COMMENTS BY REVIEWER Reviewer: Marcus Grzechnik Country/Organization: ARPANSA, Australia Date: 9/10/18				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	General	The first three guides appropriately reference GSR Part 7, however consideration should be given to referencing GSR Part 7 in the remaining guides. This is particularly relevant where emergency plans are required (such as in NS-G-2.5 revision.				X	NS-G-2.15 already mentioned.

COMMENTS BY REVIEWER Reviewer: Mikko Lemmetty, Stéphanie NGUYEN, Laurence Oury Country/Organization: ENISS Date: 2018-09-26				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

1.	NS-G-2.6, General		The preface describing the role of Safety Guides, along with the Editorial Note proceeding the contents page, discusses the use of "should" in such documents to set out recommendations. Relatedly, an exercise seems to have been undertaken to replace almost every use of "may" within the document with "should". In most cases, this is fine and adds extra weight to a recommendation, but there are many cases where the previous use of "may" seems more appropriate as one or several possibilities amongst many are being described, rather than a specific suggestion of the approach to take. In some cases, this simply leads to slightly clumsy wording, but in many cases the "may" is in a clause following a "should". By increasing these situations to "should", the Guide could be seen to promote less safe approaches which it was previously merely advocating being permissible in the stipulated situations where the earlier recommendation could not be implemented, or that it appears to foreclose otherwise acceptable options. We will give greater detail of some of the more significant examples later, but the paragraphs in which ENISS would consider the original "may" to be correct in place of the updated "should" are the following: 7.5, 8.10, 8.15, 8.33, 9.4, 9.33, 10.8, 10.10, 10.17, 10.18, 10.19, 10.20 and 10.35.			X	"Should" and "may" carry different meanings. "Should" is used when recommendation is given, while "may" keeps the meaning of one of alternative options or approaches.

2.	NS-G-2.6, para 5.4	…if this would result in violation of operating limits and conditions unless the procedure clearly mentions this and requires as a precondition for the carrying out of the maintenance task that the necessary authorisations to deviate from the operating limits and condition have been obtained. If the maintenance procedure that necessitates the violation of operating limits and conditions is to be used only during emergencies, this and the nature of emergency where the procedure is to be used should be clearly stated in the procedure.	For some seldom maintained components, it may be necessary to deviate from the operating limits and conditions with appropriate regulatory permission, or the maintenance procedure is meant only for use during plant emergencies. If interpreted literally, the guide would prohibit writing and storing maintenance procedures for such rare tasks, although the need for such procedures is the greatest when the tasks are rarely or only exceptionally carried out.			X	The common approach in the Safety Guides is to support the compliance of limits and conditions, avoiding the unnecessary reference to the cases when violation of OLC is the urgent necessity. The non-routine (infrequent) maintenance activities are covered in the para 4.9B.

3.	NS-G-2.6, para 9.38	Restore the old title "Functional test"	The change of title from “Functional test” to Surveillance testing” feels like quite a big change in emphasis – the paragraphs describe a fairly specific type of testing, whereas the term “surveillance testing” is a much more vague term.			X	Functional tests have been replaced in accordance with IAEA Safety Glossary. Content of the Section explains meaning of surveillance tests.

4.	NS-G-2.6, para 10.1	In-service inspection programmes should also consider focus on detecting manufacturing and other relevant defects that can cause further cracks and flaws. Available tools and techniques should be used to identify, in a timely manner, crack initiation and pipe wall thinning.	In this paragraph, “also” certainly needs to remain here, otherwise it gives the impression that ISI is mostly targeted towards manufacturing defects. Suggest that changing “focus” to “consider” or “cover” would likewise set a better balance for the emphasis of ISI in being predominantly geared towards in-service degradation mechanisms.	Ok	The comment is covered in the resolution of UK comment (82) The new para 10.2.A inserted instead of para 10.1.A. In addition to in-service inspection being targeted at defects initiating during operation, IS&I programmes should also consider manufacturing and other relevant defects that can cause further cracks and flaws or grow during service.		

5.	NS-G-2.6, para 10.11	In such cases, however, these components should still be examined for integrity as part of the system hydraulic tests, if performed	The condition "if performed" should be added to the end of this paragraph, as not every operator will conduct in-service hydrostatic testing. This is recognised in paragraph 10.11 (c).	Ok Text modified as:	The bullet (c) has been modified as the following: (c) Where appropriate, a system hydrostatic pressure test at or near the end of each major inspection interval, may be applied.		To achieve compliance with the resolution of the UK comments (85,86)
6.	NS-G-2.6, para 10.8	The inspection programme should may involve regular inspection intervals or, alternatively, the inspection intervals should may be varied over the operating lifetime of the plant to improve the correlation between inspection intervals and the probabilities and characteristics of component failures.	The first two uses of "should" to replace "may" make this sentence contradictory, as the two options are distinct options, therefore they cannot both be introduced as "should".	Ok Text modified	"may" has been reinstated as in the original version.		

7.	NS-G-2.6, para 10.8	Whichever programme is adopted, however, the results of inspections should may necessitate a shortening of the intervals towards the end of the plant's operating lifetime.	The last use of "should" in this paragraph is incorrect, as it seeks to pre-guess what the results of the inspections will be; "may" is more appropriate as for most components, there is unlikely to be a need to vary the inspection interval, it will only be on those for which the results dictate it. Introducing unnecessary inspections is inconsistent with the principle of ALARA.	Ok Text modified	"may" has been reinstated.		
8.	NS-G-2.6, para 10.10	Examinations that necessitate the disassembly of components (such as the disassembly of pumps or valves to volumetrically examine large bolting, or the removal of fuel or of core support structures in reactor vessels in order to examine welds or nozzle radius sections) should may be deferred	The option to defer inspections to the end of an interval is about flexibility allowed by many inspection regimes to aid outage planning and avoid unnecessary re-work. However, the right opportunities are also likely to occur earlier in the interval, depending on how other work is programmed. Deferring to the end of the interval is not about improving nuclear safety, therefore "may" is more appropriate than "should" in this case.	Ok Text modified	"may" has been reinstated		

9.	NS-G-2.6, para 10.17	Optical aids such as television cameras, binoculars and mirrors should may be used.	Optical aids may be used, but this would be done as and when required. If an equally good (or better) inspection can be achieved by direct visual, then this would be the preference. Hence “may” instead of “should”.	Ok Text modified	“may” has been reinstated		
10.	NS-G-2.6, para 10.19	Radiographic techniques employing penetrating radiation such as X rays, gamma rays or thermal neutrons should may be utilized with appropriate image recording devices, to detect the presence of flaws and also to establish their size. An ultrasonic testing method is most commonly used to establish both the length and the depth of flaws.	The “should” in the sentence regarding radiographic techniques should be restored to “may”, otherwise the sentence reads that radiography is preferable to ultrasonic testing. Given the ALARA considerations and differing capabilities to detect different defect types, the choice of method will depend on the inspection in question. Hence “may” is appropriate here.			X	In this case “should“ refers to the utilization of recording means , which is reasonable.

11.	NS-G-2.6, para 10.20	Alternative methods of examination, a combination of methods, or newly developed techniques should may also be used, provided that the results have a demonstrated equivalence or superiority to those of the methods mentioned above and are comparable with them.	“Should” in this paragraph suggests that alternative or newly developed techniques should be used in preference to well established, qualified techniques. “May” is appropriate here, as there is nothing to stop operators using new techniques providing they have been adequately demonstrated, but the well-established methods and techniques would still be expected to be the majority of an ISI programme.			X	In this context “should” is reasonable.
12.	NS-G-2.6, paras 10.17-20	Restore the "may" instead of "should".	As now written, the paragraph 10.16 guide specifies that the mentioned methods should be used in accordance with the appropriate regulationas and standards and selected so as to accommodate practical issues. Then, paragraphs 10.17–20 all require each mentioned method to be used in all cases without any further consideration.	Ok Partly	“may” was reinstated where reasonable (see resolution of comments 39-43.		

