

NUSSC and NSGC comments on:
Design of Instrumentation and Control Systems for Nuclear Power Plants (DS 431, Rev. "M")

MS No.	Member State	Sec.	Para	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection	Remark
2	ENIS	1	1	Change in 1.1: "This Safety Guide addresses the establishment, execution and preservation of <u>the qualification of equipment</u> important to safety in nuclear installations..."	In consistency with the comment above, Suppress "execution" (similar to "establishing") to be consistent with 1.10 and 2.13	x	Modified new para 1.11 This Safety Guide primarily applies to equipment required to perform safety functions, but it also may be used for equipment not important to safety as determined by Member States specific requirements.			
1	UK	1	1	Potential addition to text, starting with 1.1 to include "upgrading" alongside establishment, execution and preservations.	It is observed that IAEA's 1998 Safety Report on equipment qualification included "upgrading" amongst the phases on equipment qualification (EQ). Preservation and execution do not really cover upgrading or extending EQ. Should the scope of the standard be expanded to include upgrading or is the view of the IAEA that existing plants should have already upgraded EQ to be consistent with guidance?			x	This safety guide is primarily intended for the new nuclear installations, Certainly, it can be applied, as far as practicable, to existing nuclear installation. Activities related to upgrading of a nuclear installation belong SSG-48 Ageing management and LTO.	
23	CA	1	2	Include the "Safety Reports Series No. 3, Equipment Qualification in Operational Nuclear Power Plants: Upgrading, Preserving and Reviewing"	It is adequate to refer to this Safety Reports Series in the Background & References.			x	This para refers to "requirements" from IAEA safety standards. Safety report does not belong to safety standard and therefore, it is not referenced in this para.	
1	HU	1	4	IAEA Safety Standards Series No. NS-G-1.6, Seismic Design and Qualification for Nuclear Power Plants [7] provides recommendations on equipment qualification specific to seismic design for nuclear power plants and IAEA-TECDOC-1250 Seismic design considerations of nuclear fuel cycle facilities.	It would be beneficial to refer also to the highest level documents for the other facility types having similar object and scope IAEA publications, like: IAEA-TECDOC-1250 Seismic design considerations of nuclear fuel cycle facilities.			x	This safety guide provides references to safety requirements and other interfacing safety guide. TECDOC are not a consensus publications, therefore it is not referenced in the safety guide.	
2	HU	1	5	... notably IAEA Safety Standards Series No. GS-G-3.1, ...	Typo	x				
3	PAK	1	5	The equipment qualification programme important to safety is established to meet the requirement of IEEE 323 for qualifying electrical equipment to the harsh environmental conditions of nuclear power plants. The other qualification of equipment used in nuclear facilities are NUREG 0800 and ASME QME-1-2000.	May be considered			x	The IAEA may reference IEEE and IEC standard, but definitely not 'to meet their requirements'.	
8	CA	1	7	The objective of this Safety Guide is to provide a structured approach and guidance on the establishment, execution and preservation of equipment in nuclear installations.	Objective clause 1.7 on page 7 is not aligned with clause 1.1 on page 6 – execution of equipment <u>qualification</u> in nuclear installations is missing in objective.	x				
3	ENIS	1	7	The objective of this Safety Guide is to provide a structured approach and guidance on the establishment and preservation of equipment <u>qualification</u> in nuclear installations.	It is a guide on "equipment qualification" not operation and maintenance.	x				
1	Israel	1	7	...equipment <u>qualification</u>	Scope and completeness	x				
1	SWE	1	7	The objective of this Safety Guide is to provide a structured approach and guidance on the establishment and preservation of equipment <u>qualification</u> in nuclear installations.	It is a guide on "equipment qualification" not operation and maintenance.	x				
10	SWE	1	7	The objective of this Safety Guide is to provide a structured approach and guidance on the establishment and preservation of equipment <u>qualification</u> in nuclear installations	It is a guide on "equipment qualification" not operation and maintenance.	x				
1	JP	1	7	The objective of this Safety Guide is to provide a structured approach and guidance on the establishment and preservation of equipment <u>qualification</u> in nuclear installations.	Missing a word.	x				

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1	PAK	1	8	1.8. This Safety Guide provides recommendations on the equipment qualification for nuclear installations to meet specific requirements established in SSR-2/1 (Rev. 1) [1] and SSR-2/2 (Rev. 1) [2] for nuclear power plants, in SSR-3 [3] for research reactors, in SSR-4, [4] for nuclear fuel cycle facilities, and in GSR Part 4 (Rev. 1) [5] for all facilities and activities.	The specific requirements related to equipment qualification for NPPs (SSR-2/1 and SSR-2/2) have been reproduced in this document (e.g., at 2.1, 2.2, 4.15, 5.1, 5.2, 5.4 and 5.14) but the specific requirements of SSR-3 (research reactor), SSR-4 (nuclear fuel cycle facilities) and GSR Part 4 (all facilities and activities) have not been reproduced anywhere in the document	x	Modified introduction and references to specific safety requirements. However, we only provide an overarching requirement - a statement of applicability.			
4	PAK	1	8	This Safety Guide discusses the methods to meet specific requirements established in SSR-2/1 (Rev. 1), SSR-2/2 (Rev. 1), SSR-3, UNSRC 10 CFR 50.49, IEEE 323, the "Category I" requirements of NUREG-0588 and the requirements of NUREG-0800 (SRP 3.11) for nuclear facilities.	May be considered			x	This safety guide provides recommendations to meet IAEA safety requirements; we do not include national safety requirements that belong to a national regulatory framework.	
5	FI	1	10	This Safety Guide addresses the process for establishing and preserving equipment qualification in nuclear installations ¹ , to ensure reliable performance of the safety functions within anticipated service conditions during the entire lifetime of the nuclear installation.	footnote 1) limit the scope of NIs to NPPs, RRs and fuel cycle facilities. Qualification of equipment is relevant also to waste management nuclear installations and disposal facilities. Please delete the foot note. It is not needed.			x	Please, see para 1.2. which lists all safety requirements that directly quote equipment qualification. This footnote was added due to previous comments. It may be deleted during a thorough editorial process.	
1	BE	1	12	Non-active items important to safety that which safety function is demonstrated according to applicable codes (e.g. piping and metallic components) are outside the scope of this Safety Guide.	Sentence incorrectly structured. Proposal is made to correct.	x				
2	CA	1	12	Equipment within the scope of this Safety Guide includes electrical, instrumentation and controls, electromechanical, active mechanical equipment with non-metallic parts, and interfaces associated with this equipment (e.g. seals, gaskets, connections, mounting structures and their anchoring). Non-active Passive items important to safety that safety function is demonstrated according to applicable codes (e.g. piping and metallic components) are outside the scope of this Safety Guide	Consider using passive for non-active items.	x	New 1.14.			
24	CA	1	12	"Equipment within the scope of this Safety Guide includes electrical, instrumentation and controls, electromechanical, active mechanical equipment with non-metallic parts, and interfaces associated with this equipment (e.g. seals, gaskets, cables , connections, mounting structures and their anchoring). Non-active items important to safety that safety function is demonstrated according to applicable codes (e.g. piping and metallic components) are outside the scope of this Safety Guide."	Throughout the entire document, only para/line 4.73 mentions "cables". "Cables" are often forgotten but : (i) are critical to the safe and reliable operation of NPPs due to their widespread use as a connection medium for many systems important to safety; (ii) are also subjected to harsh environmental conditions resulting from DBA. Therefore, they need to be qualified to perform their intended safety functions	x	New 1.13			
5	DE	1	12	Equipment within the scope of this Safety Guide includes electrical, instrumentation and controls, electromechanical, active mechanical equipment with non-metallic parts , and interfaces associated with this equipment (e.g. seals, gaskets, connections, mounting structures and their anchoring). Non-active items important to safety that safety function is demonstrated according to applicable codes (e.g. piping and metallic components) are outside the scope of this Safety Guide.	Clarification	x	New 1.13 and 1.14 clarifies the scope.			

