"CONSTRUCTION FOR NUCLEAR INSTALLATIONS" (DS441)
Member State Comments on DS441 version dated January 2012

COMMENTS BY REVIEWER Reviewer: M.Gettemans Country/Organization: Belgium/Bel V Date: 2012-06-18				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	General	Use only the term "construction organization" to designate the responsible organization.	Ensure consistency (sometimes the word "licensee" is used where "construction organization" seems more appropriate, e.g. para 4.55, 5.14, 5.45, 5.48)			R	In 4.55 licensee is appropriate. 5.14 (new 5.24) and 5.45 (new 5.20) both are mentioned. 5.48 (new 5.2) licensee is appropriate.
2	1.3/line 3	Text refers to ref [4] which is still a draft; adapt reference when published	Ensure consistency			R	This document is already issued by IAEA
3	1.3/line 10	Replace the last sentence by: "This recommendation should address all construction activities having a potential impact on safety, although no nuclear material may be present during the construction"	We do not believe that all construction activities have a potential impact on safety (see also para 1.8)		A		Sentence modified and word "may" added.
4	2.8	Replace the first sentence by: "All efforts (management, organization, training, …) should be taken by all parties to ensure that an adequate level of safety	The present text is too vague. We also believe that safety culture should be mentioned explicitly.		A		(Para is now 2.9)

		culture is achieved (safety consciousness and acceptance of personal responsibility for safety, questioning attitude, adherence to procedures)."					
5	2.9	Add the text between brackets in the last sentence: "Design changes (to be documented and approved by the regulatory body, see para 3.8) and late …".	The regulatory body should be mentioned because it is an important stakeholder in the process already at an early stage of the construction phase.	A			Added in new para 3.8
6	2.13	Correct last sentence: " … is provided in paras **5.51-5.53."**	Present text refers to wrong paras.	A			
7	4.43	Separate fifth bullet in two, between **"…** or service" and "The extent of **…".**	Editorial	A			
8	4.44	Add the following text in the very last sentence: "... including the licensee **and the regulatory body see paras 3.32 3.6 & 3.7),** should be ...".	The regulatory body should be mentioned with a link to chapter 3.	A			
9	5.4	Add a text on the necessity for the construction organization to have an integrated Quality Assurance program consistent with the QA program of sub-contractors.	The present text is OK, but it seems useful to mention that a complex organization such as the construction organization needs a QA program that is consistent with the others.	A			
10	5.19	Explicitly mention the organization that should be responsible to specify and	Clarity	A			Organizations specified

		monitor the environmental conditions.					
COMMENTS BY REVIEWER Reviewer: STUK Country/Organization: Finland/STUK Date: 2012-06-18				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
11	General	Reference to the other guides. There are lots of widely used guides and standards from areas of construction and project management.	To be considered e.g.: A guide to the project management body of knowledge" PMBOK - ANSI/PMI, Fourth edition 99-001-2008 (IEEE 1490-2011). PROJECT MANAGEMENT INSTITUTE, Construction Extension to the PMBOK® Guide Third Edition, PMI, Newtown (2007). PROJECT MANAGEMENT INSTITUTE, Project and Program Risk Management: A Guide to Managing Project Risks and Opportunities, PMI, Newtown (1992).			R	Not appropriate: the document is not about project management
12	Backgroun d § 1.2	modify ... and **"Safety significant major modifications** of existing nuclear installations as decided by the Ioea1 authorities	The modifications implemented to existing nuclear facilities vary from minor non-safety related modifications to major		A See comments		Wording modified to be consistent with NS-G-2.3 item 1.7

