

NUSSC comments on:
Equipment Qualification for Nuclear Installations (DS514)

	A	B	C	D	E	F	G	H	I	J
	MS No.	MS	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
1	1	Egypt	1	4	This Safety Guide additionally provides recommendations on the qualification of items important to safety at different types of nuclear installations	Replace other by different	x			
2	1	UK	1	9	Remove 'reliable', 'reliably' in terms of demonstrating equipment performance. 1.11, 1.14, 4.20	Implies the need to consider reliability data which is not normally a requirement for EQ.			x	The word 'reliable' does not necessarily mean the number; it is associated with the fact that if the item is not qualified (when it should be) it might introduce potential failure modes to the system that would challenge its ability to reliably perform its safety function, or increase the potential for spurious operation. Para 4.20 - is related to severe accident conditions for which rigorous qualification is not possible.
3	1	USA	1	9	Add as a second sentence to paragraph 1.9: The identification of items important to safety within the scope of this Safety Guide should be consistent with the definition and requirements of "important to safety" consistent with the rules and guidance within each member state's regulatory framework.	DS514 should specify that its equipment qualification provisions should be implemented consistent with the applicable regulatory provisions because the term "important to safety" may have different definitions established by various regulatory authorities.			x	We understand that the term "important to safety" has a different meaning, however this safety guide uses the IAEA terminology. The safety guides are generally not mandatory in Member States. The application of IAEA safety guides is provided in the preamble of each IAEA safety standard.
4	1	FI	1	10	Add a new para: Demonstration of the suitability and correctness of functions performed by the items important to safety is part of the qualification process. However, this Safety Guide does not fully specify all the methods and processes related to qualification of the functions performed by the items, especially for the I&C equipment. Details concerning the qualification of the functions performed by the items important to safety are found in related Safety Guides e.g. SGG-39 for I&C equipment.	The Safety Guide is focused on environmental qualification in harsh environment. Demonstration of correct functionality of equipment (especially for I&C) requires typically other tests and V&V activities in addition to the type tests in harsh environments. New text is proposed to suggest the need for complementary processes, which can be found from respective Guides.	x	Verification and validation of software is part of the equipment qualification process. However, this Safety Guide does not specify software verification and validation methods and processes in detail. Such detail is provided in Ref. [12].		
5	2	USA	1	10	Add the following sentence to the beginning of this paragraph: Equipment qualification demonstrates the capability of items important to safety to perform their safety functions based on applicable functional, seismic, environmental, and electromagnetic interference parameters, over their full range from normal operating conditions up to and including design-basis conditions.	DS514 should specify the scope of equipment qualification. Paragraph 1.10 indicates that DS514 does not include seismic qualification methods or processes in detail.	x			
6	3	USA	1	12	Items important to safety in the scope include electrical, instrumentation and controls, electromechanical, mechanical equipment with non-metallic parts and interfaces associated with this equipment.	The qualification is limited to the mentioned equipment (mechanical equipment that have non-metallic parts subject to aging)	x			
7	4	USA	1	13	Items important to safety which that requires safety function is to be demonstrated according to applicable codes (e.g. piping, structures and passive mechanical-metallic components) are outside the scope of this Safety Guide.	Passive components with gaskets, O Rings etc., are susceptible to degradations that could cause reactor coolant systems to leak	x			
8	5	USA	1	13	Insert the word "Non-active" before "Items" at the beginning of this sentence.	Paragraph 1.13 should be clarified to indicate that all items whose safety function is demonstrated according to codes are not outside the scope of this Safety Guide. For example, safety relief valves are within the scope of this Safety Guide, and are certified in accordance with the ASME Boiler and Pressure Vessel Code.	x			
9	6	USA	1	13	Remove structures from paragraph 1.13 or 2.19.	Paragraph 1.13 states that items important to safety function is demonstrated according to applicable codes (e.g. piping, structures and passive mechanical components) are outside the scope of this Safety Guide; however, paragraph 2.19 seems to indicate structures are part of this Safety Guide scope.	x			
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1	1	ENISS	1	16	Please clarify scope. For example, The recommendations of this publication relating to qualification of items important to safety is applied to facilities other than nuclear reactors in accordance with a graded approach.	Provide more information on the scope of application of this safety guide. It is not clear what types and sizes of "nuclear installations" are covered by these guidelines. For example, does the publication apply to facilities for storage of nuclear spent nuclear fuel and final repository? If applied to installations other than nuclear reactors then it is applicable that the recommendations relating to qualification of items important to safety is applied in accordance with a graded approach.	x	The entire para has been deleted.		
11	2	Korea	1	16	The recommendations of this Safety Guide apply to qualification of items important to safety for new and existing nuclear installations.	Delete unnecessary words & add the sentence for clarity	x	Deleted entire para.		
12	2	FI	1	17	This Safety Guide is intended for use by entities responsible for aspects of qualification of items important to safety for nuclear installations. <u>The document can be applied also for the qualification of equipment for disposal facilities.</u> This publication also provides guidance for regulatory authorities to support their licensing and inspection activities related to qualification	Please consider including disposal facilities. The disposal facilities of various types are under construction and qualification of equipment is needed.			x	Qualification of items important to safety applies to nuclear installations as defined in SSR 2/1, SSR 2/2, SSR-3 and SSR-4.
13	2	ENISS	1	19	The Annex provides an example list of international nuclear and industrial standards that can be used for qualification of items important to safety...	The provided list is an example of international nuclear and industrial standards. Other international standards than the ones listed in the Annex can be used for qualification of items important to safety.	x	Para 1.19 has been modified according to US comment 7.		
14	7	USA	1	19	Add the following sentence to the end of this paragraph: International nuclear and industrial standards are typically reviewed by their applicable regulatory bodies that specify conditions for their implementation.	DS514 should indicate that international nuclear and industrial standards may have conditions for their use specified by the applicable regulatory body.	x			
15	3	FI	2	0	Please add reference to SSR-2/1 in line with para. 1.2. There is Req. 30 and three paragraphs below it in SSR-2/1				x	Requirement 30 does not fit here, it refers to qualification programme. Moreover, there are inconsistencies on equipment qualification between Requirements 13 of SSR 2/2 and 30 of SSR 2/1.
16	4	FI	2	0	Please add reference from GSR Part 4 1 in line with para. 1.2. para. 4.21 and 4.28 deal with equipment qualification.				x	Paras 4.21 and 4.28 of GSR Part4 refer to Assessment of safety functions and engineering aspects part of which is equipment qualification. However, Section 2 of DS514 provides guidance on qualification process and concept.
17	8	USA	2	3	Insert the word "full" prior to "range" in this sentence.	DS514 should indicate that the qualification should include the full range of service conditions from normal operations to accident conditions.	x			
18	3	ENISS	2	4	Please clarify	Please be more specific about what synergistic effects involves.			x	synergistic effect = that produces an effect greater than the sum of their individual effect.
19	9	USA	2	5	Qualification of items important to safety is a necessary condition for prevention of some types of potential common cause failures caused	Test in the simulated environment is to confirm endurance under accident environment after operational aging	x			
20	5	FI	2	7	Within the context of qualification When planning and implementing the qualification of items important to safety, items important to safety s they should be considered as a structured assembly of one or more interconnected components or assembly, each with dedicated functionality and specified interfaces to perform or contribute to one or more safety functions.	Please clarify and simplify the sentence.	x	Revised along with USA#5.		
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1	10	USA	2	7	items important to safety should be considered as a structured-an integrated assembly	Better explanation on the combination of subcomponents	x			
22	11	USA	2	8	Add the following to the end of this sentence: "and its application."	DS514 should indicate that not only the item to be qualified needs to be representative of the item that will be installed, but also its application in the nuclear installation (such as functional and operating requirements) needs to be addressed.	x			
23	2	Egypt	2	11	The qualification should address all factors affecting the suitability of systems and components for intended safety functions. This include a suitability of systems or components for performing the safety functions under the effects caused by service conditions during all plant states and events not excluded by the design	all is added before plant states to strength the sentence and include all plant states	x	The events not excluded by desing are: seismic, internal flooding, electromagnetic phenomena, arcing, lighthning)		Several examples provided
24	6	FI	2	11	The qualification should address all factors affecting the suitability of systems and components for intended safety functions. This include a suitability of systems or components for performing the safety functions under the effects caused by service conditions during plant states and events not excluded by the plant design. For example, internal fires, explosions, tornadoes or hurricanes are not considered in the qualification since designs generally protect the items from these events.	Please clarify: events not excluded from plant design? or what design	x	The events not excluded by desing are: seismic, internal flooding, electromagnetic phenomena, arcing, lighthning)		Several examples provided
25	1	Japan	2	11	The qualification should address all factors affecting the suitability of systems and components for intended safety functions. This include a suitability of systems or components for performing the safety functions under the effects caused by service conditions during plant states and events not excluded by the design. For example, internal fires, explosions, tornadoes or hurricanes are not considered in the qualification since designs generally protect the items from these events.	Clarification for "not excluded by the design". It may be understanding that the conditions for "excluded by the design" are related to surrounding SSCs or something. In addition, clarification for "generally". These safety related systems or components should not be subject to qualification, but it should be certified that these items are adequately designed against events.				