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4	ENIS	1	12	Clarification needed regarding the scope for active mechanical equipment. Lubricants shall be added in the list of interfaces associated with the equipment (e.g. seals, gaskets, lubricants, connections...)	The scope of "...active mechanical equipment with non-metallic parts." is not clearly defined. The functional requirement for a valve or a pump does not differ whether the equipment contains for example a graphite gasket or a metallic gasket. Is the purpose to put extra attention to aging-sensitive parts, such as polymers? In that case the qualification cannot only apply to active equipment since gaskets etc. in passive equipment also degrades. Is the attended scope mechanical equipment where the active part contains aging-sensitive material, for example membrane valves? Either way, the scope must be more clearly defined and justified. Lubricants are submitted to ageing under irradiation and thermal conditions and thus shall be qualified for a mission time. Same as the gaskets of a pump as an example.	x	New 1.12 and 1.19 clarifies the scope.			
1	FR	1	12	Equipment within the scope of this Safety Guide includes electrical, instrumentation and controls, electromechanical, active mechanical equipment with non-metallic parts , and interfaces associated with this equipment (e.g. seals, gaskets, connections, mounting structures and their anchoring). Non-active items important to safety that safety function is demonstrated according to applicable codes (e.g. piping and metallic components) are	Active mechanical equipment with metallic part must also be qualified, for example with regard to vibrations.	x	New 1.13 and 1.14 clarifies the scope.			
2	SWE	1	12	Clarification needed regarding the scope for active mechanical equipment.	The scope of "...active mechanical equipment with non-metallic parts." is not clearly defined. The functional requirement for a valve or a pump does not differ whether the object contains for example a graphite gasket or a metallic gasket. Is the purpose to put extra attention to aging-sensitive parts, such as polymers? In that case the qualification cannot only apply to active equipment since gaskets etc. in passive equipment also degrades. Is the attended scope mechanical equipment where the active part contains aging-sensitive material, for example membrane valves? Either way, the scope must be more clearly defined and justified.	x	New 1.13 and 1.14 clarifies the scope.			

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3	USA	1	12	Delete "with non-metallic parts"	<p>Equipment qualification is defined in IAEA Safety Glossary, Publication 1830 (2018 Edition), "Terminology Used in Nuclear Safety and Radiation Protection," as generation and maintenance of evidence to ensure that equipment will operate on demand, under specified service conditions, to meet system performance requirements. The safety glossary indicates that seismic qualification is one form of equipment qualification. The safety glossary specifies that proof that an item of equipment can perform its function is an important part of equipment qualification. Based on the safety glossary definition, equipment qualification is intended to demonstrate the seismic, environmental, and functional capability of equipment to perform their safety functions. Mechanical equipment to be qualified might include non-metallic parts or contain all metallic parts. In either case, mechanical equipment need to be qualified to be functionally capable of performing their safety functions.</p> <p>Note to Secretariat:</p> <p>A previous US comment on Draft 7 requested that "with non-metallic parts" be used when describing the scope of mechanical equipment to be qualified. However, a second review of the revised draft of the document recognizes that the real IAEA intent in this safety guide is to identify and provide guidance for all forms of equipment qualification needed—not just environmental qualification, which primarily affects elastomeric components embedded within mechanical equipment. We now believe that our previous comment was in error and recommend deleting the phrase "with non-metallic parts".</p>	x	New 1.13 and 1.14 clarifies the scope.			
5	ENIS	1	13	1.13.c) Suggestion to add: "Integration of qualification processes within the design, <u>manufacturing</u> , installation..."	To be consistent with 2.6 Manufacturing also is important in the equipment qualification process	x	New 1.15. includes manufacturing			
6	FI	1	14	This Safety Guide considers qualification aspects of other interfacing programmes and processes, including: (a) Development and review of the safety analysis report; (b) Modification processes; (c) Aging management (d) Other processes that affect qualification (e.g. supply chain, procurement, storage, maintenance, corrective action programme); (e) Operational experience feedback (e.g. internal, external).	<p>Please add at least: Aging management to the list Please ensure constancy with para 1.17, section 7 (7.1, 7.2. FSAR, modifications etc.) and update the list accordingly.</p> <p>Aging is an important related to qualification factor to be considered from design to decommissioning of the NI.</p>	x	New. 1.15.			
2	FR	1	14	(d) Operational experience feedback (e.g. internal, external).	What do we mean by "(e.g. internal, external)"?	x	New. 1.15.			
2	JP	1	15	This Safety Guide does not specify <u>some aspects of</u> seismic qualification methods and processes in detail . Recommendations on seismic qualification (for nuclear power plants) are provided in NS-G-1.6 [7].	Modification. Seismic qualification should be considered when dynamic qualification is discussed, as the elements of dynamic qualification of equipment include vibration load owing to DBA such as LOCA, mechanical vibration during normal operation, as well as seismic load owing to SSE and load owing to OBE during normal operation.			x	NS-G-1.6 will be replaced by the revision DS490.	