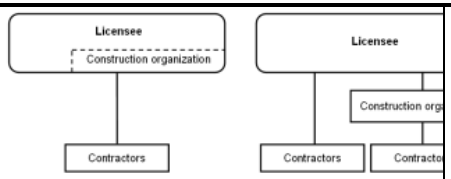
			backfitting projects being either safety related or not. Hence the application of these requirements is not feasible for each kind of project. Therefore it is suggested that the requirements should be applied for safety relevant/significant major modifications only and the decision to be made by local authorities on case by case basis.				
13	1.5 Scope	References could be added to parallel guides, where other phases of the project (such as design, commissioning and operation) are discussed. **Safety significant major** modifications of existing nuclear installations as decided by the local authorities	It would be easier to understand meaning of this guide, when structure of complete constructions guidance would have presented. See comment above		A see comments		Same as item 12 above
14	4.6	…new text proposal:. .. are fully aware of the safety ~~significance~~ requirements set for their supplies	Safety significance being a very wide concept and difficult to specify it is suggested that use the word "requirements" which are contractually specified easily verified			R	Sentence modified to " awareness of safety significance of contracted work"
15	4.19 – Project Management	Content and purpose of Project Management chapter is unclear. Does the chapter give guidance for project management or for something else? Some kind of	Consideration for strong reference to the PMBOK could be addressed also reference to chapter 5. which provides guidance for project		A See comment		Reference to NP-T-2.7 included as per UK comment

		project management guide (for example (PMBOK) could be referred.	management				
16	4.23	…procedures and instructions. The coherent application of the design requirements in separate project discipliners shall be reviewed by competent personnel before start of construction. The requirements and changes…	The degree of preparedness of design including the correct definitions and requirements for all interfaces between different design discipliners builds basis on successful construction phase.	A			
17	4.25	The licensee should ensure that the detailed design defines interfaces between systems and design discipliners in such level that the safety related requirements are applied, reviewed and approved through the supply chain.	The degree of preparedness of design including the correct definitions and requirements for all interfaces between different design discipliners builds basis on successful construction phase.			R	Part of suggestion is getting covered with the modification based on Pakistan comment
18	4.48 – 4.51	Heading “Control of Design Information” is unclear; it could be changes for example to: “Configuration Management”.	“Control of Design Information” can be understood to refer to document and records management, which is not the point here.	A			Clarified by adding reference of design guide
19	5.1	… The activities to be performed in manageable units. Definition of the projects work breakdown structure (WBS) is a essential task in project definition and considered an important project management tool.	PROJECT MANAGEMENT INSTITUTE, Practice Standard for Work Breakdown Structure, PMI, Newtown (2001).			R	It is believed that words “ manageable units” cover this

COMMENTS BY REVIEWER	RESOLUTION
Reviewer: Country/Organization: France/ASN	

Date: 26 juin 2012							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
20	General		Why is some text underlined ?			R	Underline indicated some additional work to be done
21	General		Is there a need to differentiate quality assurance provisions/requirements from the management system provisions/requirements ?			R	QA is part of management systems see refs 1, 2 & 3
22	1.1	this Safety Guide ~~provides~~ recommends an appropriate management process	Alternate wording			R	Safety Guide does not recommend.
23	1.2	judgement has to be exercised on the ~~measure~~ degree of the following recommendations' applicability to a specific installation	Alternate wording	A			
24	1.3	Therefore all construction activities have a potential impact on safety, although no nuclear or radioactive material may be present during the construction.	Nuclear material is restrictive considering the scope of the guide.			R	Radioactive material like (radiography equipment etc.) may be present at site during construction
25	1.4	as part of the demonstration that the ~~product~~ structures, systems and components, as well as the overall installation, can be commissioned and is capable of operating safely and reliably over its lifetime.	Clarification. Also to cover the case of a modification to an already operating installation (see 1.5).		A		The word "product" deleted and objective modified based on comments from other Member States

26	1.5	including the process of manufacturing and assembling the components, carrying out of civil and architectural work, installation and ~~maintenance~~ preservation of components and equipment,	Preservation is a more broader term, that encompasses maintenance but other topics such as foreign material exclusion, environmental conditions…			R	Maintenance covers broader aspects then preservation
27	1.5	This Safety Guide is applicable to the construction stage of a new nuclear installation and the modification of an existing nuclear installation~~1~~,	Suggestion either to remove the link with the footnote as it only focuses on NPP or to add is possible a link with other nuclear facility			R	Given only as an example
28	1.7/5th bullet	- To assist stakeholders in understanding the roles and responsibilities of different types of contractors. These contractors may as well be technical support organizations or consultants	Clarification		A Sentence modified and additional clarification provided		
29	1.7/5th bullet	- These contractors may be technical support organizations or consultants carrying out independent review and assessment or third party inspections **(needs improvement)**	What means “needs improvements” ?	A			Para modified
30	1.9	… which is a prerequisite for a safe and reliable operation of nuclear installations, it is noted that security and environmental aspects should also be considered and evaluated during construction.	Security is not the only aspect , environmental aspect may be added as limiting environmental impact may be required			R	This para covers security aspects. Environment aspects are covered in 2.15