13.	NS-G-2.6, para 10.35	Restore the "may" instead of "should".	“should” should read “may” here, as in many cases, it would not be appropriate to use other methods or techniques – the inspection will typically have been designed with the best adapted method. Use of any additional inspections to provide extra detail should be done in a well-thought out means to avoid incurring unnecessary dose (ALARA) for limited additional information The further study of the unacceptable flaw may be unnecessary if, for example, the decision is taken to change the component. Here, "may" gives a permission for further studies to verify whether the fault is really unacceptable, so changing it to "should" is not conservative.	Ok Text modified	“may” has been reinstated		

14.	NS-G-2.6, para 10.44	In the event that the re-examinations recommended in paragraph 10.43 indicate that the flaws remain essentially unchanged over three successive inspection intervals and no specific ab-normal transients affecting the component have taken place, the schedule for examinations of that component may revert to the original schedule for the subsequent inspections.	These paragraphs suggest that all degradation is purely time-driven. In many cases, it might be predominantly driven by certain transients, of which no relevant ones may have occurred during the interval considered. Therefore it would be worth adding a paragraph to consider the need to re-inspect such components following any transients of concern.	Ok Text modified as:	with exclusion "over three successive inspection intervals" to comply with the UK comment 95		

COMMENTS BY REVIEWER Reviewer: ? Country/Organization: FRANCE ASN-IRSN Date: 10/10/2018				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	N/A	For definitions, see the Ref. IAEA Safety Glossary, Terminology Used in Nuclear Safety and Radiation Protection, 2016 Revision [4].	Because the glossary has been deleted, add a sentence in the introduction to explain that the relevant definitions can be found in the IAEA glossary, for example for defining SSC important to safety (see sentence in paragraph 2.2)			X	The content of the introduction has been agreed for all the set of Safety Guides under revision.
2.	1.2	which relates to the Maintenance,	To be consistent with the			X	The title of the

		Testing, Surveillance and In-Service Inspection of SSCs important to safety.	title of section 8 of Safety standard SSR-2/2 rev1				Safety Guide is "Maintenance, Surveillance and In-Service Inspection… "The testing is not considered as the separate item, it is part of the surveillance and maintenance services.
3.	1.3	~~In addition the application of the recommendations of this safety guide will support the fostering of a strong safety culture.~~	Regarding the definition of "safety culture", there is no reason to enhance safety culture in the objective of this safety guide than in any other guide. Consider deletion or complementary explanation. Why does this sentence appear in DS 497?			X	The proposal is correct; however, there are strong recommendations in the DS 497 to point out the safety culture.
4.	1.5	This Safety Guide provides recommendations and guidance for preventive and remedial measures, including maintenance, testing, surveillance and in-service inspection, that are necessary to ensure that all SSCs important to safety are capable of performing as intended.	Not clear if the added word "maintenance" applies only to testing or to all the following activities. In the latest case, the addition is not needed.	Ok Text modified as:	The text has been modified by deleting the "testing" as it is the activity within both, maintenance and surveillance		
5.	1.6		This paragraph may be	Yes			

			adapted to reflect the final version of the document, with its additional topics				
6.	1.8	Section 4 provides recommendations and guidance on such organizational aspects as organizational structure, planning and safety management, administrative control, ~~quality assurance,~~ and training and qualification of personnel.	Quality assurance has been deleted from this section	Ok Text modified as:	"quality assurance" removed.		
7.	2.2	A considerable part of all maintenance activity is performed ~~while the plant is shut down~~ during plant outage;	The work "shut down" may be confusing in this context. MS&I activities are performed during the outages (planned or unplanned).			X	In this sentence the focus is on the shutdown mode of the reactor as opposed to the power operation status.
8.	2.3 b	Predictive (condition based) maintenance (condition based)	Rewording	Ok Text modified			
9.	2.5 and 2.6		Not favorable to the replacement of the title "systems approach to maintenance" because paragraph 2.5 is not valid only for optimization of maintenance	Yes	"Systems approach to maintenance" reinstated. In addition, "systems approach" is reinstated in the para 2.6.		
10.	2.6	A systematic approach to evaluation should be taken to establish which maintenance tasks are to be performed, on which SSCs, and at	The approach as described in this paragraph is applicable only for optimization of			X	The text is clear to express the condition monitoring

		what intervals, in order to optimize the use of resources allocated for maintenance and to ensure the availability of the plant. In addition to maintenance based on a time interval, the maintenance ~~services~~ activities should be carried out based on the SSCs' condition and ability to perform their functions~~. This approach should be used in~~ for establishing a new optimized preventive maintenance programme and for optimization of the ongoing maintenance programme. Condition monitoring should be used ~~also~~ to determine where unnecessary maintenance work, by taking into account also staff radiation exposure, and failures induced by errors in maintenance can be avoided. If a probabilistic safety assessment has been performed, its results should be used for this purpose.	maintenance; not for the establishment of any preventive maintenance Clarification Addition of radiation protection aspect				objectives and its impact on the preventive maintenance programme. Radiation protection is not the key attribute for moving to the condition based maintenance approach
11.	2.7 line 3		Is intended function similar to defined function? Or should "required" function should be used in this guide, like in the definition of "availability" of the IAEA glossary??			X	"Intended function" is clear and understandable for user. No changes are made.
12.	2.9		Clarification may be needed to explain why the SSCs in scope of condition monitoring are not the same as those considered			X	The danger of damage to equipment associated with the performance of

			as important to safety				safety functions must be identified at the first sign of possible damage. That's why condition monitoring is primarily focused on these systems.
13.	2.10A	2.10.A The optimization of maintenance should be used with the objective that the available resources are efficiently deployed in the best way, to maintain ~~ensure~~ the safe operation ~~maintenance~~ of the plant. The operating organization should ensure that its use of a maintenance optimization programme is not used as a way of cutting costs, at the expense of safety. ~~and~~ The operating organization should ensure that its use o~~n~~f maintenance optimization remains consistent with the requirements set out in [1] and that the maintained SSC ~~equipment~~ continues to be capable of perform~~deliver~~ing its ~~the~~ required function~~ality,~~. to increase the safety and balanced in such a way that cost benefits in no way lead to a reduction in the level of safety.	Rewording The highlighted part of sentence needs clarification	Ok Text modified as:	Proposed and "to increase safety" removed.		
14.	2.12 A 2nd bullet	Functional testing	Is this testing equivalent to periodic tests, to surveillance tests?	Yes			
15.	2.12 A	Testing and inspecting SSC important	Rewording for consistency	Ok			