26	1	IEC	2	15	Recommend the following rewrite: "The qualification process needs to establish a qualified life of items important to safety that are subject to significant ageing degradation mechanisms and expected to function such as within a harsh environment. Such mechanisms can degrade the functional capabilities of items to perform required safety functions during anticipated service conditions. The potential failure mechanisms that produce the failure modes can be identified through a systematic failure modes and effects analysis (FMEA) of the equipment."	Additional information is need to provide clarity to the user. Reading Para 2.15 alone the reader may believe a qualified life is only required if the equipment is located in a harsh environment.			x	Qualified life is set for items that subject to significant ageing degradation mechanisms or expected to function within the harsh environmen.
27	2	Japan	2	15	The qualification process should establish the qualified life of items important to safety that are subject to significant ageing degradation mechanisms or expected to function <u>even</u> within the harsh environment. Such mechanisms can degrade to ensure the functional capabilities of items to perform required safety functions <u>would not be degraded</u> during anticipated service conditions.	Better wording for highlighting qualified life being strictly established	x	Please see modifications to this para according to USA comment 12.		
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1	12	USA	2	15	<p>Qualified life definition is needed: Qualified life period for which an equipment has been demonstrated, through testing, analysis and/or experience, to be capable of functioning within acceptance criteria during specific operating conditions while retaining the ability to perform its safety functions in accident condition and/or earthquake as applicable</p> <p>The qualification process should establish the qualified life of items important to safety that are subject to significant ageing degradation mechanisms or and expected to function within the harsh environment. Such mechanisms can degrade the functional capabilities of items to perform required safety functions during anticipated service conditions</p>	<p>Qualified life is generally not seen for seismic only. It is in combination with EQ</p> <p>Qualified life requirement is limited to safety equipment located in harsh environment. The clause 2.17 does not limit it to harsh environment but requires it if ageing degradation applies.</p> <p>If Qualified Life is needed outside of harsh environment it is a huge undertaking and involves a lot of testing. This will be a new requirement.</p>	x	However, definition of qualified life is included in the IAEA Safety Glossary.		
29	13	USA	2	16	Parameters and any modelling of anticipated in-service ageing-degradation environmental conditions used to establish the qualified life should be specified	Aging degradation is the consequence and that is tested using simulated harsh environmental conditions			x	The definition of qualified life is provide in nuclear safety glossary; we do not repeat definitions in the safety guides unless these definitions differ from those in the glossary.
30	7	FI	2	17	A qualified life may not be required for items located in a mild environment for all operational states and which have no significant ageing degradation mechanisms.	<p>In Finnish Guides, the lifetime of the equipment should be defined, despite the environmental conditions of the installation location.</p> <p>Change is proposed which allows to define the qualified life, even for equipment in mild environment.</p>			x	desing (service) and qualified life are different. We do not establish e.g. by testing a qualified life for mild environment. But the manufacturer may provide information on a desing (service) life of the equipment under certain environmental conditions (e.g. temperature for cables in mild environment do not exceed 90C), the service life is 40 years).
31	3	Japan	2	17	A qualified life is not required for items located in a mild environment for all operational states and which has no <u>judged not to have</u> significant ageing degradation mechanisms.	It would be important who judges whether some items have significant ageing degradation mechanisms.	x	Para modified according to USA comment 14.		
32	2	UK	2	17	also 4.8, 4.9. Add "unless the items are important to safety" to read as "A qualified life is not required for items located in a mild environment for all operational states, and which has no significant ageing degradation mechanisms, unless the items are important to safety.	To align with paragraphs 4.8 and 4.9 since it is currently written to indicate that items in a mild environment do not need to be qualified.		Para modified along with US comment 8.	x	In general, the qualified life for equipment in mild environment is not required unless significant ageing degradation...
33	14	USA	2	17	Modify paragraph: The requirements for identifying a qualified life are required for equipment in harsh environments, and which have significant aging degradation mechanisms. These components are considered non-serviceable after the beginning of a design basis event. Items in a mild environment not subject to significant aging degradation mechanisms are typically serviceable and therefore regular compliance to the design specification requirements and adherence to the maintenance program is considered adequate.	<p>The strict requirements of qualified life is required only for equipment in harsh environment only because these components are considered non-serviceable after the beginning of a design basis event. The equipment in the mild environment are serviceable and therefore complaisance to the design specification and adherence to the maintenance program is considered adequate.</p> <p>Other critical equipment that can lead to plant unavailability (cause plant trips, power runback etc.) could also be qualified for higher performance requirements but not as much as the rigor needed for EQ</p>	x	2.17.A qualified life is required for equipment in harsh environments, and which have significant aging degradation mechanisms. These components are considered non-serviceable after the beginning of a design basis accident. 2.17.a Items in a mild environment not subject to significant aging degradation mechanisms are typically serviceable and therefore regular compliance to the design specification requirements and adherence to the maintenance program is considered adequate.		
34	4	Japan	2	18	The qualified life of an item established in initial qualification may not be required to cover the entire lifetime of the nuclear installation. <u>These items should be clearly described in maintenance program.</u>	Clarification for better management of relevant items.	x	Para modified according to USA comment 15.		
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1	15	USA	2	18	2.18. The qualified life of an item established in initial qualification may not be required to cover the entire lifetime of the nuclear installation. Replace with the following: An item important to safety that is located in the harsh environment should be maintained within its qualified life while installed in service or in while in storage prior to installation. The qualified life of the item may not be required to cover the lifetime of the nuclear installation, as it may need to be periodically replaced.	Rather than relating to lifetime of nuclear plants, it is better to address the required qualified life for equipment in service or planned to be put into service.	x			
36	16	USA	2	19	2.19. Appropriate qualification methods should be applied in accordance with the plant specific application and the design bases environment for different equipment important to safety types, such as:	Reactor internal and other metallic parts should be outside the scope of this document.	x			
37	17	USA	2	21	Insert the following after the first sentence of paragraph 2.21: The specific methods of qualification for any particular type of item may include the application of more than one method of qualification (for example seismic, environmental, and periodic functional testing.)	The qualification methods listed in paragraph 2.21 might not be appropriate for each instance of qualification. For example, functional qualification of power-operated valves cannot be accomplished by analysis alone but requires testing or a test-based methodology.	x			
38	2	IEC	2	23	Order of Para 2.23 and 2.24 need to be changed. The Contents of Para 2.24 needs to come before the contents of Para 2.23.	Order of Para 2.23 and 2.24 need to be changed. The Contents of Para 2.24 needs to come before the contents of Para 2.23.	x			
39	3	IEC	2	23	Need to update 2.23. A review of qualified status can occur for multiple reasons. Changes in service conditions is just one of the reasons. A few of the other reasons why a review of the qualified status review is performed are: equipment design or installation changes, licensing basis of the nuclear power plant, parts changes, component material changes, component failures, uncontrolled maintenance, life extension review.	A review of qualified status can occur for multiple reasons. Changes in service conditions is just one of the reasons.	x	Other reasons added as a new para 2.24.a		
40	1	DE	2	24	The qualified life of items important to safety should be reassessed during the lifetime of the nuclear installation, <u>taking into account new knowledge and understanding of degradation mechanisms and the operating environment of the item.</u>	This is explained in more detail in 5.8. This statement raises the question under which conditions a reassessment is necessary. In-stead it could also re-ferred to chapter 5.			x	Details on reassessment of a qualified life is provided in paras5.49-5.55.
41	8	FI	2	24	The qualified life of items important to safety should be periodically reassessed during the lifetime of the nuclear installation.	Clarification	x			
42	18	USA	2	24	2.24. The qualified life of items important to safety should be reassessed periodically during the lifetime of the nuclear installation	Plant service conditions could change from climatic conditions, HVAC failures, small steam breaks/ maintenance, etc.,	x			
43	19	USA	2	25	At the end of the sentence in paragraph 2.25, add the following: "where justified and documented."	Extensions of the qualified life may be considered but must be justified and documented.	x			
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1	4	IEC	2	26	The reader needs to first understand the role quality assurance plays in the equipment qualification process first in this paragraph. Quality assurance for equipment being qualified includes a variety of elements of a program such as equipment design, production, qualification (test, analysis, combined test and analysis and experience (including similarity)), installation, plant surveillance and maintenance, periodic testing and documentation. The paragraphs that follow Para 2.26 mainly address type testing and needs to address the other elements of a quality assurance program for equipment qualification.	The reader needs to first understand the role quality assurance play in equipment qualification before identification of any elements associated with equipment qualification.	x	Included as a new para 2.26.		