31	2.2		Add a figure, after 2.2, to be more explicit on the construction organization vs the licensee	A			
32	§2.2 Line 10 Page 5	The use of contractor(s) in no way replaces or reduces the responsibility of the licensee for **all matters related to safety**.	Better wording		A Modified as per SF-1		
33	§2.3 Line 1 Page 5	The contractor means ~~to~~ any individual or organization who provides items or	Correction	A			
34	2.5	The highest level of safety that ~~can~~ should be achieved in the construction of nuclear installations	Clarification		A Sentence reworded to reflect the proposal		
35	2.9	Design changes and late completion of design works that may have any impact on safety should be minimized after construction starts	The guidance may open the door to any modification that may have no real impact on protection, safety aspects (e.g. a modification that may improve security during construction without any so much impact on safety may be possible)	A			New para is 2.10
36	2.9	Design changes and late completion of design works should be minimized after construction starts and should be recorded in a well defined quality process so that a final safety review may be carefully performed at the end of construction.”	Changes and late completion have to be recorded during construction in such a way to ensure appropriateness to the “as built” construction.		A With reworded text		

37	2.9	Adequate completion of design, including acceptance criteria, and engineering work commensurate with the authorization process should be verified prior to start of construction. To achieve that, the design schedule, including acceptance criteria and engineering work commensurate with the authorization process should be established well in advance. Before construction begins, a readiness review should be performed and forward action plan covering remaining design and engineering works and the necessary resource requirements should be developed and monitored as construction proceeds.. Care should be taken to ensure that the form of contract does not result in late completion of design work resulting in parties being placed under time and cost pressures that may affect quality and ultimately safety. Design changes and late completion of design works should be minimized after construction starts.	Due to the interaction between design process and procurement and the necessary integration of contractors methods in the execution design, the execution design is developed by sequence in advance of construction. Having all the design done when construction starts would imply equipment contracts to be signed several years in advance of the real needs. This would be especially difficult to achieve for a first of a kind.	A			

38	2.10	Development and qualification of well-defined methods of construction, transportation, inspection or testing that is relevant to safety should be done before commencement of the activities, especially for a first-of-kind technology*. * More quality non-conformance and re-works are expected when new methodologies are applied for the first time.	Transfer text as a footnote. This general assertion that justify previous sentence is not fully necessary : no need to assert that it is normal that new methodologies leads to more non-conformances	A			Now para is 2.11
39	2.11	Security and protection of the environment requirements should be identified and taken into account in addition to safety considerations. Conflicting requirements should be identified and resolved according to the licensee management system and consistently with applicable regulations. According to those requirements, on-site arrangements should be implemented, including physical protection against sabotage in use and storage of items important to safety.	According to 2.7, licensee has to consider health and safety, pressure boundaries and protection of the environment -> security, safety and protection of environment issues Clarification on the resolution process.			R	Environment is covered in 2.15. 2nd part of proposal accepted with some modification.

40	2.12	For sites with existing nuclear installations, in addition to ensuring that construction activities do not jeopardize the safety of existing nuclear installations, in emergency preparedness should take account the followings:	Needs to repeat the focus on avoiding compromising safety of operating facilities			R	Safety of existing installation already covered in 2.14
41	§2.12 Line 1 Page 8	For sites with existing nuclear installations, emergency preparedness should take **into** account the followings	Correction	A			
42	2.12/1st bullet	• measure to protect personnel working both at the operating nuclear installation and on the construction site, considering the average and peak employment at the site throughout the construction or modification project	Clarification			R	Site includes both operating and under construction installation
43	2.12/3rd bullet	- Provision of additional alarms to alert all personnel at the site (encompassing operating installations and installation being built); and,	Clarification	A			
44	§2.12 Line 6 Page 8	Provision of additional alarms **for** all personnel at the site; and,	Correction		A Wwith modification		
45	2.12	Locate 2.12 after 2.16	To have recommendations on emergency provisions after the risks/environmental impact reviews	A			