	4th bullet	to safety ~~safety related structures, systems and components~~		Text modified			
16.	2.14 Lines 1-3	These data are normally collected in the pre-service inspection carried out ~~during manufacturing or~~ before the start of plant operation, including inspection performed during manufacturing, whenever applicable.	Suggestion. The regulation can impose some conditions for using inspections carried out during manufacturing, based on performance of the technique used	Ok Text modified			
17.	2.14 Last sentence	Whenever an SSC has been repaired or replaced, a pre-service inspection should be at least performed before putting it into operation, even if a functional requalification test may be also required (see paragraph 5.28).	Addition for cases when inspection is not sufficient to ensure the capability of the maintained SSC to perform its function after its return to service			X	The paras2.14 and 5.28 supplements each other.
18.	3.2.A 3rd line	between the levels of the defenc~~s~~e in depth	Misspelling	Ok Text modified			
19.	3.2.B 1st sentence	MS&I ac~~i~~tivities should be performed in such a way that the defenc~~s~~e in depth is maintained	Misspelling Question: because it seems redundant with the previous paragraph, is this sentence needed?	Ok Text modified	Misspelling corrected		First sentence is an introduction to the following content.
20.	3.8 1st line	~~Vendors~~ Suppliers and contractors	Seems more appropriate for this paragraph Moreover, is it realistic to have such requirements for suppliers only providing equipment?			X	UK proposed to replace “Vendor” by “Vendor staff”. Modified as proposed by UK
21.	3.9A	The contractors selected for specific safety related work should be required to provide documentary	Regarding the last sentence: such experience is not always available, for			X	“Similar” does not mean the same. If contractor’s

		evidence that they and their staff have the appropriate training and qualification and the required certification (for example some categories of welders). This information should be obtained prior to involvement of contractor personnel in ~~maintenance~~ MS&I activities. ~~Additionally confirmation of relevant experience in performing similar work should be requested from the contractor.~~	example for a new contractor; this issue should be addressed at the qualification stage for employing the contractor				personnel do not have the adequate experience for the work at nuclear power plant, such experience should be gained when working at the other utilities not so hazardous as the nuclear power plant. But this is beyond the scope of this Safety Guide
22.	4.8 1st sentence	In planned outages ~~shutdowns~~ or during reduced power operations the opportunity should be taken to undertake MS&I activities when such activities can be carried out only during this plant's status.	Rewording and clarification because maintenance actions can be carried out during normal operation and this would smooth the planning of activities (see 4.15)	Ok Text modified as:	In planned shutdowns or during reduced power operations the opportunity should be taken to undertake MS&I activities if such activities can be carried out during this plant's status.		The text has been modified, however the shutdowns remained as this term is broadly used in the requirements SSR-2/2.
23.	4.12 7th line	Replace ~~outside vendors~~ by suppliers	Rewording	Ok Text			

				modified			
24.	4.13 2nd sentence	Replace ~~outside agencies~~ by suppliers	Rewording and consistency	Ok Text modified			
25.	4.19 last sentence	should be effected, if justified or the MS&I programme changed, depending on the safety impact of the choice.	Clarification, the strategy to resolve the problem should be decided by considering also consequence on safety	Ok Text modified	The additional text has been added.		
26.	4.36 last sentence	Arrangements should be made for MS&I ~~maintenance~~ personnel	Rewording	Ok Text modified			
27.	Section 5	Replace ~~maintenance~~ by MS&I?	Rewording	Ok Text modified			
28.	5.9 (j)	Keep "as required by the regulatory body"	This note should be kept because in some states, the regulator may have such requirements (e.g. for activities on the reactor coolant system)			X	Common approach to remove the RB involvement.
29.	5.11 2nd sentence	nor in the loss, even temporarily, of one or more complete safety functions, which are necessary according to the reactor operation status	Not favorable to the complete deletion about loss of safety functions	Ok Text modified			
30.	5.12 last sentence	If the MS&I activity ~~test~~ is interrupted for any reason, these systems or components should expeditiously be restored to normal service		Ok Text modified			

31.	5.14.A 2nd sentence	In the planning process, consideration should be given to potential combination ~~Work should be scheduled and combined~~ with other MS&I activities on the same equipment, or with other maintenance on similar equipment in proximity ~~taking into consideration~~ with regards to the availability of all necessary resources.	Clarification: the combination with other MS&I activities has to be promoted as appropriate but not prioritized	Ok Text modified			
32.	5.14.B	Waivers or deferrals of scheduled MS&I activities should be minimized, anticipated as much as possible and authorized only for justified plant conditions and after an appropriate technical review.	Suggestion about a proactive work control			X	The idea in the original text is clear. No reason for modification.
33.	5.18 A 2nd line	or that a ~~large~~ backlog	Suggestion: the word "large" is not precise enough, and to be consistent with the last sentence about minimization of the backlog	Ok Text modified			
34.	5.19.A 2nd line	To achieve good results in the performance of MS&I activities the operating organization should establish a set of tools based on practical methods and techniques	Clarification to introduce the "set of tools" used in following paragraphs	Ok Text modified			
35.	5.19.B		Is it necessary to repeat what is written in paragraphs 6.61 of revised NS-G-2.4 or a reference to the relevant paragraph would be sufficient?			X	It is good for the MS&I people to have these examples in relevant Safety Guide. No harm.

36.	5.19.C		The purpose for introducing the graded approach for the human prevention set of tools is not clear			X	The graded approach for the error prevention means the selection of error prevention tools based on the significance of the work to be carried out.
37.	5.19.D	MS&I ~~Maintenance~~ personnel actions should be planned and performed in such a way to avoid the possibility of human induced equipment faults; as they have the potential to lead to the failure, or unavailability of safety related equipment or systems required to cope with an accident. These human errors can occur during all MS&I activities (testing, repair, inspections ~~maintenance~~ or calibration).	Clarification	Ok Text modified			
38.	5.22.C	during this~~e shut down~~ period	Clarification			X	The necessary safety assessments are undertaken in connection with this specific mode of reactor (shutdown).
39.	5.22.H	Radiation safety is one of the most important elements ~~aspects~~	Suggestion	Ok Text modified			
40.	5.22.M before last	The tools used for performing the MS&I activities should also be	Suggestion because regarding FME it may be	Ok	The proposed text has been		

	sentence	verified in order to ensure that any material or part has not been lost	useful to take into account also the tools used for performing the MS&I activities	Text modified as:	included before the last sentence.		
41.	5.34 2nd sentence	should include inputs from all appropriate parts of the organization, including personnel in MS&I, operations ~~and~~, technical support and from offsite staff involved in the MS&I activities.	Clarification/suggestion	Ok Text modified			
42.	5.36 after last sentence	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).	Suggestion: it is important that the assessment also identifies "good practices", not only negative aspects, in order to encourage a positive attitude and improve MS&I	Ok Text modified			
43.	6.1 2nd sentence		Need for clarification: some parts of the sentence seem to be missing in comparison with the previous version of this guide	Ok Text modified as:	The missing text of the original version has been reinstated		
44.	6.4 Section 8	More information on the specific types of records and documentation relevant to surveillance and in-service inspection is given in paragraphs 9.45–9.46 and 10.45–10.47.	Question: Why there is not such information for section 8 about Maintenance?	Ok Text modified as:	Two additional paras were developed (8.56 A and B) under the title Record keeping		
45.	6.10 last sentence	Trending of results should be carried out even when these results are within acceptance criteria ~~normal~~	Clarification & suggestion	Ok Text			