45	9	FI	2	30	All non-conformities and deviations identified during the qualification activities should be corrected justified and documented.	Missing comma?	x			
46	5	IEC	2	31	Before addressing any specific type of documentation all the different types of equipment qualification documentation need to be identified. There are a variety of equipment qualification documentation types (including files) that need to be addressed then included in paragraphs that follow such as: qualification specification / plan, qualification analysis and test procedures, qualification analysis and test reports, qualification analysis and test data, qualification summary report, plant specific equipment qualification files (equipment qualification reports, environmental, seismic and electromagnetic compatibility (EMC) evaluations, qualified life evaluations, plant field testing and analytical evaluations, equipment modifications and changeouts, and surveillance / maintenance records.	Before addressing any specific type of documentation all the different types of equipment qualification documentation need to be identified.	x	Included as a new para 2.31.		
47	20	USA	2	32	2.32. The qualification status of items should be properly documented and maintained in an auditable form while the item is in service or in storage for installation throughout the lifetime of the nuclear installation	(historic record retention may different – 5 to 10 yrs) Important requirement is verify qualification while in service	x			
48	10	FI	2	33	The items initial qualification status should be documented in a preliminary suitability assessment report. Further qualification steps of the items should be described in the qualification programme.	Proposed modification suggests to plan the required qualification steps and processes in the actual qualification programme, instead of the suitability assessment	x			
49	21	USA	2	34	Insert “functional qualification and aging through functional cycling” after “seismic qualification” within the parenthetical phrase.	DS514 should indicate that test specifications should be prepared for functional qualification.	x			
50	22	USA	2	34	Modify Para 2.34 to read: 2.34. Test specifications or analysis reports should be prepared for each type of qualification (i.e. electromagnetic, chemical components, chemical composition analysis, compatibility, environmental qualification, seismic qualification). For example, non-destructive chemical composition of certain components could be of paramount importance to its safety functions and safety margins.	Specification or analysis report frequently contain chemical component analysis of items used in nuclear installations.	x			
51	11	FI	2	37	The qualification summary report should be the basis for the suitability analysis if needed. A suitability analysis documents the basis for concluding that the qualified item is now suitable for the range of intended safety functions to be implemented in the nuclear installation. at its location of use at a nuclear facility.	Propose modification to highlight that conclusion of the suitability of the item is related to the location of use and the environmental conditions at that location.	x	See USA comment 14.		
52	24	USA	2	37	Modify second sentence: “A suitability analysis documents the basis for concluding that the qualified item is now suitable for the plant-specific application and safety functions to be implemented.”	A plant specific, and physical location specific analysis is needed for establishing the qualified life for the specific application. It better to be done for each application than general range because of difference in qualified life based on normal conditions	x			
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1	25	USA	2	37	Modify paragraph 2.37 to describe the content, purpose, and appropriate use of the qualification summary report.	A plant specific, and physical location specific analysis is needed for establishing the qualified life for the specific application. It better to be done for each application than general range because of difference in qualified life based on normal conditions	x			
54	1	SWE	2	39	The personnel involved in qualification activities should be trained to possess adequate skills, knowledge and attitude and should be included in the equipment qualification programme.	To connect to safety culture on all levels. This is particularly relevant when qualifying personnel, but may be relevant also when qualifying the method and, in particular, in assessing interfaces (which are deservedly addressed) when qualifying equipment - this is to ensure that user interfaces are also included in the qualification, where necessary. [eg connects to 3.4 NS-G-2.8 Recruitment, Qualification and Training of Personnel for Nuclear Power Plants]	x			
55	6	IEC	3	0	An introductory paragraph needs to be added to introduce the reader to the main sub-section of "Design Inputs" and why.	An introductory paragraph needs to be added to introduce the reader as to the main sub-section of "Design Inputs" and why.	x	Addressed by USA comment 15.		
56	26	USA	3	1	3.1. Before the qualification begins, it is necessary to establish- Qualification program begins with establishing the range of conditions and events under which the items important to safety should be qualified. To establish this, every design basis event for the nuclear installation should be identified and its effects on the items important to safety should be quantified.	Better structure	x			
57	7	IEC	3	3	Process conditions needs be added as an example of normal operating conditions. The sentence needs to read: "...and radiofrequency interference (RFI), process conditions (e.g., voltage, current, temperature, pressure), and fluid conditions) ...	Process conditions such as voltage, current, temperature and pressure need to be included.	x			
58	3	Korea	3	3	The set of anticipated service conditions should include normal operating conditions (e.g. resulting from mechanical conditions, electrical conditions, electromagnetic interference (EMI) and radiofrequency interference (RFI) , and fluid conditions) and environmental conditions resulting from plant states, internal and external events.	Electromagnetic interference includes radiofrequency interference. It has been described under 3.19	x			
59	23	USA	3	3	Insert "including differential pressure, temperature, flow, fluid parameters, and chemical content" following "fluid conditions" within the parenthetical phrase.	DS514 should indicate the fluid conditions that are applicable to the qualification of the functional capability of active mechanical equipment.	x			
60	27	USA	3	7	The set of anticipated service conditions should bound normal operational states, accident conditions, internal and external events, as applicable.		x			
61	5	Japan	3	8	Differences between these anticipated service conditions and actual conditions can be addressed through additional qualification of the items additional measures.	Clarification for 'additional qualification'. The example given in this text is additional measures.			x	This para explicitly requires 'Additional qualification' for different service conditions.
62	8	IEC	3	11	Spray (water and chemical) are additional environmental conditions that need to be included in a harsh environmental qualification program. Add to "Humidity/steam" "spray (water or chemical)	Spray (water and chemical) are additional environmental conditions that need to be included in a harsh environmental qualification program.	x			
63	9	IEC	3	11	Electromagnetic compatibility (EMC) is a relevant environmental condition that needs to be addressed for as a minimum I&C equipment. Add Electromagnetic compatibility (EMC) to the list of relevant environmental conditions.	Electromagnetic compatibility (EMC) is a relevant environmental condition that needs to be addressed for as a minimum I&C equipment.	x			
64	28	USA	3	11	3.11. Relevant environmental conditions typically include: Boric Acid (Other applicable chemical) spray	PWRs have Boric acid spray	x			
65	3	Egypt	3	12	Submergence are repeated in section 3.11 environmental conditions and 3.12 operating conditions. Are is O. K. ?		x	Yes submergence can be in both categories.		
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67	10	IEC	3	12	Change "Operating cycles" to "Operating cycles (electrical and mechanical) to better define the cycling that needs to be addressed.	Change "Operating cycles" to "Operating cycles (electrical and mechanical) to better define the cycling that needs to be addressed.	x			
68	11	IEC	3	12	"Chemical" and "loads" need to be separated into two different lines. Recommend changing "Chemical" to "Chemical composition". Also change "Loads" to "Loads and Duty cycles".	The wording "Chemical loads" adds confusion since it has not been defined.	x			
69	12	IEC	3	12	The following two operating conditions need to be added to the list since they commonly used in equipment qualification programs: - Self-heating - Self-induced vibration	The following two operating conditions need to be added to the list since they commonly used in equipment qualification programs: - Self-heating - Self-induced vibration	x			
70	29	USA	3	12	Mechanical loads (e.g. self-induced/flow induced vibration, thrust or torque, stress, displacement); -Seasonal & Climatic variations		x			
71	12	FI	3	17	Evaluation of the performance of items important to safety for operational states generally involves demonstrating the item's functional capability when experiencing a combination of service condition extremes (e.g. maximum operating temperature, full load horsepower, rated current capacity).	Full load horsepower - full power	x			
72	30	USA	3	17	Delete the parenthetical examples, or provide a more detailed list of examples of service conditions applicable to various items to be qualified.	The examples for service condition extremes in paragraph 3.17 are not applicable for functional qualification of power-operated valves. For example, motor-operated valves need to be capable of performing their safety functions under degraded voltage conditions (not full load horsepower specified in the examples).	x			
73	13	FI	3	20	Acronyms EMI/RFI not specified (may be electromagnetic interference and radiofrequency interference)	Please define the acronyms.	x			
74	6	Japan	3	20	Detailed requirements and acceptance <u>criteria</u> for EMI/RFI qualification should be determined for safety systems and components in accordance with international standards or alternatively on the basis of individual system requirements.	Missing a word.	x			
75	2	DE	3	23	The postulated initiating events resulting in harsh environment conditions include loss of coolant accidents or high energy line breaks. These conditions are characterized by the simultaneous changes or increases of temperature, pressure, humidity, radiation, submergence, or process or environmental chemical composition.	Clarification Meaning of process not clear from context	x	Modified according to USA comment 31.		