46	2.13	For sites with existing nuclear installations, ~~The regulatory body should ensure that the~~ licensee(s)[3] should carry~~ies~~ out a risk and threat assessment to determine the possible risks of the construction site to the existing facilities and the effect of existing facilities on the construction site.	To have the onus on the licensee(s)		A First part accepted and regulators role retained		
47	2.13	Possible risks are caused by, but not limited to, dredging, quarrying, excavation, blasting, piling, dust, transportation, lifting and creation of connections between the existing facilities and the construction site. Preventive measures should be taken to manage the construction	Additional risk to mention	A			
48	2.17	by engineering and performance barriers to ensure that items are installed and ~~tested~~ and preserved as designed. Security measures employed should consider control of personnel, material, and	Testing is not really the focus of this guide.			R	Not valid as the clause deleted to avoid duplication with new 2.13
49	§2.17 Line 1 to 5 Page 9	The security measures that describe actions taken during construction should consider, detect, and deter conditions that would impair the capabilities of security- and items to perform their intended safety functions, where those conditions are not	No proposal of modification to this sentence, but it shall be modified; it is quite difficult to understand the meaning of it. What means “security- and items”?			R	Same as above

		otherwise detected by engineering and performance barriers to ensure that items are installed and tested as designed.					
50	2.18	In addition, the following issues should be considered before on-site construction begins to ensure quality of the construction: *Off-site preparedness* - Location and approach/exit roads especially for large component transportation; - Arrangements to accommodate specialized nuclear installation work force to the site (labour colony); *Site capabilities* - Marking of nuclear licensed site boundary; - All infrastructure support systems should be in place including required electricity, gas and water supply, protection or coverage after work completion and environmental qualification. - Construction ~~processes and~~ equipment such as cranes, scaffolding, temporary structures, portable equipment, and flammable equipment are all designed to withstand meteorological and hydrological hazards such as earthquakes,	Rearrange list to improve logic by grouping similar items		A With minor rewording		

		floods, fires, heavy rains, snow, ice, etc., during the construction. *Management system and workers'safety* - Licensee's management system provisions related to ~~manual~~ on site construction activities ~~quality management~~; - Work hazard analysis report; ~~- Construction safety management manual (radiation source handling and hazard);~~ - Plan for radiation safety of workers, at least for non-destructive testing, and if relevant ~~(~~for construction with existing installations~~)~~; *Design and construction technical data* - Design reports of items important to safety having reference to construction consent.					
51	2.18	Plan for radiation safety of workers (for modification of construction with existing installations);	This sentence may be related to the modification of an installation and not the construction		A Wwith different wording		

52	§2.18 Line 15 Page 10	Construction processes and equipment such as cranes, scaffolding, temporary structures, portable equipment, and flammable equipment are all designed to withstand meteorological and hydrological hazards such as ~~**earthquakes,**~~ floods, ~~**fires,**~~ heavy rains, snow, ice, etc., during the construction**, and this up to defined and normal limits according to the site conditions.**	This requirement is extremely constraining and cannot be fulfilled as written. Cranes and scaffoldings for example are not designed to withstand an earthquake	A			This bullet has been rewritten based on large number of comments received
53	3.8/2nd bullet	- on ~~a systematic basis,~~ the development of the remaining design of the nuclear installation as demonstrated in the safety documentation submitted by the applicant or licensee;	Review and assessment should be proportionate to safety so systematic may be too ambitious.			R	The language is as per para 3.40 of SSG-12
54	3.9	If there are non-conformances, an action plan ~~may~~ is likely to be needed to correct deficiencies to allow progress beyond witness or hold points	"may" is weak.		A Word "may" deleted different wording used.		
55	3.10	The regulatory body should have in place ~~a system to allow them~~ provisions to receive and address any matters raised by other parties concerning the safety of construction.	Simpler wording	A			