		~~limits~~.		modified			
46.	6.13 bullet (a)	deficiencies of equipment, procedures, ~~or~~ personnel or organization.	Suggestion: latent problems can be originated by a defective organization	Ok Text modified			
47.	7.5.A 2nd sentence	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 ~~equipment or component replacement~~.	Clarification because all MS&I activities can impact an equipment qualification	Ok Text modified			
48.	7.8 1st line	In order to manage ageing ~~processes~~	Suggestion	Ok Text modified			
49.	7.8		Suggestion: should management of technological obsolescence also be mentioned in this section?	Ok Text modified as:	In the text of para 7.7 the "technological obsolescence " is added in the last sentence.		
50.	8.25 3rd bullet	- any uncertainties in the future supply of parts and components that are currently available, especially with regard to the risk of technological obsolescence;	Clarification	Ok Text modified			
51.	8.32	The operating organization should ensure that storage facilities offer adequate space and provide for the secure retention of stocks in suitable environmental conditions, in order to prevent deterioration. Any dangerous	Suggestion: it is impotant to take into account risks originated from dangerous substances such as oil, chemical products	Ok Text modified as:	After the first sentence in 8.32 the additional sentence has been inserted:		

		products present in a storage facility should also be safely stored.			"Any hazardous substances such as oil, chemical products should be segregated and stored separately".		
52.	8.37 lines 1-2	Items that have a limited shelf-life ~~should~~, if not used,~~ be a subject of appropriate ageing management programme [11] and should~~ be replaced	Not favorable to the addition about the ageing management programme: items with a limited shelf-life should be stored in an adequate environment, checked and replaced as appropriate	Ok Text modified			
53.	Section 8 Repair and replacement		Suggestion: move the "remedial maintenance" part before the "general provisions" part or in section 2 with the part about the types of maintenance			X	Repair and replacement are the elements of remedial actions. We try to minimize changes to the structure of the original Guide.
54.	8.55 1st sentence	Before any system or component is returned to service after maintenance, tests should be performed to ensure that the objective of the maintenance has been achieved, that the required functions of the maintained system or component are maintained, that the	Suggestion about the objective of this post-maintenance testing	Ok Text modified			

		limits and conditions for normal operation associated with that system or component are satisfied, and that the plant can be operated safely.					
55.	9.12 after last bullet	- monitoring of the mechanical behaviour of the containment in operation and during tests by means of an instrumentation system (measuring overall deformation and displacement).	Addition/clarification: this instrumentation system is important to monitor the condition of the containment	Ok Text modified as:	The additional bullet has been included		
56.	9.18 6th bullet	fire and other hazards prevention, detection and fighting systems;	Suggestion, and also for consistency with quite similar bullet modified in 4.26	Yes "other hazards" included		X	
57.	Title before 9.38		If the title is modified from "functional tests" to "surveillance testing", which is OK, attention should be paid to modify accordingly similar wording (e.g. in 2.12, 7.12,…)			X	Functional tests are the elements of the surveillance testing programme.
58.	10.1.A 1st sentence	In-service inspection programmes should also focus on detecting all relevant defects, including manufacturing ones, ~~and other relevant defects~~ that can cause further cracks and flaws. Available tools and techniques should be used to identify, in a timely manner, crack initiation and pipe wall thinning.	Suggestion: ISI should be carried out in order to detect on time any defect, whatever its origin is	Ok Text modified as:	The para 10.1.A has been replaced by the para 10.2.A following comment from UK, which covers idea of France comment.		

59.	10.2 last sentence	In-service inspection programme should also identify and monitor all SSC whose failure could jeopardize the safe operation of the plant and where corrosion and erosion is prone to appear, with associated acceptance criteria.	Suggestion: the SSCs should be inspected according to their safety significance, based on a graded approach; see also 10.4	Ok Text modified			
60.	10.43 4th line	the flaws should be re-examined in a timely manner, e.g. in each of the next three inspection intervals,	Suggestion: the adjusted frequency for inspection depends on national requirements and codes If this suggestion is accepted 10.44 has to be modified accordingly	Ok Text modified…	… in accordance with the UK comment removing "next three inspection intervals"		
61.	10.45 Other sections	The documentation necessary for proper implementation of the in-service inspection programme should be readily available to the operating organization and the regulatory body, as required. This documentation should include, but is not limited to, the following items: - specifications and as-built drawings;	This information about "as-built" documentation is important and seems applicable to other MS&I activities: as such, it should be mentioned either in the generic sections or in sections 8 and 9			X	In Sections 8and 9 drawings are mentioned in general meaning (type of item). In para 10.43 the as-built drawings are critical for the selection of elements for the NDT testing.
62.	In all the guide		Not clear why the references to the regulatory body/authority have been deleted in most cases or kept only in a few ones			X	The regulatory Body is kept as exception in places where it is really necessary by the context of the statement.

COMMENTS BY REVIEWER Reviewer: ? Country/Organization: Germany/Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS) Date: 05.10.2018				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	2.7 Line 3	… Such goals should be commensurate comply with safety regulations and, where practicable, industry-wide operating experience should be taken into account.	Clarification	Ok Text modified			
2.	2.8 Line 2 Line 9	…. Such a monitoring program should at least be based on the following assumptions as a minimum - that redundant measurements of important parameters are carried out	Wording and clarification Please add this point, an important aspect for relevant safety parameters	Ok Text modified		X	For the objectives of condition monitoring focus is on the important parameters (not safety parameters) that are appropriate indicators for the condition/status of the SSCs.

3.	4.21 A.	Probabilistic safety assessment (PSA) methodology can be used to prioritize the MS&I related activities which have the greatest impact on risk and plant safety, provided under conditions if the PSA scope and quality are adequate. Or, alternative: …provided that the scope and quality of the PSA are adequate.	Clarification	Ok Text modified as:	"… provided that the scope and quality of the PSA are adequate."		
4.	4.22.	The elimination of plant defects should be tracked until their completion, and records should be kept of the performed work should be documented in detail performed. These documentation records should be accessible whenever needed for review.	Clarification	Ok Text modified			
5.	4.26	The factors to be taken into account in developing administrative controls and procedures applicable to MS&I should include, but are not limited to, the following: …. - documentation procedures …..	Please add this point. Documentation and adequate procedures for it are essentials.	Ok Text modified as:	The additional bullet "documentation procedures" is included		

6.	4.33. New	TRAINING AND QUALIFICATION OF PERSONNEL Developing of an “error-culture”: A positive culture of error deals with mistakes openly and without blame and uses them to further develop competencies, processes, rules etc. Experiences are thereby collected and analysed, which lead in the best case to the error prevention and performance increase.	Suggestion to add, perhaps as an aspect of 4.33 in combination with “safety-culture” or with a link to 5.19. In IAEA NS-G-2.14 “Conduct of Operations at Nuclear Power Plants” it is called “no-blame attitude”			X	Error prevention aspects (not error-culture) are adequately covered in the new version of the Guide (see paras.4.30, 5.19A, 5.19B, 5.19C, 5.19.D, ...) General Human performance management related aspects are presented in the relevant Safety Guides, SSG-3.1, 3.5and others.

7.	4.34	All personnel involved in MS&I should be given training in the operational radiation protection (e.g. ALARA principle) and in minimization of waste, radiation protection, safety rules, access control and emergency procedures, as appropriate to their duties, and should be adequately qualified in these areas before being allowed to work in controlled areas.	Please add this aspect of general radiation protection			X	The "operational radiation protection" is not used in the radiation protection terminology. The necessary information on the radiation protection aspects to be included in the training programme for MS&I personnel are covered under the para 4.34. More detailed information on the training on the radiation protection aspects for all NPP personnel is covered in the SG NS-G-2.8.

8.	8.30 Line 6	… not cleared for final storage disposal or issue.	Suggestion/ clarification			X	The meaning of “final storage” is clear and cannot be replaced by “disposal”.