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34	CA	1	16	also for 2.10, 5.9	In these paragraphs we have the following: term validation and verification process (1.16), in (2.10) equipment qualified configuration which includes software, hardware, description language, process interface and (5.9) states that software should be protected but not qualified and periodically verified. The above paragraphs need to be aligned to avoid confusion in terminology (i.e. validation, verification, and qualification by means of protecting the software). No new text is required, only a request for clarification.	x	New 1.12 and 1.19 clarifies the scope.			
7	FI	1	17	Section 2 provides guidance regarding qualification concept and process. Section 3 provides recommendations for specifying the design inputs needed to support qualification process. Section 4 provides recommendations on establishing qualification. Section 5 provides recommendations for preserving qualification. Section 6 provides recommendations on the evaluation of the effectiveness of the equipment qualification programme. Section 7 provides recommendations on programmatic interfaces and integration of qualification within other safety programmes and processes.	see 1.14	x	New 1.20.			
24	USA	1	17	Editorial – add ‘the’ ...support the qualification process	Add missing word.	x	New 1.20.			
3	JP	2	2	2.2A Equipment Qualification Programme (EQP) or the equivalent programmes should be developed by both operating organization and suppliers (including vendors, manufacturers) respectively, which should specify the qualification activities throughout the lifetime of a nuclear installation. The programmes developed by the vendors should be cleared by and transferred to the operating organization when the equipment concerned is delivered. The operating organization should be responsible for preserving its own programmes and those transferred from the suppliers. The programmes developed by the operating organization may be submitted to regulatory body for clearance in accordance with national law and/or practices.	Add a new paragraph after para. 2.2. Equipment Qualification Program (EQP) is the top-level and most important document that govern the EQ activities throughout the lifetime of a nuclear installation. It would be essential to state clearly development of the program and by whom this programme is developed.	x	Please, see new paras 2.4-2.11.			
7	ENIS	2	3	Suggestion to modify the sentence as follows: "Qualification should demonstrate that items will be capable of performing their events, except earthquake, as the design generally protects against those intended safety function(s) under the full range of service events (as is described for several events in paragraph 2.11). Paragraph 2.3 conditions anticipated for the nuclear installation in operational should be clarified regarding what should be considered in qualification by states and accident conditions, and <u>if not protected by the design itself</u> , during internal and external events.	Qualification does normally not take into account internal and external events, except earthquake, as the design generally protects against those intended safety function(s) under the full range of service events (as is described for several events in paragraph 2.11). Paragraph 2.3 conditions anticipated for the nuclear installation in operational should be clarified regarding what should be considered in qualification by states and accident conditions, and <u>if not protected by the design itself</u> , during internal and external events. This also relates to paragraphs 3.27-3.30 (where the term protected is used for some aspects and the term qualified for other aspects).	x	See new para 2.4.			

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3	SWE	2	3	"Qualification should demonstrate that items will be capable of performing their intended safety function(s) under the full range of service conditions anticipated for the nuclear installation in operational states and accident conditions, and during internal and external events, <i>unless protected by the design itself.</i> "	Qualification does normally not contain internal and external events, except earthquake, as the design generally protects against those events (as is described for several events in paragraph 2.11). Paragraph 2.3 should be clarified regarding what should be considered in qualification by excluding the parts that are requirements for the overall safety design of a nuclear power plant. This also relates to paragraphs 3.27-3.30 (where the term protected is used for some aspects and the term qualified for other aspects).	x				
18	CA	2	4	Add a sentence at the end: "The qualified life of items important to safety should be reassessed periodically during the lifetime of the nuclear installation. This reassessment should be conducted every 24 or 36 months."	would be appropriate to propose frequencies (such as every 24 months or 36 months) for conducting reassessment.			x	This safety guide does not provide specific numeric criteria, it is left on a member state decision.	
7	DE	2	4	The qualification should address combinations of anticipated service conditions, including synergistic effects, where identified. <u>Synergistic effects are the result of two or more processes interacting together to produce an effect that is greater than the cumulative effect that those processes produce when used individually. The concept is an important consideration in safety whenever multiple hazards are present in the workplace</u>	It would be helpful to be more specific about what synergistic effects are involved. Therefore a reference to paragraph 4.29 should be given here: "The synergistic effects of multi-ple parameters, such as application of appropriate radiation dose rates and temperatures, should be taken into account when preparing the test plan."	x	Modified new para 2.5.			
1	TAEK	2	4	Define synergistic effects		x	New para 2.5.			
8	DE	2	5	Appropriate Equipment qualification is a necessary condition for prevention of common cause failures caused by the item not being qualified for the intended function required to perform during anticipated service conditions.	Clarification of the requirement	x	New para 2.5.			
7	USA	2	5	"Maintaining an equipment qualification program is a necessary condition for preventing common cause failures that can result when items cannot be otherwise proven capable of performing their required functions during all anticipated service conditions."	Editorial	x	New para 2.5.			
5	PAK	2	6	Paragraph 2.6 is partially described in paragraph 2.1 and paragraph 2.3.	Repetition may be deleted	x	Modifiend the beginning of Section 2.			
2	UK	2	6	Words added to paragraph below: "The qualification activities should provide confidence that equipment is designed, manufactured, installed, commissioned, operated, and maintained such that the equipment is capable of performing its required safety functions, when necessary, and in the specified service conditions, throughout its qualified life, with due account taken of plant conditions during maintenance and testing, <i>as well as any changes in plant conditions, and the environment where it is situated, that may have occurred over time and deviate from the plant conditions at which qualification was established.</i> "	It is important to consider that plant conditions, environmental and functional, may have changed over time and should be noted at maintenance and testing as a matter of course to understand if the qualification margin is starting to be "threatened" in a significant matter as to invalidate the current qualification.	x	New para 2.7. modified.			
8	USA	2	6	Manufactured, <i>stored</i> ,	Technical requirements	x	Para 2.6 deleted, repetition.			
9	DE	2	8	The item to be qualified should be representative of the item that will be installed in the nuclear installation and its application. The same for para 4.36 and for „type testing“ in "DEFINITIONS"	Amend the Safety Guide with a definition for "representative" or provide criteria for a representative item/ test specimens/ sample. Possible criteria may be but/ not limited to: raw material, processes, machinery and equipment, personnel qualification, supply chain, measuring/ inspection/ control devices.	x	New 2.9. The equipment to be qualified should be an accurate representation of the type or series type of the equipment to be installed.			