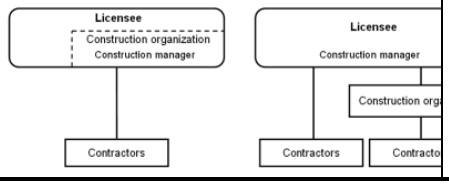
56	3.11	3.12 The regulatory body should require appropriate corrective actions to be carried out to prevent the recurrence of safety significant events.	Make the last sentence a separate paragraph	A			
57	4.1	Since construction work has significant impact on future safety of nuclear installation, ~~a successful~~ the management system during construction should ensure~~s~~ that safety matters are not dealt with in isolation but are considered within the context of all construction activities.	Clarification.		A Word "successful" deleted		
58	4.2	This involves an understanding that deviations from procedures and specifications, or ~~failure to understand~~ lack of understanding the safety significance of structures, systems and components may have unforeseen consequences in the future.	Failure is too strong…	A			
59	4.2	Safety culture is important in all phases of nuclear installation life cycle. In the construction stage, it implies characteristics and attitudes pursuing high quality construction to ensure safety in the future commissioning, operational and decommissioning phases.	Add future	A			

60	4.3	These factors are known to be some of the prime ~~conditions that can induce poor~~ challenges on safety culture. Goal conflicts between schedule, cost and safety should not adversely affect conservative decision-making and the maintenance of a questioning attitude.	Alternate wording less negative	A			
61	4.3	Application of safety culture attributes should be implemented in all participating organizations and individuals, taking into account the safety significance of their role in the construction.	Need to stress on a proportionate approach. The expected "level" of safety culture in not the same for a worker installing rebars, a civil structure foreman, a civil structure engineer or the construction manager…	A			Added in 4.4
62	§4.4 Line 2 Page 15	Construction programmes and methodologies should be developed and implemented to help all interested parties involved in the construction project **to** strengthen safety culture particularly in organizations less familiar with nuclear safety requirements.	Correction	A			
63	4.6	The licensee should ensure all contractors and subcontractors in the supply chain or involved in surveillance activities are fully aware of the safety significance of what they have been contracted to supply or to monitor.	Clarification		A See comments		More generalized wording "work that they have been contracted to do" used

64	4.7	~~Safety culture and its promotion should be considered as part of contractor evaluation and monitored during the construction stage.~~ Safety culture Monitoring and evaluation should cover all ~~not only contractors'~~ organizations in the construction activities ~~but also staff~~. In particular, safety culture and its promotion should be considered as part of contractor evaluation and monitored during the construction stage.	Rearrange paragraph to give the general expectation first, then insist on contractors.			R	Clause merged with new 4.5
65	4.8	To support the safety culture principles, there should be a process for reporting safety concerns directly to management, in first instance, and the regulatory body according to the procedure in force. This process should include capability of anonymously reporting a non-conformance	On order not to undermine the primary responsibility of the licensee, design and construction issues should be raised first to him.		A See comments		See new 4.7.

66	§4.8	To support the safety culture principles, there should be a process for reporting safety concerns directly to management and the regulatory body. This process should ~~**include the capability of anonymously reporting a non-conformance or concern**~~ **guaranty that the persons who would effectively report about such concerns could not, as a consequence, be exposed to undue blame**.	Acting anonymously is contrary to "transparency" which is of prime importance for safety and safety culture. We believe that on the contrary, such anonymous process might be detrimental to safety and even generate poisonous and suspicious climate. In our proposal, the word "undue" is used on purpose, because it might happen that the person who reports about the concern might share some of the responsibilities and might therefore be subject to reparation for the damage she contributed to causing. She could be blamed for the initial fault, not for reporting about it.		A See comment		Both open and anonymous reporting included
67	4.9	A graded approach based on the relative importance to safety of each item, service or process should be used during all construction activities. The graded approach should reflect a planned and recognized difference in the application of specific management system ~~quality assurance~~ requirements, for example on quality assurance.	To be consistent with 4.10 Quality assurance is only one part of the management system	A			