COMMENTS BY REVIEWER Reviewer: ? Country/Organization: Japan/NRA Date: 09/10/2018				RESOLUTION			
No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	Para. 3.9C	Modify as follows; A formal system for evaluation of contractors performance should be established in support of an effective purchasing & contracting function of an operating organization on the basis of graded approach. Performance of all contractors should be evaluated and documented ~~on the basis of graded approach~~.	Evaluation system itself should be established on the basis of graded approach. Performance of contractors should be evaluated on the basis of contract specifications.	Ok Text modified			
2.	Para. 5.19C	Delete 1st sentence; ~~The graded approach should be applied to the use of human error prevention tools.~~ The tools should be used appropriately: the tasks in which they are used should be carefully selected and the tools should not be rigid but be scalable to avoid overdoing error reduction in simple tasks. When selecting human error prevention tools, the relationship between existing work practices and the practices implied by the tools should be addressed to promote the tools integration into, or adaption to existing work practices.	Selection of tool is not based on graded approach.			X	The error prevention tools should be selected based on the significance of planned work to safety.

3.	Para. 7.5B 1st bullet	Clarify “Work Request”.	“Work Request” is not defined in this document, in spite of proper noun.	Ok Text modified as:	The para 7.5 B has been modified in accordance with the comment from UK. “WORK REQUEST” was replaced by “work request” for clarity.		
4.	Para. 8.23A	Modify as follows; An appropriate qualification system should be established for ~~the use of~~ commercial grade items used in safety related systems and components. Thorough, engineering-based process should be implemented for review, testing, and dedication of commercial-grade items for suitability in safety related systems and components. The appropriate measures should be established to ensure that substandard items are not installed at nuclear power plant.	Use of commercial grade items not used in safety related systems and components is not always subject to qualification.	Ok Text modified			

COMMENTS BY REVIEWER Reviewer: KINS Country/Organization: Republic of Korea/Korea Institute of Nuclear Safety Date: Nov. 5, 2018				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	Page 66 Para 8.41	REPAIR AND REPLACEMENT **General provisions**	It would be too late when unacceptable state is	Ok	“In principle, components		

		In ~~general~~ principle, components should be repaired or replaced ~~if they have been assessed to be unacceptable for further service~~ if the planned maintenance activities determined prior to unacceptable degradation or equipment failure. (See also paragraph 2.3) . They should also be replaced ~~in the event~~ prior to of obsolescence.	found and assessed. Same as obsolescence. The concept of planned maintenance approach should be applied to Replacement of component in advance.	Text modified as:	should be repaired or replaced before an equipment becomes unacceptable for further service due to defects or obsolescence. Condition monitoring should help to reveal early symptoms of degradation (see para 2.3)".		
2.	Page 78 Para 9.35	**Verification of calibration and response times** 9.35. A calibration verification test is intended to check whether a known input to the instrument or channel gives the required output (analog, digital or bi-stable). In analog channels, linearity and hysteresis as well as drift should also be checked.	Drift should be check during calibration according to the figure 3 of SSG-39.	Ok Text modified	"as well as drift" is included in the text.		
3.	General	(New Item) Measuring and test equipment Tools, gages, instruments, and other measuring and test equipment used for activities affecting important to safety system shall be controlled, calibrated at specific	The test equipment is designed, installed and tested as an embedded facility in important to safety system. It is necessary to describe	Ok Text modified as:	Additional subsection "Measuring and test equipment" (paras 8.15.A and 8.15.B) is		

		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. 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	separately the Measuring and Test equipment to calibrate "Test equipment".		included before the subsection “Special equipment and tools” (para 8.16)		

COMMENTS BY REVIEWER Reviewer: D Davies, R Hadden, R Booler Country/Organization: UK, Office for Nuclear Regulations Date: 08 October 2018		RESOLUTION
Minor editorial comments:	1. It is recommended that this publication is thoroughly reviewed for quality and clarity. Examples: • “May” has been changed to “should” throughout. This is not always appropriate. Two examples are 8.9 and 8.10. • There are a number of words that are inappropriately split with a hyphen, e.g. 8.14 “expo- sure” should be one word “exposure”. This may be a legacy from a previous issue where words were broken up at a line change. • The word “entity” has been introduced in several places.	See paras Agree. Check before publication Agree. Check before publication

		Is this appropriate – should it be organization?					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	2.1	Insert after the first sentence- The purpose of maintenance should be to ensure that the design integrity of all SSCs important to nuclear safety is maintained.	NPPs SSCs design integrity is fundamental to nuclear safety.			X	The proposed statement sounds as the requirement and is more appropriate in the Requirements publication. This sentence gives no value for the guiding document.
2.	2.4	Suggest the following additional paragraphs or similar, in this section. Corrective maintenance should also include a means of identifying obsolescent components in SSCs together with implementation of appropriate measures for ensuring design integrity is not affected. Corrective maintenance activities frequently require the fitting of replacement components that have been procured. Therefore, to ensure replacement components are fit-for-purpose an appropriate procurement process should be established and should include all elements of the supply chain needed to procure the component.	As above for comment 1.			X	The replacement of defective items, including those to be replaced as a result of obsolescence is broadly discussed in the Section Repair and Replacement (paras 8.41-8.54). Design integrity matters in the repair and replacement processes are presented in other wording in the paras 8.41-8.44. The procurement matters in order to avoid that substandard items are not installed at nuclear power plant are presented in the

							Section Spare parts and Stores (paras 8.21-8.40).
3.	2.6 / 4	In addition to maintenance based on a time interval, the maintenance services should be carried out based on the SSCs' conditions and ability to perform their safety functions.	Clarifies that maintenance supports the safety case.	Ok Text modified			
4.	2.6 / 11	If a probabilistic safety assessment has been performed, its results should be considered for this purpose.	It may not be appropriate to use probabilistic safety assessment in all circumstances.	Ok Text modified			
5.	2.10 / 7	PSA methods should be considered to monitor the risk impact of changes ……..	Consistent with use of "should" throughout document.	Ok Text modified			
6.	2.12 A	Add to list: Changes in use and abnormal occurrences.	These should be identified and recorded to support interpretation of trends and decision making.			X	The meaning of this proposal is not clear.
7.	3.2 B / 6	Change ".. a high level of safety performance". To " .. the level of safety performance required by the safety case".	"High level" may not be appropriate for all SSCs. Maintenance should be linked to the safety case.			X	The Safety Guide is dealing with the equipment important to safety.
8.	3.3	It should thereby take into account operating experience from all applicable sources and should use this to inform and adjust M, S&I activities. Furthermore, it should contribute to industry-wide operating experience, where practicable.	To improve clarity on the role and importance of OPEX in M,S&I activities.			X	The role of operating experience in MS&I activities are broadly presented through the Safety Guide (see paras 2.7,2.10, 3.3, 3.11, 4.3, 4.21, 4.29, 9.21).
9.	3.8	Vendor staff and contractors should be subject to the same standards …	It would not be practicable to expect the whole	Ok			

		Alternatively, to be consistent with 3.9: Contractors and other personnel who are not permanent employees of the plant ..	vendor organization to change its ways. This should apply to vendor staff working at the plant only.	Text modified			
10.	3.9 A / 2	The contractors selected for specific safety related work should be required to provide documentary evidence that ~~they and~~ their staff have the appropriate training and qualification and the required certification	Requirement should apply to individuals not the organization.	Ok Text modified			
11.	3.9 B	Suppliers and contractors should adopt the same safety culture or equivalent as NPP personnel.	It is not a matter of simply comprehending the safety culture it should be applied.	Ok Text modified as:	"comprehend" is replaced by "adopt"		Safety culture equivalents sound unclear.
12.	3.9 D / 3	Staff of the operating organization required to supervise contractors or other temporary support staff should be clearly identified within the operating organization's management arrangements.	It is not clear how these staff should be identified. It could be by clothing signage.	Ok Text modified			
13.	3.11 / 4	A close relationship (e.g. a partnering approach) should be maintained between the operating organization ~~(partnering)~~ and the design or manufacturing organization throughout the plant's operating lifetime.	Clarity.	Ok Text modified			