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3	UK	2	9	Here is the current text: "The qualified configuration should include the items themselves and their interfaces." Consider adding the following: "The item themselves subjected to qualification testing should not be considered for use in service following qualification, unless proven that said testing has not adversely affected its ability to perform safely during its qualified life, nor has any margin been significantly reduced."	To mitigate the risk of a manufacturer providing sometimes expensive items for testing then using them in service to save cost, it is worth stating that the item should not be used thereafter. During a testing programme, derogation may be needed and should be recorded, but a less informed manufacturer may not consider this to reduce any margin or ageing calculation significantly. Whilst this should be reported in the qualification file, this seems a reasonable assumption to communicate for qualification, that items cannot be used after testing. It is very often stated in test house assumptions that testing should be considered to render the item not fit for service. There are some exceptions that could be made for very expensive long lead time items, as long as safety is not impacted (and is the overriding priority compared to cost and time).	x	New para 2.10.			
2	BE	2	10	... hardware description language ...	What is hardware description language? Isn't this an uncommon terminology?			x	See definition of HDL in SSG-39. Language that allows one to formally describe the functions and/or the structure of an electronic component, for documentation, simulation or synthesis.	
10	DE	2	10	The equipment qualified configuration should also include software, hardware description language codes, and process interfaces, if any.	A hardware description language is something like a programming language (C, Java, etc.) in the software environment. Only the code written in a hardware description language is belonging to the equipment qualified configuration.			x	See definition of HDL in SSG-39. Language that allows one to formally describe the functions and/or the structure of an electronic component, for documentation, simulation or synthesis.	
4	UK	2	10	Existing text: "The equipment qualified configuration should also include software, hardware description language, and process interfaces, if any." "Consider adding: "The inclusion of existing items such as software, should itself also be already qualified, or have sufficient "proven in use" for its designated function in this setup, if used in the qualification configuration. Furthermore, the additional items use within the qualification configuration does not automatically mean that said item is also then qualified".	An example also might be cables that are routed in and out of a test chamber for functional testing of an item. These cables have to withstand the environment that the item is subjected to in order to ensure functional testing can be relied upon. This is also the case with software, where used in functional testing it has to be assured that the functional testing of the item undergoing test is being fed the right, reliable and repeatable information	x	New para 2.10.			
3	BE	2	11	This includes a suitability of systems	Spelling error	x				
3	FR	2	11	The qualification should address all factors affecting the suitability of systems and components for performing the intended safety functions. This include a suitability of systems or components for performing the safety functions under the effects caused by anticipated service conditions during all plant states and during events not excluded by the design of a nuclear installation (e.g. seismic, internal flooding, electromagnetic phenomena, arcing, lightning). For example, internal fires, explosions, internal flooding, tornadoes or hurricanes are not considered in the qualification since designs generally protect the items from these events.	Internal flooding is not considered in the qualification since designs generally protect the items from these events. Thus it may be better not to mention it as an example	x				

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2	Israel	2	11	3.27-3.30: General Remark: The general reasoning (including some examples) regarding which kind/type of systems/components have to be considered for equipment qualification, and which others are exempted from equipment qualification since they are protected during anticipated events due to their design, is addressed in paragraph 2.11 . Then, the four paragraphs 3.27 to 3.30 discuss this issue again, from the angle of internal and external events, bringing some examples. We would like to suggest to consider checking the consistency or clarity of accordance between paragraphs 2.11 and the more detailed content included in paragraphs 3.27-3.30.	clarity	x	Modified new para 2.4. Paras 3.27-3.30 has been deleted.			
25	USA	2	11	Editorial – add “s” This includes a suitability	Editorial	x				
6	PAK	2	12	May be deleted	Unnecessary paragraph			x	It is relevant para.	
6	ENIS	2	15	Applies to 2.15-2.19. Request to add into the Safety Guide the notion of “qualified condition” which is connected with “qualified life”. or to change as follows: 2.15. The qualified life <u>or condition</u> should be established for items important to safety that are subject to significant ageing degradation... 2.16. The parameters in for example IEC/IEEE 60780-323 (Ref [17]. “Condition monitoring for and any modelling of anticipated environmental conditions used to establish the qualified life <u>or condition</u> should be specified. 2.17. indicators to determine whether equipment remains in a qualified condition. The qualified life <u>or condition</u> should ensure that the items important to safety are capable of functioning within acceptance criteria during specific...2.19. Items important to safety that are located in a harsh environment should be maintained within their qualified life <u>or condition</u> while installed in service or in while...	Only “Qualified life” in this document. A lot of work have been done regarding “Qualified condition” as an alternative to “Qualified life”. One of the advantages is that it reduces the problem with different ageing mechanisms during accelerated ageing. “Qualified Condition” is mentioned in for example IEC/IEEE 60780-323 (Ref [17]. “Condition monitoring for and any modelling of anticipated environmental conditions used to establish the qualified life <u>or condition</u> should be specified. 2.17. indicators to determine whether equipment remains in a qualified condition. “It is also discussed in IEC/IEEE 62582-1”An easy way to solve this concern is to insert “ <u>or condition</u> ” into the actual wording as suggested.			x	We have been discussing long time whether to include qualified conditions. The Team agreed that we will use 'qualified status' instead.	
8	FI	2	15	The qualified life should be established for items important to safety that are subject to significant ageing degradation mechanisms and or are expected to function within a harsh environment. Such mechanisms can degrade the functional capabilities of items to perform safety functions during anticipated service conditions.	Please replace and with or. Ensure consistency of para. 2.15 and Para 2.18. If components are subject to aging degradation mechanism the qualified life should be specified at least in some member states. IAEA glossary Qualified life Period for which a structure, system or component has been demonstrated, through testing, analysis 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 conditions for a design basis accident or a design basis earthquake. service conditions? See. for instance, WENRA reference level G4.2 for existing reactors states “Qualification procedures shall be adopted to confirm that SSCs important to safety meet throughout their design operational lives the demands for performing their function, taking into account environmental conditions over the lifetime of the plant and when required in anticipated operational occurrences and accident conditions.”	x	Qualified life is now better described in paras 2.14-2.17.			