68	4.11 (b)	The necessary level of detail and the need for and extent of inspection and test plans;	Clarification	A			Para is now 4.9
69	4.15	During construction, The licensee should take the responsibility ~~during construction~~ for all activities that could affect safety of the installation regardless of location.	Alternate wording to stress on construction	A			
70	4.15	. The licensee should perform surveillances to verify that the contractors' activities are in compliance with all relevant safety/security requirements from both technical and management system perspective;	Why only focusing on safety , suggestion to add security			R	New para is 4.13 Security checks are unlikely to be done through "audits" of the type referred to here.
71	4.15/1st bullet	- Developing and implementing a management system covering construction activities to assure (future) plant safety ~~the required quality~~.	Safety is the goal and quality is a necessary requisite to achieve it.		A See comment		Word plant safety added
72	4.15/1st bullet	supervision plan for the items important to safety which includes audits, product quality surveillance, witness/hold points, and field/workshop walk downs	To stress on construction activities performed off-site.		A See comment		Clause generalized by just retaining walk downs without qualifying them
73	4.15/6th bullet	- Inspections, tests and verification of items important to safety~~, which the regulator verifies but does not substitute for~~.	Although true, no need to write it			R	Important statement

74	4.15/8th bullet	- Ensuring that appropriate records relevant to safety are established and preserved;	Establishing the records should be mentioned	A			
75	4.15/10th bullet	- Ensuring that appropriate records relevant to safety are established and preserved, including ~~.~~ ~~Ensuring that~~ appropriate records relevant to plant life and ageing management are preserved;	Merge bullets 8 and 10.	A			
76	4.17	The construction manager should have access to the necessary resources to establish a construction organization which may ~~be or~~ include contracted staff or even fully contracted (turnkey project).	Not to have the all outsource scheme first.	A			
77	4.17	The management structure of the construction organization should define the level of responsibility for groups within it, including the responsibilities among ~~contractors~~ contracted staff, as well as the responsibilities of contractors involved in the construction.			A See comment		Involvement of all contractors included
78	After 4.17		Add a figure for clarification		A See comment		Reference to Fig given

79	After 4.17	If the construction organization is fully contracted by the licensee (turn-key project), the licensee should develop adequate provisions to implement its responsibility for safety. As a consequence, the licensee should devote significant resources to assess the construction organization and its contractors performance with regard to safety.	Add a paragraph to insist on turnkey projects and the role of licensee.		A See comment		Covered in modified 2.2 – but cannot "insist" on "turn-key" projects.
80	4.18 (c)	(c) Identification of generic construction activities, developing and maintaining guides about the use of standardized instructions and procedures and best practices;	Clarification	A			
81	4.18 (h)	(h) Ensuring preservation of installed equipment, by Carrying out maintenance of equipment as required, ensuring proper care of equipment that could deteriorate during construction, such as dehumidification	The goal should be stated first, then the means.	A			
82	4.26	Excessive Reliance should not be placed on just quoting codes and standards.	Clarification	A			
83	4.27	Traceability of items important to safety from initial design through construction and then to commissioning is necessary for ~~an important aspect of ensuring~~ safety.	Alternate wording	A			

84	4.27	Traceability of items important to safety from initial design through construction and then to commissioning and future life phases is an important aspect of ensuring safety	Need to clarify why the sentence focuses on commissioning and not the other subsequent life phases	A			
85	4.27	Add a bullet : (xx) qualification record,	To recall the need for qualified equipment	A			
86	4.27	The construction organization should be responsible for ensuring that the traceability records required by the licensee are actually provided ~~to them~~.	Clarification			R	Comment not valid as clause modified as per German comment
87	4.30	Interface arrangements should be identified and agreed between the licensee, construction organization (if ~~appropriate~~ not within the licensee)	Clarification	A			
88	4.33	Access control rules and procedures for items important to safety and working areas should also be ~~written~~ documented and implemented for the transfer.	Clarification	A			

89	4.34	When items important to safety and working areas are to be transferred between groups within the construction organization or between contractors of the construction organization, both groups/contractors concerned should make a joint check of the transferred items and the associated documents together, preferably at the location in consideration.	To extend to transfer between contractors. Preferably gives some flexibility, especially for the document review part.	A			With minor modifications
90	4.35	After transfer, any remaining further work or corrective actions by the previous group should only be done with appropriate authorization by the new group.	Clarification	A			
91	4.36	The licensee should ensure provisions are ~~made~~ established and implemented to control and coordinate the handover from construction to commissioning.	Implementation is important	A			
92	4.36	These provisions should cover at least ~~include the following activities~~:	Alternate wording, considering the bullet list.			R	Include has at least in it.
93	4.36 (c)	(c) Any remaining non-conformances or incomplete items should be identified and assessed to determine ~~ensure that there is no~~ safety implication for ~~during~~ commissioning activities and later plant operation.	To have an open question			R	Replacement of ensure by determine dilutes the clause