14.	4.2 / 4	"… initiated ~~appropriately~~ early in the design phase".	Avoids two consecutive adverbs.	Ok Text modified			
15.	4.2 A / 4	Add: Alternatively, for plant that supports decommissioning activities (e.g. ventilation), MS&I requirements may increase.	Potential for MS&I to increase should be addressed.	Ok Text modified			
16.	4.6	Suitable organization arrangements and sufficient numbers of suitably qualified and experienced personnel should be available for the MS&I programme ….	Clarity. Staff should not just be qualified they must be experienced too.	Ok Text modified			
17.	4.9 A / 7	Operations personnel should be notified of the commencement of such work activities and informed about any changes that might occur.	Clarify which shift personnel this applies to. Personnel also need to know if the nature of the work changes.	Ok Text modified			
18.	4.9 B / 4	Enhanced levels of attention should be paid when such activities require the coordination and scheduling of work.	Clarity. Use of special does not have much meaning.	Ok Text modified			
19.	4.13 / 7	In each case~~, however,~~ the plant management should retain primary responsibility for implementing the MS&I programme	Consistency in use of "should".	Ok Text modified			
20.	4.21	Suggest inclusion of the following or similar prior to the existing sentence. In the planning and carrying out of M,S&I activities some form of assessment and monitoring of the risk from the activity should be	To improve clarity on the importance of understanding the impact on risk to nuclear safety from undertaking the M, S&I, either a single	Ok Text modified as:	The proposed sentence has been included at the beginning of para 4.21.A		

		implemented; this should include a means of showing the impact on risk from undertaking single and multiple activities	activity or the cumulative effect from undertaking several activities in parallel.				
21.	4.21 / A	Probabilistic safety assessment (PSA) methodology should be considered to prioritize the MS&I related activities	Consistency in use of "should".	Ok Text modified			
22.	4.26 / Bullet 7	Conventional (non-radiological) safety controls;	Clarity			X	IAEA terminology
23.	4.26 / Bullet 8	Internal and external hazard controls;	Adding "and other" is inappropriate. Examples (e.g. fire) can be added.	Ok Text modified as:	The text is modified as proposed, including fire as example.		
24.	4.26 / Bullet 20	Add: Team/shift handover	This is where errors are made.	Ok Text modified as:	The additional bullet is included		
25.	4.28	Temporary changes to procedures should be adequately controlled ….	"Properly" is hard to define.	Ok Text modified			
26.	4.36 / 3	Delete: "wherever possible".	Not necessary as "should" is sufficient.	Ok Text modified as:	"wherever possible" removed		
27.	5.1 / 4	If other documents (such as excerpts from vendor manuals, vendor instructions) are used to support MS&I procedures they should receive the same review and approval as normal MS&I procedures and become a part of	I would not expect vendor documents to be used in place of MS&I but they can be appropriate for detailed maintenance activities and therefore incorporated into the plant	Ok Text modified			

		plant documentation.	MS&I.				
28.	5.2 / 7	If persons outside the plant organization prepare procedures for MS&I routine activities, these procedures should be ~~adequately~~ reviewed by the operating organization for adequacy and submitted to the maintenance manager for approval.	It is not the review that should be adequate; it is the adequacy of the procedures that is important.	Ok Text modified			
29.	5.9(k)	Work should not proceed past this point until the inspection has been performed satisfactorily and documented.	The outcome of the inspection should determine whether it is acceptable to proceed further.	Ok Text modified			
30.	5.14 A / 5	The hazards associated with multiple MS&I activities on the same equipment or in close proximity should be accounted for.	Clarity.	Ok Text modified			
31.	5.15 / Bullet 4	Conventional (non-radiation) safety measures	See 4.28. Measures considered more appropriate.	Ok Text modified as:	"non-radiation safety measures".		"Non-radiation" is accepted IAEA terminology.
32.	5.15 / Bullet 7	Internal and external hazard control	See 4.28	Ok Text modified			
33.	5.15 A / 3	Change "operability" to "performance".	More appropriate word.	Ok Text modified			
34.	5.19 A	To achieve a high standard in the performance of MS&I activities the operating organization should establish a set of practical methods and techniques for anticipating, preventing, revealing and recovering	More appropriate words. In particular it is not clear what "catching" means – alternative wording offered by human factors colleague.	Ok Text modified			

		from human errors;					
35.	5.22 A / 2	Change “items” to “techniques”.	More appropriate word.	Ok Text modified			
36.	5.22 B / 6	Outage planning should be undertaken as far in advance as possible, …	More appropriate word. Planning is continuous process and therefore unlikely to be “completed” until just prior to the outage.	Ok Text modified			
37.	5.22 C / 6	State OLCs in full.	Abbreviation not explained.	Ok Text modified as:	Operational Limits and Conditions (OLC)		
38.	5.22 D	The risk assessment should cover in particular those activities that have a significant influence on the level of nuclear safety risks at the plant e.g. reactivity control, ….	Clarify that it is nuclear safety.	Ok Text modified			
39.	5.22 E	Probabilistic safety analysis (PSA) should be considered to support the risk assessment	Consistent use of “should”.	Ok Text modified			
40.	5.22 H / 5	Delete: “which enable optimization of outage duration”.	Superfluous statement and meaning not clear.	Ok Text modified			
41.	5.22 J / 4	After the safety review is completed (including independent assessment) the plant management should take the necessary actions to address the safety issues prior to the next outage.	Actions that are implemented are more important than decisions. To address safety, they should be implemented before the next outage.	Ok Text modified			
42.	5.22 J / 6	Delete last sentence.	It may not be appropriate to provide examples as these themselves can			X	The substantiation for the removal of examples is not

			become foreign material.				strong enough.
43.	5.22 M /10	The results of both inspections should be documented and attached to the work package. Photos and videos should be taken wherever practicable and recorded electronically.	Use of photos and videos should be encouraged. "Helpful" is not strong enough.	Ok Text modified			
44.	5.33 A / 1	To maintain and continually improve safety performance MS&I programmes should be periodically assessed.	Emphasis should be on improvement.	Ok Text modified			
45.	5.33 A / 4	At the organizational level it should be carried out by senior management. At the unit or work group level it should be carried out by other managers and individuals with more detailed knowledge of the plant systems.	Consistent use of "should". Needs explanation of why it is appropriate for "other" managers and individuals	Ok Text modified			
46.	6.1 / 3	Records and reports are necessary to provide objective evidence that the MS are in accordance with the management system.	Erroneous word.	Ok Text modified			
47.	6.1 /7	Change "corresponding" to "relevant"	More appropriate word.	Ok Text modified			
48.	6.9 A / 1	The results of failed surveillance tests should not be cancelled out by a successful retest.	Clarification.	Ok Text modified			
49.	6.13	In addition to the internal feedback of experience, lessons learned from other power plants and ~~the other~~ hazardous industries (e.g. aviation, rail~~road~~ and chemical ~~industry and other hazardous industries~~) should be considered important contributions to	Clarification	Ok Text modified			