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4	FR	2	15	The qualified life should be established for items important to safety that are subject to significant ageing degradation mechanisms and are expected to function within a harsh environment. Such mechanisms can degrade the functional capabilities of items to perform safety functions during anticipated service conditions. For items that are expected to function within a mild environment, i.e. an environment that would at no time be significantly more severe than the environment that would occur during operational states (see definitions below), it should be ensured that they will fulfil their function during their service life	This article is tricky and could be understood as if there is not expectation regarding item functioning within a mild environment. This document is a guidance and this should be explained. For example, some polymeric seals of valves used in normal operation located in the containment are sensitive to radiation ageing and must be regularly changed. It seems contradictory with the fact that they have no qualified life since they are used in mild conditions	x	Qualified life is now better described in paras 2.14-2.17.			
4	SWE	2	15	Change heading: Qualified life and condition . 2.15. The qualified life or condition should be established for items important to safety that are subject to significant ageing degradation... 2.16. The parameters and any modelling of anticipated environmental conditions used to establish the qualified life or condition should be specified. 2.17. The qualified life or condition should ensure that the items important to safety are capable of functioning within acceptance criteria during specific... 2.19. Items important to safety that are located in a harsh environment should be maintained within their qualified life or condition while installed in service or in while... also 2.33. mild environmental conditions	Only Qualified life in this document. A lot of work have been done regarding Qualified condition as an alternative to Qualified life. One of the advantages is that it reduces the problem with different ageing mechanisms during accelerated ageing. Qualified Condition is mention in for example IEC/IEEE 60780-323 (Ref [17]). "Condition monitoring for equipment qualification purposes monitors one or more condition indicators to determine whether equipment remains in a qualified condition." Also discussed in IEC/IEEE 62582-1 The easy way to solve this is to insert "or condition" Otherwise a new section with Qualified Condition (Condition Monitoring)			x	We have been discussing long time whether to include qualified conditions. The Team agreed that we will use 'qualified status' instead. Qualified life is now better described in paras 2.14-2.17.	
2	TAEK	2	16		Instead of anticipated environmental conditions actual operating environmental conditions . The 'mild environment' should be used	x	Qualified life is now better described in paras 2.14-2.17.			
5	UK	2	16	Consider adding words along the lines of the following suggestion in bold: The parameters and any modelling of anticipated environmental conditions used to establish the qualified life should be specified. A maintenance and/or service condition monitoring methodology for ensuring that these parameters and anticipated environmental conditions remain relevant should be put in place and respected to ensure continued validity of the qualification.	Similar to previous comments, service conditions that are anticipated can drift from reality. This can be addressed by adding margin to the anticipated conditions, however too much conservatism should be avoided to avoid unnecessarily onerous test conditions that could result in expensive/timely rework. Perhaps a reference to section 2.2 to highlight this importance is worthwhile, as this is an important subject to consider upfront and not just in service life. There may be a tendency for the reader interested in establishing qualification to overlook the preservation as they may consider that "someone else's" problem, i.e. licensee issues in 10 years' time...	x	Qualified life is now better described in paras 2.14-2.17.			
11	DE	2	17	The qualified life should ensure that the items important to safety are capable of functioning within acceptance criteria during specific operating conditions while retaining the ability to perform their safety functions in a design basis accident and under all further conditions, where the function of the specific items is demanded (design extension conditions).	Clarification: There are further requirements that need to be addressed	x	Qualified life is now better described in paras 2.14-2.17.			
9	FI	2	17	The qualified life should ensure that the items important to safety are capable of functioning within acceptance criteria during specific operating conditions while retaining the ability to perform their safety functions in a design basis accidents.	The whole design envelope should be considered. Please change design basis accidents to accidents in line with SSR-2/1.	x	Qualified life is now better described in paras 2.14-2.17.			

NUSCC and NSGC comments on:
Design of Instrumentation and Control Systems for Nuclear Power Plants (DS 431, Rev. "M")

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5	FR	2	17	The qualified life should ensure that the items important to safety are capable of functioning within acceptance criteria during anticipated service conditions specific operating conditions while SSR-2/1 and DS 514 itself (see 4.15). The qualification must also take into retaining the ability to perform their safety functions in a design basis-accident.	According to the proposed text, the scope of accident conditions considered for qualification is limited to DBA which is in contradiction with account design extension conditions.	x	Qualified life is now better described in paras 2.14-2.17.			
9	USA	2	17	"The qualified life should ensure that the items important to safety are capable of functioning within acceptance criteria during all plant operational states while retaining the ability to perform their safety functions in a design basis accident.	To address the full spectrum of conditions	x	Qualified life is now better described in paras 2.14-2.17.			
12	DE	2	18	Items important to safety that are not in a harsh environment and are not subject to significant aging degradation mechanisms are typically accessible and therefore a qualification regarding compliance with the design specification and adherence to the maintenance program is considered adequate.	Even devices in a mild environment must be qualified	x	Qualified life is now better described in paras 2.14-2.17.			
10	FI	2	18	Items important to safety that are not in a harsh environment and are not subject to significant aging degradation mechanisms are typically accessible and therefore compliance with the design specification and adherence to the maintenance program is considered adequate.	The national approaches may be different. Please formulate the text "Items important to safety that are not in a harsh environment and are not subject to significant aging degradation mechanisms are typically accessible and therefore compliance with the design specification and adherence to the maintenance program is considered adequate." in a more flexible way or delete the paragraph 2.18. If national requirements do not require qualification in, an alternative systematic comprehensive safety assessment that meets the objectives of the qualification is recommended to be performed. See. for instance, WENRA reference level G4.2 for existing reactors states "Qualification procedures shall be adopted to confirm that SSCs important to safety meet throughout their design operational lives the demands for performing their function, taking into account environmental conditions over the lifetime of the plant and when required in anticipated operational occurrences and accident conditions."	x	Qualified life is now better described in paras 2.14-2.17.			
26	USA	2	18	Editorial – add comma ...accessible, and therefore...	Editorial	x	Qualified life is now better described in paras 2.14-2.17.			
4	BE	2	19	... while installed in service or in while in storage prior to installation ...	Word to be deleted	x	Qualified life is now better described in paras 2.14-2.17.			
41	CA	2	19	Propose adding "non-safety-related equipment whose failure due to harsh post-accident environment that could prevent safety related equipment from accomplishing its safety function should be considered"	The harsh environment could indirectly prevent an item important to safety from performing its safety function if a nearby equipment's failure impairs the qualified equipment. The design should identify these interdependencies. Other equipment whose failure due to the harsh environment could impair the safety functions of qualified equipment.	x	Qualified life is now better described in paras 2.14-2.17.			

