessment should be focused on safety aspects and areas where problems have been found. Assessment plans should be reviewed and adjusted to reflect new or emergent management concerns and performance problems.	To keep a consistency with the para. 6.22 of GS-G-3.1.			Yes	Para. 6.22 of GS-G-3.1. is dealing with the general aspects of independent assessment. As to the specific activities like MSI “should” matches better.
2.	7.5.B 7th bullet	EQUIPMENT QUALIFICATION CONSIDERATIONS - preparing for unforeseen mechanisms that may be causing equipment degradation ~~are timely identified.~~, deviations and anomalies are properly evaluated in a timely manner after detected.	It is not a practical way to identify and detect unforeseen mechanisms when establishing equipment qualification required maintenance. However, it is making it possible to detect deviations and anomalies.	Yes			

COMMENTS BY REVIEWER				RESOLUTION			
Guide: NS-G-2.6 Reviewer: Dorcas Nonyane Country & Organization: South Africa / National Nuclear Regulator			Page 29 Date: 17/05/2019				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for rejection
1.	4.4	"The goals, objectives and priorities of the MS&I programme should be defined, so as to be consistent with the policies and objectives at the plant, and communicated to plant personnel."	It is crucial to get buy-in from plant personnel on matters of MS&I and safety and communicating the goals allows them be more invested in the plant performance.	Yes			
2.	4.26	Suggestion to add "-proper disposal of low level radioactive waste generated from MS&I activities"	This is an important factor to consider when drafting MS&I procedures for NPPs	Yes	Minimizing and handling of radioactive waste.		
3.	5.22.A	Suggestion to add - Identification of critical path activities unless already covered in first bullet				Yes	Covered in the first two bullets.
4.	5.22.F	"Any specific training needs, special procedures for the shutdown mode or additional operating procedures or surveillance necessary should be identified; Suggestion to add - Training and induction of contractors prior to outage commencement.				Yes	Except of the training needs this paragraph deals with the additional procedures and surveillance. To add in addition the training needs makes misbalance between the items covered by this para. Training of contractor personnel is referenced in 4.33 (c).

COMMENTS BY REVIEWER

Guide: NS-G-2.6

Reviewer: Dr. Basit Khalid, PE, DNPES
Country/Organization: Pakistan / PAEC

Page 30
Date:26/06/2019
Deadline: 31/05/2019

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for rejection
1.	2.1/5	The plant maintenance program should also cover the safety provisions for design extensions (with or without fuel failure) and the system and equipment (mobile and permanently installed) that could be necessary to respond to an accident, including a severe accident.	May be deleted from this section 2.1 as design extension conditions are not covered under maintenance program.			Yes	During the previous review steps decision was taken that the maintenance program should cover design extension conditions.
2.	2.8/3	Such monitoring program should at-least be based on the following assumptions.	The word "at-least" may be deleted			Yes	As far as the bullets below are not exhaustive list of the assumptions to be taken into account insertion" at least" is reasonable.
3.	2.8/5	The acceptance criteria are clearly defined for all safety functions.	The word "available" may be replaced by "clearly defined for all safety functions" for more emphasis on acceptance criteria.	Yes	The bullet 2 rephrased to: - that acceptance criteria are clearly defined.		
4.	2.10/8	PSA methods should be considered to monitor the risk-impact of changes in maintenance and testing strategies, provided the PSA scope is so comprehensive that adequate data on the change to system or component reliability data are available.	"and quality are adequate" is replaced by "so comprehensive" to define the scope of PSA explicitly.	Yes	The last sentence modified as " … provided the PSA model is **enough comprehensive** and…"		
5.	3.8	Vendors and contractors staff should be subject to the same standards as plant staff, particularly in the areas of professional competence, adherence to procedures and evaluation of performance.	The professional competence of staff of both vendors and contracts is compared with staff of the plant.			Yes	The view of reviewer is already covered in the paragraph 3.8.
6.	7.8/2	Prediction of remaining (probabilistic) service	MS&I programme should			Yes	The proposed text is