		the further improvement of MS&I programmes.					
50.	7.5 A / 5	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.	Clarification and that ultimately it is what happens to the equipment that needs to be understood.	Ok Text modified			
51.	7.5 A / 7	Equipment qualification status should be preserved; maintenance, surveillance, conditions monitoring, component replaces prior expiring the qualified life are recommended methods.	The highlighted text is incomprehensible.	Ok Text modified as:	The text of the last sentence has been replaced by the following: "Equipment qualification status should be preserved using different administrative controls like installation and maintenance control, replacement control, modification control, service condition monitoring, etc. For more detailed information see Ref. [17].		
52.	7.5 B / All bullets	Needs to be reviewed.	Text in the document provided is confused.	Ok Text modified	The text of the para 7.5 B has been modified to		

				as:	avoid the existing confusion (see the modified text in the Guide revision.		
53.	7.8 / Bullet 1	identification of SSCs important to safety that are susceptible to degradation	Consistency.	Ok Text modified			
54.	8.4 / Bullet 6	opportunities for on-line maintenance based on deterministic and risk analysis considerations;	Offered as more appropriate word.	Ok Text modified			
55.	8.9	Specific maintenance facilities, located within the controlled area, should be provided for radioactive and contaminated plant. Dedicated tool stores should also be considered; their use should be controlled.	Clarity.	Ok Text modified			
56.	8.12 / Bullet 4	Additional bullet after 4: - Equipment for packaging and safe export of solid and liquid radioactive wastes.	Not addressed within existing bullets	Ok Text modified as:	The additional bullet is included		
57.	8.12 / Bullets 3&4	Change to - Handling and temporary storage of solid and liquid radioactive wastes - Treatment, packaging (as applicable) and dispatch of solid and liquid radioactive wastes for subsequent processing for disposal.	It is unlikely that wastes will be disposed of directly by the decontamination facility.	Ok Text modified as:	The bullet 4 modified as proposed		
58.	8.15 / Bullet 5	– training and qualification of personnel for specific work, and confirmation of work durations to manage worker exposure to	Ultimately this is done to minimise the dose workers receive.	Ok Text modified			

		radiation.					
59.	8.16 / Bullet 5	Add: shielded windows to list of examples.	Shielded windows are in common use.	Ok Text modified as:	"shielded windows' added to the list of examples".		
60.	8.16	Change "telescopic cradles" to "self-extending platforms".	Term "telescopic cradles" is not understood. Alternative offered.			X	"Telescopic cradle" is the maintenance equipment. Telescopic Cradle is battery operated telescopic boom projection out the main frame. It is used to access deep recesses in a building facade up to 4-metre from suspension centre.
61.	8.17 / 6	This will ensure that similar photographs or videos taken made …	"Tapes" are old technology (electronic media).	Ok Text modified			
62.	8.19/ 1	Plant management should provide suitable permanent and mobile lifting and handling facilities of adequate lifting capacity.	Not all lifting equipment is mobile. Preference is that it is permanent. Adequate capacity is more important. Need for clear indication of lifting capacity should be addressed by legislation and therefore not necessary for this guide.	Ok Partly Text modified as:	"of adequate lifting capacity" is inserted. Permanent lifting equipment is envisaged by the design.		
63.	8.23	Review highlighted text: The maintenance entity should be responsible for identifying adequate	Intent unclear. Unable to offer alternative words. Use "parts" for	Ok Text modified	The first sentence is modified as		

		spare parts and components, tools and resources for achieving its objectives are available. It should also be responsible for establishing stock levels and authorizing the issue and use of spare parts and components.	consistency with previous sentence.	as:	following: "The maintenance group should be responsible for identifying of adequate spare parts and components, tools and resources for the maintenance needs are available". The second sentence is modified as proposed.		
64.	8.24	New clause proposed: Personnel engaged in the procurement of MS&I items should be alert to items that may be substandard or provided with fraudulent certification. Appropriate training should be provided for procurement personnel to assure that they are trained to identify items which may be of substandard quality or may be supplied with fraudulent certification.	This should be addressed at the procurement stage not just on receipt of the goods. Based on 8.31 A	Ok Text modified as:	The additional para 8.29 A has been included: "Personnel engaged in the procurement of MS&I items should be alert to items that may be substandard or provided with fraudulent certification. Appropriate training should be provided for procurement personnel to		

					assure that they are trained to identify items which may be of substandard quality or may be supplied with fraudulent certification.		
65.	8.24 / 3	These spares should, as a minimum, meet the same technical standards and quality assurance requirements as the ~~equivalent~~ installed plant items. Additional provisions should be provided for ensuring adequate protection during long term storage and ensure that the items remain suitable for use	Ultimately the need is to ensure that they remain suitable and are not affected by storage.	Ok Text modified			
66.	8.25 / Bullet 6	– the shelf-life of the component or consumable.	Consumables such as welding rods, lubricants and sealants should be included.	Ok Text modified			
67.	8.40 / 4	Review: The operating organization should ensure the maintenance of items under storage and the updating of inventory under storage.	Meaning is unclear. Does this relate to record keeping for item that has been released from store and subsequently returned?	Ok Text modified as:	The last sentence has been replaced. The additional sentence has been added to the para.8.33 to address the maintenance of the items under storage.		
68.	9.9 / 1	In preparing and reviewing the	Clarify who “it” is.	Ok			

		surveillance programme, the operating organization should ensure that, whenever ….		Text modified			
69.	9.21 / Bullet 4	Suggest reinstatement of "of failure rates gained from maintenance or from experience in the plant or in similar plants" or an additional bullet point.	This is an informative indicator of performance. Items should be replaced or maintained before failure.	Ok Text modified as:	The deletion has been reinstated		
70.	10.1 A	Review highlighted text: In-service inspection programmes should focus on ~~detecting~~ monitoring manufacturing and other relevant defects that can propagate and cause further cracks and flaws. Available tools and techniques should be used to identify, in a timely manner, crack initiation and pipe wall thinning.	Purpose of this is unclear as manufacturing defects should have been detected and identified at the time. Unclear why pipe wall thinning is appropriate here.	Ok Text modified as:	The para has been modified in accordance with the comment 82 (below). 10.1.A has been replaced by 10.2.A		
71.	10.2	The in-service inspection programme should also identify and monitor all SSCs susceptible to corrosion and erosion. Limits should be set for acceptable levels of corrosion and erosion.	Clarity.	Ok Text modified			
72.	10.3 A	The operating organization should ensure that the in-service inspection programme is risk-informed. Itr should be focused on inspecting areas with highest risk significance and develop an inspection strategy which is commensurate with the risk significance.	It should be more than considering risk informed inspection. This has distinct benefits.			X	Not all Member States accept and implement the risk informed approach, despite of the evident benefits of such approach. So, this sentence with "consider" encourages power plants to move to the

							risk informed direction.
73.	10.8 / 9	The intervals for evenly distributed inspections should may be shorter in the early years of the plant's operating lifetime and then lengthened as experience permits. Whichever programme is adopted, however, the results of inspections should may necessitate a shortening of the intervals towards the end of the plant's operating lifetime when SSC degradation may have a greater impact on plant reliability.	Clarity and explanation why intervals may need to be shortened as the plant gets older.	Ok Text modified			
74.	10.18	A surface examination should be made to confirm the presence of or to delineate surface or near-surface flaws. It should be conducted by magnetic particle, liquid penetrant, eddy current or electrical contact methods.	Removes overuse of "method".	Ok Text modified	Extra words removed		
75.	General		The word 'may' has been replaced throughout by 'should' which give the impression that some activities are mandatory. This may not be appropriate in many cases.			X	"Should" and "may" carry different meanings. "Should" is used when recommendation is given, while "may" keeps the meaning of one of alternative options or approaches.
76.	2.9A		The list of condition monitoring techniques appears too specific and			X	The list of condition monitoring has been included in response