76	13	IEC	3	23	Spray (water and chemical) are additional environmental conditions that need to be included in a harsh environmental qualification program. Add after "submergence" "spray (water or chemical).	Spray (water and chemical) are additional environmental conditions that need to be included in a harsh environmental qualification program.	x			
77	7	Japan	3	23	The postulated initiating events resulting in harsh environment conditions include loss of coolant accidents, or high energy line breaks, <u>or main steam line breaks</u> .	To keep a consistency with para. 4.10.	x	Modified according to USA comment 31.		
78	31	USA	3	23	Modify second sentence: "These conditions are characterized by changes or increases of temperature, pressure, humidity, radiation, environmental submergence, (etc.) or by changes in process fluid conditions or chemical composition."	The conditions for a harsh environment involve changes in various plant parameters, but the changes do not need to be simultaneous when they occur. In addition, the paragraph should indicate potential changes in fluid conditions in response to postulated accidents.	x			
79	14	IEC	3	25	Other postulated initiating event need to be considered even if they are less severe than a loss of coolant accident. These smaller events may happen multiple times over the life time of the equipment and contribute to the ageing of the equipment. Correct the sentence to so state.	Other postulated initiating event need to be considered even if they are less severe than a loss of coolant accident. These smaller events may happen multiple times over the life time of the equipment and contribute to the ageing of the equipment.	x	See comment resolution to USA 4.25.		

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	A	B	C	D	E	F	G	H	I	J
	MS No.	MS	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
1	15	IEC	3	28	Fire (flame) testing of cable as part of the equipment qualification test sequence is not a required. But fire flame testing of cable for cabling in nuclear power plant is required and documented included in the plant equipment qualification files. Update 3.28 to so state.	Fire (flame) testing of cable as part of the equipment qualification test sequence is not a required. But fire flame testing of cable for cabling in nuclear power plant is required and documented included in the plant equipment qualification files.	x	Added: However, the cable fire flame testing for cabling in nuclear installation is required and documented the equipment qualification files.		
80	32	USA	3	28	3.28 should be clarified if it is suggesting that other IAEA guidance addresses determining the qualified life of cables and is therefore not captured under DS514."	clarification	x	3.28.Fire testing of cables for flame self-extinguishing capabilities has been included in certain standards providing guidance on the relative fire resistance of various cable constructions. Therefore, demonstrating cable performance under postulated fire conditions in the nuclear installation is not required as part of the qualification.		
81	3	DE	3	29	Guidance on protection or qualification of items important to safety against internal and external events such as fire, and flooding and seismic events that the installation is required to withstand is provided in other IAEA safety standards and therefore excluded from this Safety Guide. <u>Guidance on qualification of items important to safety against seismic events is provided in other IAEA safety standards. (see 3.32.)</u>	clarification	x	Accepted 1st part of the sentence. Seismic qualification is addressed in para 3.32.		
82	16	IEC	3	29	"Seismic event" should not be excluded from this Safety Guide. Seismic events occur throughout the world and it is important that equipment important to safety be design to withstand such event at the plant location it is installed. Equipment important to safety must be capable of performing their required functions throughout its qualified life. Equipment important to safety must be demonstrated to be able to perform its safety function(s) after being exposed to ageing stressors and design basis accident events such as loss of coolant accidents and seismic events.	"Seismic event" should not be excluded from this Safety Guide. Seismic events occur throughout the world and it is important that equipment important to safety be design to withstand such event at the plant location it is installed. Equipment important to safety must be capable of performing their required functions throughout its qualified life. Equipment important to safety must be demonstrated to be able to perform its safety function(s) after being exposed to ageing stressors and design basis accident events such as loss of coolant accidents and seismic events.			x	Sesmic event is included in the qualification process of this safety guide, however qualification practices are included in different safety guide. See para 1.10.
83	17	IEC	3	34	This document needs to define that equipment safety functions can be active or passive. Please identify so here.	This document needs to define that equipment safety functions can be active or passive. Please identify so here.	x			
84	33	USA	3	35	Modify paragraph 3.35: "The process of specifying those events includes an evaluation of the events and accidents. This is usually achieved by modelling to determine the ambient effects of the conditions resulting from the event at the location of items important to safety."	Minor correction	x			
85	8	Japan	3	38	Performance requirements and service conditions should be quantified and documented as ranges of parameters valid throughout applicable operational states, accident conditions, <u>internal</u> and external events.	To keep a consistency with para. 2.3. Para.2.3. describes, 'The qualification should demonstrate that the item important to safety will be capable of performing its intended safety function(s) under the range of anticipated service conditions of the nuclear installation (operational states and accident conditions), internal and external events.' In para. 3.38 and later, internal (events) are excluded from similar descriptions. Similar descriptions are para.3.41, 3.46/bullet #2, 3.47 and 4.6. Why is the term 'internal events' excluded in these paragraphs? These paragraphs should be described in a uniform manner.	x			
86	14	FI	3	44	– Mechanical and , electrical, process and I&C interfaces of the equipment;	Clarification	x			
87	18	IEC	3	45	Seismic and EMC are also requirements for qualification derived safety design as a minimum. Change the last entry to include seismic and EMC qualification. Recommend the entry to read as follows: ☐"Requirements of environmental, seismic, and EMC qualification based on applicable regulatory codes and standards."	Seismic and EMC are also requirements for qualification derived safety design as a minimum. Change the last entry to include seismic and EMC qualification. Recommend the entry to read as follows: ☐"Requirements of environmental, seismic, and EMC qualification based on applicable regulatory codes and standards"	x			
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	MS No.	MS	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
1	19	IEC	3	47	This section needs also include seismic and EMC since they are design accident conditions and operational conditions, respectively.	This section needs also include seismic and EMC since they are design accident conditions and operational conditions, respectively.	x	It has been included.		
89	20	IEC	3	47	Include the following changes to "Induced vibration parameters" since they have been left out and used in qualification programs: "Induced vibration parameters (characterized by spectra of excitation, response spectra of displacement or acceleration, time history of displacement or acceleration, power spectrum density;"	Include the following changes to "Induced vibration parameters" since they have been left out and used in qualification programs: "Induced vibration parameters (characterized by spectra of excitation, response spectra of displacement or acceleration, time history of displacement or acceleration, power spectrum density;"	x			
90	21	IEC	3	47	Editorial change. Need to bullet and indent "- Mechanical system parameters"	Editorial change. Need to bullet and indent "- Mechanical system parameters"	x			
91	22	IEC	3	47	Need to include the design and accident conditions for EMC conditions and seismic conditions, respectively.	Missing the design and accident conditions for EMC conditions and seismic conditions, respectively.	x	Although this is already included in the title of 3.47 Environmental and operational conditions during operational states, accident conditions and external events...		
92	34	USA	3	47	Radiation parameters (characterized by radiation energy, type of radiation, fluence, total integrated dose, and dose rate for operational ageing and accident doses)	Minor clarification	x			
93	35	USA	3	47	Insert "differential pressure across valves" as another example in the parenthetical phrase for the "Fluid condition" item of the list.	In addition to temperature, flow, and chemical composition, paragraph 3.47 should specify differential pressure of the fluid as a qualification condition.	x			
94	36	USA	3	47	Include "type and size of valve" instead of just type of valve	DS514 should indicate these considerations for the qualification of power-operated valves.	x			
95	3	UK	4	0	Should include text addressing Commercial of the Shelf (COTS)/ Commercial Grade Items (CGI).	Refer to Section 8.5 of EPRI's Nuclear Power Plant Equipment Qualification Reference Manual (2010.1021067) which is readily available on the internet and is recognised as valuable reference material			x	This safety guide applies to any plant equipment (items important to safety) that is subject to qualification. We do not exclude COTS from the scope.
96	16	FI	4	1	4.1. Qualification of items important to safety should be based on a selection of one or more combination of the following methods:	Propose clarification, use "combination" or "selection" instead of "one or more". Next paragraphs suggest a combination of methods, which is more realistic approach to qualification (utilizing only one method is usually not enough to qualify an item)	x	4.1. Qualification of items important to safety should be based on a selection of one or more of the following methods. This is consistent with para 6.82 of SSG-39.		