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1	Korea	2	19	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. <u>The qualified life may be re-evaluated considering the real operating and environmental conditions before the end of the original qualified life.</u>	In the case that the qualified life does not cover the lifetime, re-evaluation of the qualified life may be required considering the real operating and environmental conditions			x	Section 5 provides recommendation on preserving equipment qualification, requalification is not addressed here.	
6	UK	2	19	Consider adding text in bold to this section: ☐ "Items important to safety that are located in a harsh environment should be maintained within their qualified life while installed in service or in while in storage prior to installation. The qualified life of an item might not necessarily cover the lifetime of the nuclear installation, as it might need to be periodically replaced. The practicality of item replacement must be considered early in an equipment qualification programme."	From experience, often the requirement of new reactors longer service lifetimes (e.g. 60 year), are considered too daunting to qualify, as it necessitates longer ageing programmes. This can lead to the tendency to over accelerate these tests to fit project timescales such that they become non-representative to the environment for which they actually need qualifying for. This is not only unsafe, but also completely avoidable in a lot of cases, as a 10, 20, 30, 40 year qualified life is perfectly viable if access and ease of replacement is considered – all too often it is not. Adding this sentence allows thought early on in the process and opens the opportunity above, and de-risks any tendency to over-accelerate ageing (particularly important for some non-metallics which suffer from low dose rate effects – LDRE)	x	Qualified life is now better described in paras 2.14-2.17.			
10	USA	2	19	... as it might need periodic replacement of age sensitive subcomponents or full replacement.	Clarifying part or full replacement that is generally needed.	x	Qualified life is now better described in paras 2.14-2.17.			
27	USA	2	19	Editorial – remove a word ...in service or in while in storage...	Editorial	x	Qualified life is now better described in paras 2.14-2.17.			
4	JP	2	19	Items important to safety that are located in a harsh environment should be maintained within their qualified life while installed in service or in while in <u>including a period in</u> storage prior to installation. The qualified life	Clarification.			x	The entire para was modify with other MS comments: 'Any maintenance, replacement, or other activities that are necessary to maintain the equipment qualified conditions should be performed.'	
5	JP	2	19	Items important to safety that are located in a harsh environment should be maintained within their qualified life while installed in service or in while in storage prior to installation. The qualified life of an item might not necessarily cover the lifetime of the nuclear installation, as it might need to be periodically replaced. <u>However, the safety system which includes qualified items important to safety should maintain its intended safety function without any interruption throughout the lifetime of nuclear installations, irrespective of replacement of any qualified items.</u>	The qualified life of an item might be shorter than the lifetime of the nuclear installation, but the system is required to be functional throughout the lifetime of the nuclear installation.			x	The entire para was modify with other MS comments: 'Any maintenance, replacement, or other activities that are necessary to maintain the equipment qualified conditions should be performed.'	
8	ENIS	2	20	Please clarify. "Pressure boundary active components with non-metallic parts" and "Other mechanical equipment". The list of equipment is different from the one described in 1.12. The two clauses shall be put in coherence.	The examples of different equipment types could be improved. For example, what does pressure boundary active components mean? Is it valves that are part of a pressure boundary? In paragraph 1.12 only active components are considered, which we suspect is covered by the first statement. What is meant by the second bullet "Other mechanical equipment with non-metallic equipment"? How about the case of active mechanical equipment with metallic parts? (example: pumps equipped with only graphite gaskets)	x	Para 2.20 deleted			

NUSSC and NSGC comments on:
Design of Instrumentation and Control Systems for Nuclear Power Plants (DS 431, Rev. "M")

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5	SWE	2	20	Please clarify. "Pressure boundary active components with non-metallic parts" and "Other mechanical equipment"	The examples of different equipment types could be improved. For example, what does pressure boundary active components mean? Is it valves that are part of a pressure boundary? In paragraph 1.12 only active components are considered, which we suspect is covered by the first statement. What is meant by the second bullet "Other mechanical equipment with non-metallic equipment"?	x	Para 2.20 deleted			
4	USA	2	20	Delete "with non-metallic parts" from the first and second bullets of Paragraph 2.20	Mechanical equipment to be qualified might include non-metallic parts or contain all metallic parts.	x	Para 2.20 deleted			
5	USA	2	21	Delete the word "periodic" from the examples of qualification." In other words, the sentence should read: "The specific methods of qualification for any particular type of item might include the application of more than one method of qualification (for example seismic, environmental, and functional testing)."	Mechanical equipment must be functionally qualified to perform their safety functions prior to installation in a nuclear power plant. Periodic testing is part of the plant program to assess the operational readiness of mechanical equipment to perform their safety functions.	x	Deleted.			
9	ENIS	2	22	Delete the last sentence "The specific methods of qualification for any particular type of item might include the application of more than one method of qualification (for example seismic, environmental, and periodic functional testing)."	This sentence is totally incomprehensible from a technical point of view.	x	New para2.18. Internationally recognized methods for qualification are type testing, analysis, use of operating experience or a combination of these methods.			
28	USA	2	22	Editorial - move sentence "The Annex provides a list of applicable standards which may be considered for equipment qualification."	Placement of this sentence in the middle of para. 2.22 breaks up the discussion on methods of qualification. It should be moved to the end of this paragraph or shown as a separate single sentence paragraph	x	Moved to the end of this section.			
16	CA	2	23	Add the following paragraph: The qualified status of items may be affected by: aging; maintenance programs, modification of systems and substitution of components or subcomponents, changes to equipment design, changes by the manufacturer, changes to the plant safety analysis or operating conditions, plant life extension, emerging issues or OPEX. Controls should be provide over maintenance, modification and procurements processes to ensure Environmental Qualification integrity is maintained	An additional paragraph should be add to "Preservation of qualified status throughout the life of the plant.	x	New para 2.20. Preservation of equipment qualification is required during the lifetime of the nuclear installation.			
42	CA	2	23	Recommend adding "once qualified status is established, the operating organization should have procedural controls to ensure the status is preserved"	Subsequent lines 2.24-2.27 are examples of how the operating organization could ensure preservation of the status... first, it's important to establish that the EQ is controlled	x	New para 2.20. Preservation of equipment qualification is required during the lifetime of the nuclear installation.			
10	ENIS	2	23	Suggestion to add before 2.23 : <u>"The qualified status of items should be preserved during ma-fracturing of series equipment."</u> <u>"The qualified status of items should be preserved during installation and commissioning."</u>	This section deals only with preservation of qualified status during lifetime of the nuclear plant. There is no mention of preservation of qualification during : Manufacturing of series equipment and Installation and commissioning.	x	New para 2.20. Preservation of equipment qualification is required during the lifetime of the nuclear installation.			
6	JP	2	23	Clarify the difference between "qualified status" and "qualification status". If there is difference between two terms, it should be defined respectively, and if not, it should be used either one.	Clarification of term "qualified status" and "qualification status". Note that "qualification condition" is used in IEC publications.	x	New para 2.20. Preservation of equipment qualification is required during the lifetime of the nuclear installation.			
35	CA	2	26	...Qualification for DEC conditions should be as practically reasonable or in accordance with risk informed approach. Ability of the equipment to function correctly during Severe Accident (SA) should be assessed.	Mitigating equipment for DEC shall not be qualified, for example for SA, the same way as for DBA but some qualification would be reasonable. Please see sections 4.15-4.23			x	No risk informed approach in equipment qualification for DBA and seismic event. For DEC, namely SA - equipment survivability is applied.	