		life based on aging management programme. Utilization of feed-back from existing implemented aging management program.	include the proposed new text.				more suitable to the IAEA SSG-48 (Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants).
7.	9.12/14	Monitoring of pre-stress forces in the containment wall and dome tendons.	Surveillance measures necessary to verify the containment integrity include the proposed new text.			Yes	This subject is already included in the 9.12 (3).
COMMENTS BY REVIEWER Reviewer: Directorate General of Safety Country/Organization: Pakistan / PAEC			Page 31 Date: 26/06/2019 Deadline: 31/05/2019				
1	1.7	MS&I activities should be subject to the management system requirements specified in the Ref. Leadership and Management for Safety, Safety Standards Series No. GSR Part 2 [2]. General recommendations **on the subject (MS&I)** can be found in the Ref. Application of the Management System for Facilities and Activities, IAEA Safety Standards Series No. GS-G-3.1 [3].	New text added (bold) to make the intent of para more pronounced.			Yes	The MS&I subject is already presented in the beginning of the first sentence.
2	2.10	Changes deriving from the optimization of maintenance should be analyzed to assess the effects of the changed maintenance approach on system availability and the overall risks to the plant in all operating and shutdown states including accident conditions. A periodic review of the optimization process should incorporate operating experience, including new failure modes and data. In the optimization process, due attention should be paid to maintaining the required reliability of	Para rephrased. Added word “that” and replaced “PSA” with “PSA’s” in line # 9. Further, deleted word “data” from line # 10.	Yes			

		the SSCs and adequate safety margins. PSA methods can be used to monitor the risk impact of changes in maintenance and testing strategies, provided that the PSA's scope and quality are adequate and that adequate data on the change to system, or component reliability are available.					
3	5.18.A	An appropriate system to manage and control backlogs should be established to ensure that there are no delayed safety-related tasks, or that a large backlog due to a lack of resources does not develop. In the backlog management system the work priority assignment should be based on the safety significance considerations. The emphasis should be made on the minimization of maintenance backlog on SSCs important to safety.	Word "Does not" (bold) was introduced in the text to remove ambiguity in the context.	Yes			
4	5.34.A	**Independent Assessment should be carried out by plant's corporate office and/or Peer organization and/or international bodies.** Independent assessments should include reviewing, checking, inspecting, testing, internal audits, audits performed by external organizations and surveillance (see Refs.[3] and [5]). Independent assessment should be focused on safety aspects and areas where problems have been found. Assessment plans should be reviewed and adjusted to reflect new or emergent management concerns and performance problems.	Addition of text (bold) is suggested in order to make it consistent to para 5.33A dealing with self-assessment.			Yes	The paragraph 5.34 is formulated in line with the references [3] and [5]. Focusing on the plant corporate office is narrowing the scope of organisations for the independent assessment.
5	7.5.A	After equipment qualification programme has been established for the NPP, specific ongoing equipment qualification maintenance requirements should be identified for incorporation into existing plant maintenance programme. These requirements should establish methods and a schedule to be used for maintenance, surveillance and equipment or component replacement. Condition	Text "Qualification of items important to safety, IAEA New NSG, DS514" (bold) added to make it consistent with the rest of the document.			Yes	It is not acceptable to make reference to the documents that are at the stage of development.

		monitoring should be used to monitor actual environment conditions to which equipment is exposed. Equipment qualification status should be preserved; maintenance, surveillance, conditions monitoring, component replaces prior expiring the qualified life are recommended methods. See Ref. Qualification of items important to safety, IAEA New NSG, DS514[17].					
6	7.8	In order to manage ageing processes, the MS&I programme should include, but should not be limited to, the following aspects: — Identification of SSCs important to safety that are susceptible to degradation.…	The phrase "structures and components" replaced with "SSCs" to make it generic, enhance its scope and make it consistent with rest of document.	Yes			
7	8.19	Plant management should provide suitable **fixed and/or** mobile lifting and transport facilities, with clear indications of their lifting capacity.…	Text "fixed and/or" added (bold) as lifting equipment may not be necessarily mobile.			Yes	The fixed lifting equipment should be included in the plant's design (see paragraph 8.18).
8.	8.41	In general, if assessed during planned maintenance, components should be repaired or replaced prior to be unacceptable for further service. They should also be replaced prior obsolescence	Para rephrased, repair and replacement of equipment may be carried out prior to unacceptable service or obsolescence of components as these are items on which safety of the plant relies.			Yes	The proposed rephrasing sounds unclear. The current content of the paragraph implicitly explains the reasons for repair or replacement.