97	17	FI	4	1	— Evaluation of the design and manufacturing process.	Propose adding evaluation of design process (to comply with other paragraphs of this Guide e.g. 2.6)	x			
98	23	IEC	4	1	This sentence as written is not correct. Some of the items listed below are not qualification methods but necessary quality assurance/control items during the manufacturing of important to safety items.	This sentence as written is not correct. Some of the items listed below are not qualification methods but necessary quality assurance/control items during the manufacturing of important to safety items.			x	This para is taken from SSG-39.
99					Recommend the following rewrite: "Qualification of items important to safety need to consider the following design, manufacturing, and qualification methods as applicable to verify acceptability of its safety functions during the qualification process:"					

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1	37	USA	4	2	Add the following sentence to the end of the paragraph: In addition, the qualification for some types of items important to safety (such as functional qualification of power-operated valves) should be based on testing or test-based analysis	Operating and testing experience has revealed that qualification by analysis alone is not adequate for the functional qualification of power-operated valves in nuclear power plants.	x			
100	15	FI	4	3	New para: Results of the qualification processes should be evaluated in the qualification summary report.	In the Chapter 5 (Maintaining Qualification), and in Documentation part a qualification summary report is mentioned. Propose to repeat this in the relevant chapter of the guide.			x	Paras 2.35 - 2.37 on qualification documentation are valid for the entire document.
101	38	USA	4	3	The method or combination of methods, theories, analysis and assumptions used for equipment qualification should be justified. Type testing is the preferred method	Minor clarification	x			
102	18	FI	4	4		Consider adding references to relevant Safety Guides (if any) at the end of the paragraph.			x	Discussion how to determine environmental parameters is provided in paras 3.1 to 3.26. We do not prescribe which safety guide can be used; determination of anticipated service conditions should be done by the plant specific analysis that are performed according to national standards and requirements.
103	24	IEC	4	5	"Mild condition" is not defined and it is assumed to be "mild environment". Recommend changing "mild condition" to "mild environment." If "mild environment is correct then per Section 4.8 a mild environment is defined as: "...at no time be significantly more severe than the environment that would occur during operational states. If this is the case then for important to safety equipment in a "mild environment" needs to also include stressors other than HVAC (temperature, humidity, moisture) environmental conditions items such as: operational cycling, self-heating, self-vibration, mechanical vibration, radiation, and other conditions as applicable. If "mild condition" is correct, then I recommend deleting Para 4.5 because it is misleading	"Mild condition" is not defined and it is assumed to be "mild environment". Recommend changing "mild condition" to "mild environment." If "mild environment is correct then per Section 4.8 a mild environment is defined as: "...at no time be significantly more severe than the environment that would occur during operational states. If this is the case then for important to safety equipment in a "mild environment" needs to also include other than HVAC (temperature, humidity, moisture) environmental conditions items such as: operational cycling, self-heating, self-vibration, mechanical vibration, radiation, and other conditions as applicable. If "mild condition" is correct, then I recommend deleting Para 4.5 because it is misleading	x	conditions replaced by environment.		
104	39	USA	4	5	Revise the first sentence of paragraph 4.5 to read as follows: "The qualification parameters for items important to safety located in areas which are less severe than harsh conditions should be derived..."	The term "mild" in this sentence should be avoided because of its different interpretation by various stakeholders.	x			
105	40	USA	4	8	Insert the following sentence at the end of this paragraph: It should be recognized that while mild environment areas are defined as those areas where the environmental conditions do not significantly change during accident conditions, those "mild" areas may be subject to severe environmental conditions for which the items in those areas need to be capable of performing their safety functions.	DS514 should alert readers that "mild" areas may involve severe environmental conditions.	x			
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1	19	FI	4	9	4.9 New: Supplementary qualification processes should be used if the qualification status of the items it not acceptable (based on existing performance specifications or certifications).	<p>The section describing qualification for mild environment describes that essentially no testing or other methods of qualification are needed, and the qualification is always successful based on existing information of the item.</p> <p>This may not be possible in all cases, and some supplementary tests or analysis may be necessary to conclude that the item is suitable e.g. EMC or stringent requirements for minimum permissible operating voltage typically require additional testing or analysis.</p> <p>Propose adding a paragraph stating that supplementary methods may be necessary.</p>			x	Para 4.9. provides conditions under which the item can be considered qualified for mild environment. If it is not acceptable, other methods should be used.
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108	25	IEC	4	9	Also 4.12: It is important to identify any significant ageing mechanisms in a mild and harsh environment and address them prior to performing a seismic event. Recommend adding the following to the list of bullets: - Performance of a failure modes effect analysis (FMEA) to identify any significant ageing mechanisms that would impact the installed life of the equipment.	It is important to identify any significant ageing mechanisms in a mild and harsh environment and address them prior to performing a seismic event. Recommend adding the following to the list of bullets: - Performance of a failure modes effect analysis (FMEA) to identify any significant ageing mechanisms that would impact the installed life of the equipment.			x	In the IAEA guidance, we do not use FMEA to identify significant ageing mechanism. Please, see SSG-48 for details.
109	41	USA	4	12	Insert "valve friction coefficient increases, or valve actuator output degradation" as additional examples of performance degradation to be addressed during qualification.	DS514 should provide examples of degradation of active mechanical equipment, such as valve and actuator degradation, that should be considered during qualification.	x			
110	42	USA	4	13	Revise the second sentence of this paragraph as follows: The individual components which have a qualified life that is shorter than the expected in-service requirements should be replaced at predetermined intervals consistent with their qualified life.	If a component is in service longer than its qualified life, then it should be replaced.	x			
111	26	IEC	4	17	This statement is misleading to the reader since it has not been demonstrated. Qualified items may or may not have the capability to maintain their intended safety functions for time required under server accident conditions. Recommend changing the sentence to the following: "Qualified items need to have the capability to maintain their intended safety functions for time required under server accident conditions as appropriate for the mission time."	This statement is misleading to the reader since it has not been demonstrated. Qualified items may or may not have the capability to maintain their intended safety functions for time required under server accident conditions. Recommend changing the sentence to the following: "Qualified items need to have the capability to maintain their intended safety functions for time required under server accident conditions as appropriate for the mission time."	x	qualified items <u>may</u> have the capability...		
112	27	IEC	4	20	Recommend adding to the end of the paragraph the following additional sentence the following: In the evaluation of severe accident conditions consideration needs be given in discovering additional margin by the reducing ageing effects in the existing qualification program as a result of the location specific operating conditions and shorting of qualified life for the item.	Recommend adding to the end of the paragraph the following additional sentence the following: In the evaluation of severe accident conditions consideration needs be given in discovering additional margin by the reducing ageing effects in the existing qualification program as a result of the location specific operating conditions and shorting of qualified life for the item.			x	We just want to say that that "capability of the item to perform reliably under the severe accident conditions should be assessed".
113	28	IEC	4	21	Recommend adding to the list of bullets the following factors that need to be also considered when performing an assessment for severe accident program: - Mission time - Severe Accident conditions and environmental profiles - Safety functions during a severe accident - Installed life and qualified life -Location specific service conditions	Recommend adding to the list of bullets the following factors that need to be also considered when performing an assessment for severe accident program: - Mission time - Severe Accident conditions and environmental profiles - Safety functions during a severe accident - Installed life and qualified life - Location specific service conditions	x	Added: —Mission time; —Safety functions during a severe accident; —Specific service conditions at installed locations (e.g. severe accident environmental profiles);		
114	9	Japan	4	22	Type testing should be used as far as possible to support the prediction of behaviour of the item under simulated severe accident loads.	There are cases where it is not practical way to simulate the environment condition as accident conditions or where the reliability	x			

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1	10	Japan	4	23	IAEA-TECDOC-1818, Assessment of Equipment Capability to Perform Reliably under Severe Accident Conditions Ref-[18] provides information regarding.....	To help readers understanding.			x	This is Agency style guide.
115	4	DE	4	25	ASSESSMENT OF BASIC QUALIFICATION STATUS To assess the initial basic qualification status, the following information is necessary: ...	From the paragraph below this heading it seems that the term "basic qualification" is more appropriate. In 4.27. it is stated that "If the preliminary suitability assessment reveals deficiencies between the available documented qualification status..." This means that this is not an initial qualification status as there are already documents available.			x	We believe that 'initial' is more appropriate than the 'basic'.