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13	DE	2	26	A review of qualified status should also be conducted due to other reasons; for example, equipment design or installation changes, changes in the licensing basis of the nuclear installation, parts changes, component material changes, component failures, uncontrolled maintenance, life extension review, manufacturing changes.	Change of the equipment manufacturing is an important reason.	x	New paras 2.21-2.22.			
11	FI	2	27	During the service life of the nuclear installation, extensions of the qualified life of an item may be considered, where justified and documented.	Please check the use of term service life of nuclear installation. Proper used of terminology: service life of item and lifetime of a nuclear installation both are used in the draft	x	New paras 2.20-2.23.			
14	DE	2	28	A quality assurance programme for equipment being qualified includes a variety of elements, such as equipment design, production, qualification (e.g. test, analysis, combined test and analysis and experience), installation, plant surveillance and maintenance, periodic testing and documentation. <u>Such activities should be either verified, accompanied or reviewed and assessed by an independent party at an appropriate time.</u>	It is crucial to nuclear safety that independent parties are involved into the qualification process at various stages to independently assess and review the qualification process.			x	Not all Member States require an independent assessment of the qualification process by the third party.	
11	USA	2	28 Experience) storage , installation	Adding requirement of QA oversight on storage requirements	x	New 2.24.			
43	CA	2	29	Recommend adding "including review of qualified status" in addition to "qualification activities"	Currently unclear if the review of qualified status should be performed in accordance with approved procedures and controls in accordance with a management system that meets GSR Part 2 IAEA Safety Standards General Safety Requirements. Clarification is particularly needed because the wording in 2.28 "a quality assurance programme for equipment being qualified" could be interpreted relevant only to initial qualification activities.	x	New.2.25.			
15	DE	2	31	Data acquisition tools used during type testing should be calibrated against traceable criteria and documentation supporting such calibrations should be provided.	It is not clear which data acquisition tools are meant. Is this a specific requirement for performing tests? If so, this specific requirement is not needed here (in a general chapter). If not, please clarify.			x	New 2.26. These are sensors, data acquisition, recorders need during qualification testing.	
16	DE	2	32	Traceability should be established between the testing documentation, the conclusions from each qualification test and each installed item system and component subject to qualification, in order to ensure that the test configuration corresponds to the installed configuration.	Consistency with word-in used before.	x	New 2.27. Traceability should be established among the qualification documentation, the conclusions from each qualification test or analysis steps, and the installed equipment configuration that, in order to ensure that the installed configuration corresponds to the as-tested configuration.			
11	ENIS	2	32	Suggestion to modify as follows: "All non-conformities and deviations identified during the qualification activities should be corrected analysed, justified and documented"	If something went wrong during a test it's not always possible to correct that but deviation could be analysed and the analysis result could justify the acceptability of the deviation.	x	All non-conformities and deviations identified during the qualification and preservation activities should be analysed, justified and documented, with conclusions made as to whether any further actions or considerations are required.			
6	SWE	2	33	All non-conformities and deviations identified during the qualification activities should be corrected analysed, justified and documented.	If something went wrong during a test it's not always possible to correct that but maybe the deviation could be analysed and found to be possible to accept if it isn't crucial for the result of the test.	x	All non-conformities and deviations identified during the qualification and preservation activities should be analysed, justified and documented, with conclusions made as to whether any further actions or considerations are required.			

NUSSC and NSGC comments on:
Design of Instrumentation and Control Systems for Nuclear Power Plants (DS 431, Rev. "M")

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7	UK	2	33	Consider adding text along the line of that in bold: "All non-conformities and deviations identified during the qualification activities should be corrected and documented, with conclusions made as to whether any further actions or considerations are required to ensure the existing qualified life is not impacted"	In the opinion of the commenter, stating just that non-conformities should be corrected and documented does not go far enough to explain potential impact on qualified life. The current sentence feels too short on the description of the significant impact deviations and non-conformities can have on qualified life	x	All non-conformities and deviations identified during the qualification and preservation activities should be analysed, justified and documented, with conclusions made as to whether any further actions or considerations are required.			
17	DE	2	34	Documentation on qualification includes the qualification specification and plan, qualification analysis and test procedures, configuration identification documents of the test specimens, qualification analysis and test reports, qualification analysis and test data, qualification summary report, plant specific equipment qualification files (e.g. equipment qualification reports, environmental, seismic and electromagnetic compatibility evaluations), qualified life evaluations, plant field testing and analytical evaluations, equipment modifications and changeouts, and surveillance and maintenance records.	The configuration identification documents of the test specimens is an important documentation of the qualification	x	See new para 2.28. Equipment qualification documentation should include the following items: — A list of equipment important to safety that is subject to qualification that includes required equipment safety function and specific physical location; — The qualification requirements specifications; — E quipment specifications (e.g. identification/configuration of the equipment subject to qualification); — Q ualification analysis and test reports (e.g. qualification analysis and test data); — Q ualification assessment summary report; — Q ualification preservation instructions providing all requirements to preserve the equipment qualified status during installation, commissioning, operation and maintenance of the equipment; — M anufacturing reference documents outlining all requirements needed to preserve the qualified status during manufacturing of the series equipment			
12	ENIS	2	34	Add between 2.40 and 2.41 : " <u>A qualification preservation sheet providing all requirements allowing to keep the qualified status during installation, commissioning and maintenance of the equipment should be prepared.</u> " " <u>A manufacturing reference file providing all requirements allowing to keep the qualified status during manufacturing of the series equipment should be prepared.</u> "	Documents dealing with the preservation of qualification during manufacturing, installation, commissioning and maintenance (all operating lifetime of the nuclear installation) is not mentioned.	x	See new para 2.28. Equipment qualification documentation should include the following items: — A list of equipment important to safety that is subject to qualification that includes required equipment safety function and specific physical location; — The qualification requirements specifications; — E quipment specifications (e.g. identification/configuration of the equipment subject to qualification); — Q ualification analysis and test reports (e.g. qualification analysis and test data); — Q ualification assessment summary report; — Q ualification preservation instructions providing all requirements to preserve the equipment qualified status during installation, commissioning, operation and maintenance of the equipment; — M anufacturing reference documents outlining all requirements needed to preserve the qualified status during manufacturing of the series equipment.			