			does not appear to be aligned with the rest of the document.				to the DPP 497 to extend the predictive maintenance item.
77.	2.10A		A similar paragraph should be included in the section on ISI. The basis of risk-informed ISI should not be to reduce cost at the expense of safety.	Ok Text modified as:	Additional sentence is included in the para 2.15: If risk-informed approach is used for the In-service inspection it should be ensured that such an approach in no way leads to a reduction in the level of safety.		
78.	2.14 sentence #2	These data are normally collected in the pre-service inspection carried out in the final condition before the start of plant operation…	Removes 'during manufacture' to avoid confusing the PSI with manufacturing NDT.	Ok Text modified	"during manufacture" removed		
79.	4.33 (a)	Surveillance and in-service inspection should be conducted in accordance with sufficiently detailed prescribed instructions….	Remove the ambiguity regarding the standardization of the training. This seems to be an unnecessary level of detail.		Text improved as proposed		
80.	5.14.B	Waivers or deferrals of scheduled MS&I activities should be minimized and, where appropriate, within the intervals defined by the appropriate code.	To bring the guidance in line with the codes.			X	Justification and technical review are enough. Sometimes PSA methods can be used for justification of such

							exemptions. (sometimes they are beyond the requirements of technical specifications).
81.	5.22H to 5.22N	Reduce the content and make more general.	The FME requirements are too detailed and read like a procedure.			X	DPP 497 requires to cover the outage management. 7 paragraphs in the document Requirements for operation (NS-G-2.2) are dedicated to the outage management. To cover all these requirements adequate amount of information was needed in the Safety Guide.
82.	10.1A	Move to after par 10.2. In addition to in-service inspection being targeted at defects initiating during operation, programmes should also consider manufacturing and other relevant defects that can cause further cracks and flaws or grow during service.	Clarification for new section.	Ok Text modified as:	The new para 10.2.A inserted instead of para 10.1.A.		
83.	10.3A	In some circumstances it may be appropriate to apply risk-informed measures to ensure that ISI includes areas of high risk. Care must be	Paragraph rewrite. ONR has significant reservations over the application of risk-			X	The text is written with sufficient care using the word “consider”, not

		taken when applying risk informed measures to ensure that uncertainties in the plant construction and operation are fully considered. It may be appropriate that risk-informed ISI is used to supplement an existing deterministic approach based on a code.	informed ISI. There is a significant amount of OPEX showing that major plant defects have been found by 'accident' and would not have been detected during any RI-ISI. In general, plant operators do not have sufficient knowledge of their plant to apply RI=-ISI with confidence.				strong "implement". To cover the risk informed approaches is recommendation by DPP 497. See also comment 72. It is even more stronger than in the current version.
84.	10.8 Last sentence	Whichever programme is adopted, it may be appropriate to shorten inspection intervals based upon the results of inspections or operational experience.	Clarity and remove the presumed mandatory requirement from the use of the word should.	Ok Text modified as:	The text of the last sentence has been modified in accordance of comment 73		
85.	10.11a	Pressure and leakage testing is used to assure the leak tightness of pressure retaining SSCs during manufacture and operation. Such testing should be applied carefully so as not to cause damage to SSC.	Introduction needed.	Ok Text modified as:	The proposed text is added to the para 10.11		
86.	10.11	Pressure retaining systems and components should be subject to: (a) A system leakage and hydrostatic pressure test as part of the pre-service inspection. (b) A system leakage test before resuming operation after a reactor outage in the course of which the leak tightness of the reactor coolant pressure boundary may have been affected.	Bullet C refers to a full overpressure (proof) test which ONR judges the risk of damage overrides the benefit.	Ok Text modified as:	The bullet (c) has been modified to: "Where appropriate, a system hydrostatic pressure test at or near the end of each major inspection		

		(c) Where appropriate, a system hydrostatic pressure test at or near the end of each major inspection interval, may be applied.			interval, may be applied".		
87.	10.25	The details and scope of any qualification process, in terms of required inspection area(s), method(s) of non-destructive testing, defects being sought and required effectiveness of inspection, should be defined in a technical specification. Account should be taken of the safety significance of each particular case and of relevant national and international experience. This technical specification for the inspection to be qualified should be agreed upon before any qualification process is started and should form part of the documentation of the qualification process.	Remove agreement with regulatory body to be more generally applicable.	Ok Text modified.			
88.	10.28	Any qualification process should be carried out according to written qualification protocols which clearly define the administrative interfaces and the types (unrestricted, restricted, confidential), paths and timing of the information to be exchanged between all parties involved pursuant to the qualification process.	Remove the listing of the parties involved to make it more generally applicable.	Ok Text modified			
89.	10.29	Written qualification procedures should be produced and specify the method for qualifying the inspection procedure, equipment and personnel.	Much of the detail has been removed. The existing document describes the approach	Ok Text modified	Para 10.29 has been modified using more general		

			defined in the IAEA methodology for the ISI of VVERs and is not sufficiently general. Some of the terminology is also specific to ASME XI, App VIII		information.		
90.	10.31	Suggest removal of this paragraph	This is too prescriptive, licensees/operators consider renewal in different ways.	Ok Partly	Partially accepted. The "indefinitely" has been removed from the text.		
91.	10.33	For each successful candidate, the qualification body should issue, separately from the inspection organization, a personnel certificate that is supplementary to the national certificate. The validity of a personnel certificate should be limited in time.	Changed complementary to supplementary. Removed detail regarding the revoking of certificates. The examples given are too limited and this is treated differently around the world.	Ok Partly	Partially accepted by modification of the text.		
92.	10.40	Suggest removal	Appears to be too prescriptive and refers to a specific scheme	Ok Text modified	Para removed		The paras 10-40-10.43 are from the Safety Series No.50-SG-O2 In Service Inspection for Nuclear Power Plants (1980).
93.	10.41	Suggest removal	Appears to be too prescriptive and refers to a specific scheme	Ok Text modified	Para removed		
94.	10.42	Suggest removal	Appears to be too prescriptive and refers to a specific scheme	Ok Text modified	Para removed		
95.	10.43	Whenever examination of a component results in the evaluation of flaw indications but qualifies the component as acceptable for continued operation, that portion of	Remove the reference to three inspection intervals – too prescriptive.	Ok Text modified	Removed "in each of the next three inspection intervals".		

		the component containing the flaws should be re-examined for an appropriate number of successive intervals, as an extra recommendation over and above the schedule of the original programme.					
96.	10.44	Remove	The paragraph is too prescriptive and redundant.	Ok Text modified as:	Modified to exclude “three inspection intervals”.		
97.	10.45 1st sentence	The documentation necessary for implementation of the in-service inspection programme should be readily available to the operating organization and the regulatory body, as required.	Remove the word ‘proper’	Ok Text modified			

COMMENTS BY REVIEWER Reviewer: ? Country/Organization: United States of America/NRC Date: 10-11-2018				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text/comments	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	General	Comment 7 in NS-G-2.2 above also applies to NS-G-2.3 through NS-G-2.8, namely, that these guides cite references and documents that were revised and published several years ago. The updated versions should be referenced.	Completeness and update.	Agree	This action will be implemented at the end of the process of revision (before publication)		
2.	NS-G-2.6 Para 4.29.A Pg. 43	Item (k): “Measurement, assessment and continuous improvement reasonably practicable improvement.”	Distinguish between the practicable, Vs unending, improvement			X	The continuous improvement is referenced in SSR-2/2, GSR

			processes, within resource constraints.				Part 2 and other IAEA publications. Its application on processes is the base for the enhancement of safety culture and nuclear safety.