116	29	IEC	4	25	To assess the initial qualification status the following additional information is required and needs added to the list provided: -Qualification criteria -Regulatory and industry requirements and notifications associated with the item -Installation and maintenance requirements for the item	To assess the initial qualification status the following additional information is required and needs added to the list provided: - Qualification criteria - Regulatory and industry requirements and notifications associated with the item - Installation and maintenance requirements for the item	x			
117	30	IEC	4	26	Preliminary suitability assessment includes "resistance to adverse environmental conditions". Does this entry include ageing effects under all anticipated service conditions? As written, it is unclear and therefore please update.	Preliminary suitability assessment includes "resistance to adverse environmental conditions". Does this entry include ageing effects under all anticipated service conditions? As written, it is unclear and therefore please update.	x			
118	11	Japan	4	26	The preliminary suitability assessment should consider at minimum functional characteristics, resistance to adverse environmental conditions, and other aspects, such as electrical safety performance, conformity with respective product standards, and requirements for testability and maintainability.	It is necessary to add the standard contents of the 'preliminary suitability assessment report' as other documents (e.g. 'equipment specification' (para.3.44) and 'requirement specification' (para. 3.46)) are specified its standard content to include proper descriptions.	x	Clarified according to IEC comment 30.		
119	20	FI	4	27	4.27. If the preliminary suitability assessment reveals deficiencies between the available documented qualification status and the design requirements for given service conditions, supplemental qualification steps are needed. The selection of supplemental qualification steps should be described and justified in the qualification programme.	Propose clarification that the qualification steps for items should be described and planned in the qualification programme			x	This is too prescriptive; it is on a Member State to decide where it should be documented.
120	43	USA	4	28	Qualification by type testing refers to a test or a series of tests demonstrating that the items important to safety meet or exceed the performance requirements with suitable margin under the anticipated service conditions.	Minor clarification	x			
121	31	IEC	4	29	The test sequence needs to be the most conservative for the item under test. The following change is recommended: "... the sequence in which these tests are conducted needs to be justified as the one that is most conservative for the item and simulates the degradation due to ageing during service life followed by exposure to the accident condition."	The test sequence needs to be the most conservative for the item under test. The following change is recommended: "... the sequence in which these tests are conducted needs to be justified as the one that is most conservative for the item and simulates the degradation due to ageing during service life followed by exposure to the accident condition."	x	replaced appropriately by conservatively.		
122	44	USA	4	29	If it is necessary to test separately for different environmental parameters (e.g. separate tests for radiation effects and temperature effects), the sequence in which these tests are conducted should be justified as one that most conservatively appropriately simulating the degradation due to ageing effects during service life followed by exposure to the accident conditions. Synergistic effects of multiple parameters, such as application of appropriate radiation dose rates and temperatures, should be accounted for when preparing the test plan. Note: The specimen used for operational aging, seismic test and LOCA shall be the same sample	Minor clarification	x	Note is covered in 4.37.		
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	MS No.	MS	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
1	32	IEC	4	30	Qualification results for an item need to demonstrate the safety function(s) under anticipated service conditions. Recommend updating sentence as follows: "...demonstrate that the item meets the performance requirements and associated safety function(s) under anticipated service conditions."	Qualification results for an item need to demonstrate the safety function(s) under anticipated service conditions. Recommend updating sentence as follows: "...demonstrate that the item meets the performance requirements and associated safety function(s) under anticipated service conditions."	x			
124	5	DE	4	34	The basis of quality assurance to be applied (e.g.);	What is meant with "basis of quality assurance"? Are these qualification documentation? A clarification with examples would be helpful.	x	deleted 'basis'.		
125	33	IEC	4	34	The following inputs required for a test specification are not presently in the list provided and need to be added: -Scope of activities covered by the qualification -Applicable regulatory codes and standards -Physical description of the item -Special requirements based on the test method of qualification	The following inputs required for a test specification are not presently in the list provided and need to be added: -Scope of activities covered by the qualification -Applicable regulatory codes and standards -Physical description of the item -Special requirements based on the test method of qualification	x			
126	45	USA	4	34	Add to the test specification list: - Internal dimensions of critical parts that might impact functional performance of the item (such as internal clearances and edge radii of valves)	Functional performance of valves under high differential-pressure and flow conditions can be impacted by the clearances and edge radii of the internal parts.	x			
127	46	USA	4	34	Add to the test specification list: - The test parameters to be monitored with diagnostic equipment and required accuracy. - A description of the required test parameters to be monitored, the required diagnostic equipment, and the required accuracy.	Qualification of pumps and valves requires test parameters to be monitored with appropriate diagnostic equipment.	x			
128	47	USA	4	35	Add the following sentence to the end of the paragraph: For example, the functional qualification of valves needs to include the pressure, temperature, differential pressure, flow, and other fluid conditions of the valve design	Fluid conditions are significant for the qualification of valve designs.	x			
129	34	IEC	4	36	The first bullet needs to be update to address the components within the important to safety item since it is not being addressed in other bullets. Recommend the following update to the sentence: "Components within items important to safety and their safety function(s) to be demonstrated throughout the tests;" The following addition bullets need also be added: -Test conditions and margins to be applied -Quality Assurance (QA) requirements -Test data collection and monitoring requirements -Test visual inspection and hold points.	The first bullet needs to be update to address the components within the important to safety item since it is not being addressed in other bullets. Recommend the following update to the sentence: "Components within items important to safety and their safety function(s) to be demonstrated throughout the tests;" The following addition bullets need also be added: - Test conditions and margins to be applied - Quality Assurance (QA) requirements - Test data collection and monitoring requirements - Test visual inspection and hold points.	x	Test data collection is already included.		
130	48	USA	4	36	The test specifications should include the following design and performance requirements: - Normal operating condition of the equipment (energized / de-energized	correction	x			
131	49	USA	4	36	Insert "data recording and test equipment accuracy, diagnostic data for valve operating requirements and valve actuator output" to the list of parenthetical examples of test acceptance criteria.	DS514 should specify diagnostic data for acceptance criteria in addition to opening and closing times.	x			
132	50	USA	4	38	The test specimen description should provide sufficiently detailed information to ensure the unambiguous association assignment-of the specimen to the type or type series of the item in accordance with the design specification.	correction	x			
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1	12	Japan	4	44	4.44. Functional tests should be used to demonstrate the ability of items to perform the required safety functions. <u>The safety function may also be demonstrated by using indirect tests methods. For example, testing of a construction material (e.g. gasket compression set) using functional related acceptance criteria may apply to this test category.</u> 4.46. The safety function should also be demonstrated by using indirect tests methods. For example, testing of a construction material (e.g. gasket compression set) using functional related acceptance criteria may apply to this test category.	Para. 4.44. states: "Functional tests should be used to demonstrate the ability of items to perform the required safety functions." The 'indirect tests methods' discribed in para. 4.46 seems to be alternatives. This is easy to understand the meanings if para. 4.46 is deleted and moved it after para 4.44, and 'should' in para. 4.46 is modified with 'may'.			x	We prefer to keep para 4.46. as it is with modification accroding to USA comment 51.
134	51	USA	4	44	Add the following to the end of the sentence: "over the full range of their operating and accident conditions."	DS514 should specify that qualification should cover the full range of conditions for the items to be qualified.	x			
135	21	FI	4	45	" 4.45. While the complete qualification process should cover all of the required safety functions, a single functional test may be used to simulate only a portion of the required safety function. Other Safety Guides specify more detailed methods and processes related to qualification of the functions performed by the items, e.g. SGG-39 for the I&C equipment.	Propose adding explanatory note regarding additional effort needed to fully qualify the functionality of the items.			x	This para is related to demonstration of safety function sduring type test. SSG-39 do not provide more information on that subject.
136	52	USA	4	46	Change "should" to "may" in the first sentence of this paragraph.	D5514 should indicate that indirect test methods may (rather than should) be used.	x			
137	53	USA	4	46	The safety function should also be demonstrated by using indirect tests methods. For example, testing of a construction environmental seal material (e.g. gasket compression set) using functional related acceptance criteria may apply to this test category if it can demonstrate capability to withstand design bases events.	correction	x	accepeted 1st part of the sentence. Type testing referen to desing basis accidents, it is already mentioned before.		
138	54	USA	4	48	If needed, other specific parameters (e.g. salt spray, boric acid/ steam spray , dust) should also be considered.	Clarification	x			
139	55	USA	4	50	Significant ageing effects should be simulated during the qualification. Ageing of items expected during operational states (energized, loaded, etc.), should be simulated by accelerated ageing (e.g. radiation, humidity, thermal) to determine the qualified life of the item.	Thermal aging is for acceleration of degradation in limited time. Radiation, humidity etc., are for causing the integrated degradation testing	x			
140	56	USA	4	51	The sequence of equipment ageing should consider sequential, simultaneous, and synergistic effects to simulate the most representative state of ageing degradation.	Clarification	x			
141	35	IEC	4	52	This entry needs also to address energizing of the item during thermal aging. Energizing of the item may require the accelerated ageing temperature be reduced in order that the item remains within acceptable operational limits specified by the manufacturer.	This entry needs also to address energizing of the item during thermal aging. Energizing of the item may require the accelerated ageing temperature be reduced in order that the item remains within acceptable operational limits specified by the manufacturer.	x	See comment resolution to USA 4.50.		