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13	ENIS	2	34	Delete "plant specific equipment qualification files (e.g. equipment qualification reports, environmental, seismic and electromagnetic compatibility evaluations)" Delete "qualified life evaluations" Delete "Plant field testing and analytical evaluations".	Qualification analysis and test reports are already mentioned just before. What is the definition of these documents? The qualified life is already mentioned in the Qualification Summary Report. There are no definition or description of the context of establishing these documents. "Plant field testing": What tests are being addressed here?" Analytical evaluations": what is it?	x	See new para 2.28. Equipment qualification documentation should include the following items: —A list of equipment important to safety that is subject to qualification that includes required equipment safety function and specific physical location; —The qualification requirements specifications; —Equipment specifications (e.g. identification/configuration of the equipment subject to qualification); —Qualification analysis and test reports (e.g. qualification analysis and test data); —Qualification assessment summary report; —Qualification preservation instructions providing all requirements to preserve the equipment qualified status during installation, commissioning, operation and maintenance of the equipment; —Manufacturing reference documents outlining all requirements needed to preserve the qualified status during manufacturing of the series equipment.			
12	USA	2	34	Insert "plant-specific physical location" into the list of topics to be included among item documentation.	Location specific evaluation is needed because of its impact on qualified life	x	See new para 2.28. Equipment qualification documentation should include the following items: —A list of equipment important to safety that is subject to qualification that includes required equipment safety function and specific physical location; —The qualification requirements specifications; —Equipment specifications (e.g. identification/configuration of the equipment subject to qualification); —Qualification analysis and test reports (e.g. qualification analysis and test data); —Qualification assessment summary report; —Qualification preservation instructions providing all requirements to preserve the equipment qualified status during installation, commissioning, operation and maintenance of the equipment; —Manufacturing reference documents outlining all requirements needed to preserve the qualified status during manufacturing of the series equipment.			

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7	JP	2	34	Documentation on qualification includes the qualification specification and plans, equipment qualification programmes, a master list of items subject to qualification , qualification analysis and test procedures, qualification analysis and test data, qualification summary report, plant specific equipment qualification files (e.g. equipment qualification reports, environmental, seismic and electromagnetic compatibility evaluations), qualified life evaluations, plant field testing and analytical evaluations, equipment modifications and changeouts, and surveillance and maintenance records.	A master list is essential for inspections of qualified life, and it is a fundamental document. Therefore it is necessary to add it.	x	See new para 2.28. Equipment qualification documentation should include the following items: — A list of equipment important to safety that is subject to qualification that includes required equipment safety function and specific physical location; — The qualification requirements specifications; — E quipment specifications (e.g. identification/configuration of the equipment subject to qualification); — Q ualification analysis and test reports (e.g. qualification analysis and test data); — Q ualification assessment summary report; — Q ualification preservation instructions providing all requirements to preserve the equipment qualified status during installation, commissioning, operation and maintenance of the equipment; — M anufacturing reference documents outlining all requirements needed to preserve the qualified status during manufacturing of the series equipment.			
8	JP	2	34	As well, records of how each qualification activity was carried out should be documented to support assuring the evaluation of test records.	Records on how all EQ related activities are actually conducted are also important to assure the accurate test report and its evaluation.	x	See new para 2.28. Equipment qualification documentation should include the following items: — A list of equipment important to safety that is subject to qualification that includes required equipment safety function and specific physical location; — The qualification requirements specifications; — E quipment specifications (e.g. identification/configuration of the equipment subject to qualification); — Q ualification analysis and test reports (e.g. qualification analysis and test data); — Q ualification assessment summary report; — Q ualification preservation instructions providing all requirements to preserve the equipment qualified status during installation, commissioning, operation and maintenance of the equipment; — M anufacturing reference documents outlining all requirements needed to preserve the qualified status during manufacturing of the series equipment.			

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9	JP	2	34	Equipment specification and requirements specifications should be an input for the assessment of the initial qualification status of the equipment. The equipment specifications should also include procurement and supply chain requirement; replacement interval requirement; maintenance requirement; and interface with another programmes for assessment of qualification preservation activities.	To keep a consistency with description in para 5.41, which specifies the documentation requirements through the procurement and supply chain, and para 5.43 (maintenance).		See new para 2.29. The equipment specification should include the following items: - Equipment type, vendor/manufacturer, model number (or series types of equipment); - Specific equipment configuration and settings; - The versions of firmware and application software, hardware description language to be delivered; - Dimensions, ranges of rated parameters (mechanical and electrical); - Mechanical, electrical, instrumentation and control interfaces of the equipment; - Equipment performance capabilities (e.g. accuracy data, insulation resistance, cable impedance, response times); - Operating manual, instructions or data sheets, including parts list, maintenance, installation and test procedures; - Certificates and test documentation with respect to industrial standards.	x	Already included in the equipment qualification instructions.	
14 8	ENIS UK	2 2	35 35	Change the order of the clauses Discussion on record ownership	This clause should come after clause 2.36 From experience, the ownership and maintenance of the documentation/qualification file is a commonly asked question and thus more clarification on who should own this could be useful. In the UK, there is a specific Licence Condition (LC6 http://www.onr.org.uk/documents/licence-condition-handbook.pdf) set by the regulator but the arrangements must be owned and met by the licensee. Otherwise, these important documents may get lost	x			x we do not provide recommendations who should be an owner.	