142	57	USA	4	52	Thermal ageing effects should be simulated by exposing equipment samples to higher temperatures for a specified duration (accelerated thermal ageing) The rate of thermal aging acceleration should be documented and justified (One year to reflect aging for 40 years etc.,)	Clarification	x	but without specifying number of years.		
143	58	USA	4	56	Title: Accelerated radiation ageing	Radiation aging effects are simulated by subjecting the specimen to total integrated dosage of radiation. Acceleration of time is accomplished only through thermal aging	x			
144	59	USA	4	56	Total integrated dose during operational states and accident condition doses should be simulated.		x			
145	60	USA	4	57	Applied dose rate should be high enough to simulate the expected total integrated dose, but low enough to cause homogeneous changes snd prevent the effects caused by oxidation and gaseous diffusion	Clarification	x			
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1	61	USA	4	62	Seismic effects should be simulated on pre-aged operationally aged samples prior to accident testing, if required.	Qualified life assessment includes withstanding design bases seismic withstand capability,	x			
147	36	IEC	4	68	This entry needs also to address energizing of the item during thermal aging. Energizing of the item may require the accelerated ageing temperature be reduced in order that the item remains within acceptable operational limits specified by the manufacturer.	This entry needs also to address energizing of the item during thermal aging. Energizing of the item may require the accelerated ageing temperature be reduced in order that the item remains within acceptable operational limits specified by the manufacturer.	x	Already addressed in 4.50.		
148	62	USA	4	75	Insert the following new sections below Paragraph 4.75: Extrapolation of Qualification 4.XX Extrapolation of the qualification of an item important to safety to another size or a different application of the same item should be justified. 4.XX Extrapolation of a qualified design of a pump or valve should be justified by testing and analysis	DS514 should include guidance for the qualification of the functional performance of active mechanical equipment. These additional paragraphs summarize guidance for use in type testing of active mechanical equipment for functional qualification.	x			
149	63	USA	4	76	Add the following sentence to the end of the paragraph: However, qualification by analysis alone might not be appropriate for certain items without supplemental qualification testing to support the qualification.	Qualification by analysis alone for the functional qualification of power-operated valves has been demonstrated to be inadequate by operating and testing experience.	x			
150	37	IEC	4	78	The following two additional entries need be added under "QUALIFICATION BY ANALYSIS". 4.78A. Qualification by analysis alone is only recommended for analysis of the structural capability of the item (not functionality). 478B. Qualification by similarity analysis may be used to demonstrate that an item is qualified based on a similar item which has been qualified to equivalent or more stringent conditions.	The following two additional entries need be added under "QUALIFICATION BY ANALYSIS". 4.78A. Qualification by analysis alone is only recommended for analysis of the structural capability of the item (not functionality). 478B. Qualification by similarity analysis may be used to demonstrate that an item is qualified based on a similar item which has been qualified to equivalent or more stringent conditions.	x			
151	13	Japan	4	78	The validity of the mathematical models used for qualification might-should be justified on the basis of experimental data, test data or operating experience.	Verification and validation are essential practices for qualification by analysis.	x	Please, see modifications to this section according to IEC comment 37 and USA comments 64 and 65 to Para 4.78		
152	64	USA	4	79	Add the following sentence to the end of the paragraph: However, qualification by operating experience alone might not be appropriate for certain items without supplemental qualification testing to support the qualification.	Qualification by operating experience alone for the functional qualification of power-operated valves has been demonstrated to be inadequate without supplemental testing.	x			
153	65	USA	4	79	Insert the following new sections below Paragraph 4.79: Demonstration of Production Items 4.XX The functional performance of production items from a qualified design should be justified. 4.XX Demonstration of the performance of production pumps and valves from a qualified design should be justified by testing and analysis.	DS514 should include guidance for the qualification of the functional performance of active mechanical equipment. These additional paragraphs summarize guidance for use in type testing of active mechanical equipment for functional qualification.	x			
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	A	B	C	D	E	F	G	H	I	J
	MS No.	MS	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
1	22	FI	4	80	4.80. Qualification by operating experience alone should be limited to items that perform safety functions in mild environment where similarity of the item to previously qualified items can be justified.	SGG-39 Paragraph 6.86. prevents qualification based on operating experience alone for safety systems, despite the environmental conditions (mild/harsh) Additionally, according to Finnish Guides, qualification by operating experience alone is not possible for items important to safety. This holds true regardless of the environmental conditions (mild/harsh). We propose to remove the paragraph to be in line with other IAEA Safety Guides.			x	Para 4.80 is not referentg to safety systems. 4.79 and 4.80 includes explanation where and when it can be applied. National standards can be more stric than the IAEA.
155	23	FI	4	81	4.81. For an item that needs to perform safety functions in a harsh environment, evidence of qualification on the basis of operating experience alone is insufficient. Therefore, operating experience information should be combined with at least limited type testing and with evaluation of the production processes and quality measures applied during manufacturing.	SGG-39 Paragraph 6.86. prevents qualification based on operating experience alone for safety systems, despite the environmental conditions (mild/harsh) Additionally, according to Finnish Guides, qualification by operating experience alone is not possible for items important to safety. This holds true regardless of the environmental conditions (mild/harsh). Propose modification to the paragraph to be in line with other IAEA Safety Guides, e.g. SGG-39	x	See resolution to comment USA 40.		
156	66	USA	4	81	For an item that needs to perform safety functions in a harsh environment, evidence of qualification on the basis of operating experience alone is insufficient because operating experience generally do not include capability to withstand design bases environment.	Clarification	x			
157	14	Japan	4	84	Suggested to be rewrite so that descriptions show recommended practice.	Description of these paragraphs is suitable for engineering standards, but these description is not suitable for guidance documents.			x	Combined methods is the summary of the previous methods described in Section 4.
158	4	Korea	4	84	For example, where type testing of a complete assembly is not possible, component testing supplemented by analysis should may be used.	In point of meaning, 'may' is better.	x			
159	38	IEC	4	85	I agree that components within an item can be environmentally qualified based on material testing when it is not subjected to degradation from the effects of anticipated service conditions. But the sentence has left out the word "environmentally". Recommend the following change to the sentence: "...it is possible to demonstrate that the components of an item are environmentally qualified through a material analysis."	I agree that components within an item can be environmentally qualified based on material testing when it is not subjected to degradation from the effects of anticipated service conditions. But the sentence has left out the word "environmentally". Recommend the following change to the sentence: "...it is possible to demonstrate that the components of an item are environmentally qualified through a material analysis."	x	Added 'environmentally'.		
160	24	FI	5	5	In order to meet the above requirements...	Requirements (in plural) refer to both 5.3 and 5.4. Is this the purpose? Requirement (in singular) would refer only to 5.4	x	Yes, this is the purpose.		
161	67	USA	5	8	New paragraph: "If the item important to safety relies on programmable logic or software to perform its required safety actions, the control of access to such software shall be protected, and the software should be periodically verified as correct to retain the item's qualified status."	Protection and certification of software dedicated to instrument performance and safety function.	x			
162	39	IEC	5	9	Consideration should be given to adding the following document which are needed in support of a qualification file: -Procurement technical specification -Test specifications -Installation specification -Manufacturer data in support of qualification -Qualification analysis reports -Maintenance procedures -Relevant operating experience	Consideration should be given to adding the following document which are needed in support of a qualification file: -Procurement technical specification -Test specifications -Installation specification -Manufacturer data in support of qualification -Qualification analysis reports -Maintenance procedures -Relevant operating experience	x	Bullets expanded, except of test specification (part of the test ppoert) and maintenance [procedures (part of the results of maintenance activities).		
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	A	B	C	D	E	F	G	H	I	J
	MS No.	MS	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
1	40	IEC	5	12	The last sentence of Para 5.12 needs to be deleted because it is misleading to the reader since there is no technical basis for how a weakness or vulnerability in selective elements of the qualification process can be overcome.	The last sentence of Para 5.12 needs to be deleted because it is misleading to the reader since there is no technical basis for how a weakness or vulnerability in selective elements of the qualification process can be overcome.	x			
164	41	IEC	5	16	Since "design basis and safety analysis" are used together in other parts of the document the following change is recommended. - "Changes to the design basis or safety analysis"	Since "design basis and safety analysis" are used together in other parts of the document the following change is recommended. - "Changes to the design basis or safety analysis"	x			
165	42	IEC	5	16	Recommend adding the follow bullet because changes in regulatory and licensing requirement for the safety system the item can impact - Changes in regulations and plant licensing activities	Recommend adding the follow bullet because changes in regulatory and licensing requirement for the safety system the item can impact the qualification. - Changes in regulations and plant licensing activities	x			
166	68	USA	5	23	Additionally, ambient environmental monitoring should be used to support evaluation of remaining qualified life by determining if an item is suitable for continued service because it has aged more slowly than expected. Environmental monitoring can also lead to reduced qualified life if the measured environment was more adverse than what was originally assumed in the qualification	Clarification	x			
167	25	FI	5	32	As the qualified item approaches the end of its established qualified life, periodic condition monitoring should be implemented to determine if actual ageing is occurring at a slower rate, which would indicate that it is possible consider extension of the to extend the qualified life of the item.	would indicate that it is possible to extend the qualified life of the item - possible to consider extension in the qualified life of the item.			x	Well, too many conditionals - which would indicate that ...
168	69	USA	5	41	Qualified equipment and components should be procured in accordance with procurement requirements specified in the applicable qualification report. An explanation of the purpose of this report, its contents, and use in the procurement process can be found in section X.XX of this guide.	"Qualification report" is mentioned only once in this draft guide, in paragraph 5.41. An explanation of, or a reference to, the report's purpose, contents, and use in the procurement process needs to be provided. Comment 25 suggested this explanation be included in paragraph 2.37.	x			
169	4	UK	5	42	If the replacement is not identical, a comparison of the specifications of the original and the substituted item should be undertaken to determine equivalence.	The term "Equivalency Evaluation" is not defined.	x	deleted equivalency		
170	70	USA	5	50	If the qualified life of the item is to be extended, a thorough safety demonstration the technical bases should be provided.	Clarification	x			
171	4	Egypt	5	51	The technical bases of any conclusions regarding qualified status should be re-evaluated..... also reevaluation appears at para 5.53	Replace reevaluated by re-evaluated			x	Agency style.
172	71	USA	5	53	Methods such as re-evaluation of conservatism used in original assumptions, type test of the naturally aged items with additional aging for at the installation, performing type test for qualified life extension, item replacement and refurbishment, etc., should be used for reassessing qualified life.	Clarification	x			
173	26	FI	5	54	Reduction in exposure to the stressor intensity (e.g. lowering temperature, radiation) ...	When thinking of the requalification please consider the advice given in Para. 5.54 Give practical examples to clarify. ...How temperature and radiation can be decreased in practice?	x	e.g. lower temperature... If the stressor is lower than assumed, then the exposure is lower too.		
174	14	Japan	6	0	New subtitle: DOCUMENTATION 6.6. Documented evidence and records should be compiled to verify the correctness and completion of qualification programme and to show compliance with input documents such as equipment specifications, requirements specifications, the initial qualification status, and test specifications, by those not directly involved in or responsible for preparing any of these documents.	Correctness and completeness of the whole qualification process is imperative for ensuring reliable safety performance during operational states and accident conditions, thus it should be provided for independent verification in all cases. Verification should be made against the established requirements prescribed in input documents referred in para. 2.31-2.38 of Section 2. These statements should be added to Section 6. Preferably, verification should also be made at the planning stage prior to commencement of qualification activities, if practicable.			x	Originally, every section of this safety guide had a documentation subtitle; however, we decided to compile general requirements to the entire qualification process, including documentation, in Section 2 and not to repeat it in each individual sections. Please, see modifications to Documentation section proposed by other NUSSC members.
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	A	B	C	D	E	F	G	H	I	J
	MS No.	MS	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
1	43	IEC	6	4	Equipment qualification activities need to be performed under established quality assurance/control programs to ensure the equipment supplied are representative of the equipment qualified and process are in place to maintain qualification. Recommend the following change to the first sentence: "Evaluation of the effectiveness of the equipment qualification programme is through an established quality assurance programs which includes evaluation of activities performed by the following organizations:"	Equipment qualification activities need to be performed under established quality assurance/control programs to ensure the equipment supplied are representative of the equipment qualified and process are in place to maintain qualification. Recommend the following change to the first sentence: "Evaluation of the effectiveness of the equipment qualification programme is through an established quality assurance programs which includes evaluation of activities performed by the following organizations:"			x	Equipment qualification programme should ensure that equipment qualification activities are performed under established quality assurance/control programs to ensure the equipment supplied are representative of the equipment qualified and process are in place to maintain qualification.
176	72	USA	6	5	Modify item (c): The equipment is installed correctly (e.g. mounting, connections and conduit seals comply with the qualified configuration documentation, actuators and hydraulic/pneumatic lines are connected and arranged per design requirements);	DS514 should provide guidance for verification of correct valve and actuator installation in the list of examples.	x			
177	27	FI	7	1	The equipment qualification programme interfaces with other organizations, programmes, and processes to ensure continued sustainability of the status of qualification of items important to safety.	Not full sentence, please clarify.			x	Well, I agree the sentence is bit clumsy, but it is correct. Editors will certainly help with that.
178	73	USA	7	4	Insert "and testing" after "in-service inspection" in the first sentence of this paragraph.	The list of programmes of a nuclear installation should include inservice testing programs in addition to inservice inspection programs.	x			
179	74	USA	7	7	Insert "and their application" after "items" in the first bullet regarding information on the scope of items subject to qualification.	DS514 should indicate that the qualified items and their application should be specified in the qualification safety analysis report.	x			
180	44	IEC	7	10	The "Modification" sections placed in Section 7 is out of place and is a better fit in Section 5 (Preserving Qualification). Recommend moving Sections 7.10 through 7.13 into Section 5.	The "Modification" sections placed in Section 7 is out of place and is a better fit in Section 5 (Preserving Qualification). Recommend moving Sections 7.10 through 7.13 into Section 5.			x	We propose to keep is separately. Section 5 is about preserving qualification; there may be qualification-related modification, but Section 7 focus on plant modifications during which the equipment qualification needs to be considered.
181	28	FI	7	11	Any modification involving qualified items should be incorporated into plant controls before the modification is implemented. This includes: — All the documentation affected by the plant modification, such as the safety analysis report, operational limits and conditions, drawings, operating and emergency procedures, periodic maintenance and testing procedures, and equipment indexes have been updated and are available. Documents should not be released for use until the modification has been completed; — The as-built configuration of modified systems has been verified and the design basis document has been updated; — Personnel have been trained on the modifications; — Records for design, manufacturing, commissioning, quality assurance, testing and installation have been reviewed for completeness and accuracy.	Records for design, commissioning, quality assurance, testing, installation have been reviewed for completeness and accuracy. Please check whether manufacturing phase should be mentioned In order: design, manufacturing, testing, installation, quality assurance, commissioning	x	added 'manufacturing' as suggested.		
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	A	B	C	D	E	F	G	H	I	J
	MS No.	MS	Sec.	Para	Proposed new text	Reason	Accept	Accepted, but modified as follows	Reject	Reason for modification/rejection
1	5	UK	Definiton		Needs expanding e.g. harsh environment and should include all definitions relevant to guide even if included in the IAEA safety glossary	To make the guide more useable.	x	Added defintion of harsh environment . Definitions contained in the IAEA Safety Glossary are not included: USE OF THE IAEA SAFETY GLOSSARY BY DRAFTERS Drafters of safety and security related IAEA publications — particularly safety standards — should, as far as possible, use the terms related to safety as recommended by the Safety Glossary. Unless otherwise justified and accepted through the review process, there should be no individual glossary in individual publications.		
183	75	USA	Definiton		We recommend adding a definition “items important to safety,” as given below” Items important to safety: in the context of DS514 scope; such items include: electrical, instrumentation and controls, electromechanical, active mechanical equipment and interfaces associated with this equipment (e.g. seals, gaskets, connections, mounting structures and their anchoring).	Clarity to include in the definition section “Items important to safety.”			x	Items for which this safety guide applies are listed in 1.12.
184	1	Korea	Ttile		(Proposed Title) Equipment Qualification Items Important to Safety for Nuclear Installations	This guide is only addressing equipment qualification of SSCs important to safety. And it is also intended to meet the Requirement 13(Equipment Qualification) of SSR-2/2 which states the scope, and the process of equipment qualification. Thus, the proposed title is recommended to change for keeping consistency with the expression using in SSR-2/2. ※ Specific Safety Series No. SSR-2/2, Requirement 13 (Equipment Qualification) “Appropriate concepts and the scope and process of equipment qualification shall be established, ~.”	x			
185										