94	4.36 (g) and (h)	4.## To enable adequate maintenance and ageing management once the installation is in operation: (ag) The level of technical detail in transfer documentation should be sufficient to allow the ~~recipient~~ licensee to identify parts and order replacements for maintenance. (bh) All relevant information should be copied to the licensee ~~plant operators and other parties who will be responsible for ageing management at a later time~~.	Make a separate paragraph for bullet (g) and (h) as they are dealing with ageing management and are very specific compared to (a) to (f). It is up to the licensee to arrange for maintenance and ageing management	A			New clauses added
95	4.36 new bullets	(i) Approved "As built" plans should be established and transferred; (j) all different parts of the structure, systems and components transferred have to be marked/tagged in accordance to the documentation; (k) all temporary devices (for example, temporary caps in piping or temporary electrical straps) installed on the equipments should be identified	3 additionals topics to mention	A			
96	4.37	Processes should be in place to ensure initial and continuous qualification of the workers.	Initial qualification should be mentioned	A			
97	Title before 4.39	Training of licensee's staff ~~human resources~~	To better reflect the topic of 4.39	A			

98	4.39	so that they undergo hands-on training to gain ~~special~~ additional expertise in operation, maintenance and technical support.	Clarification (hands-on work during construction will not be possible for licensee staff recruited after construction…)	A			
99	4.39	Licensee personnel who will be involved in commissioning, operating and maintaining nuclear installations should be involved, as far as practicable, during the construction, so that they undergo hands-on training to gain additional ~~special~~ expertise in operation, maintenance and technical support.	This might be possible for only part of the staff, not all staff of the Licensee.	A			
100	4.42	Where contracted services are an integral part of construction, contractor oversight has additional challenges ~~are similar in scale and safety importance as~~ compared to those for operating installations.	Oversight of construction has additional magnitude compared to operating plants…			R	Comment not valid anymore as the clause has been modified
101	4.42	The use of contracted services tends to be increased by~~: a lower availability of nuclear expertise;~~ the expansion of the international supply chain~~; the first-of-a-kind project;~~ and turn-key projects.	No need to stress on availability of nuclear expertise nor first fo a kind.			R	Lower availability of nuclear expertise has been qualified to be for the licensee which is especially true for new comers.

102	4.43	The licensee should be notified of the results of the oversight performed by the construction organization on safety related matters ~~and, if necessary,~~ both to define and implement its own oversight of contractors' activities and to be able to present the results to the stakeholders.	Need to emphasis the need of oversight by the licensee			R	Utilization of results of oversight by licensee is covered under responsibilities of licensee
103	4.44	Before initiating any activity following the award of subcontract(s), the contractor(s) should demonstrate to the construction organization, and to the licensee if required by the licensee, that the contractor(s) is fully aware of all relevant requirements for the activities.	Licensee role should be recalled in accepting contractors	A			
104	4.46	The construction organization should ~~frequently~~ organize regular meetings	Redundant with regular.	A			
105	4.47		Beginning of the sentence is unclear	A			Clause modified as per German and UK comment
106	4.47	Contractors should ensure that each contractor organizes daily tool-box meetings where work process, schedule, any deviation, and any other important aspects of work that is relevant to safety and quality.	Graded approach is needed for both momentum on appropriate topics and efficiency on site.	A			Clause modified as per German and UK comment

107	4.49	The licensee should control the drawings, design ~~codes and~~ , construction, commissioning and operation related documentation which describe the basis for licensing the construction, commissioning and operation	Licensee has usually very weak influence on design code. Expand scope to other safety related documents			R	Commissioning and operation is out of scope of this document. However clause is modified to reflect control on use of design codes not control of design code as written in the draft document.
108	4.50	This may includes queries related to the understanding or implementation of safety related provisions established in design/construction codes.	To explicitly mention the issue of conformity with construction codes.			R	Too much detail. Does not add value
109	4.54	This system should define non-conformance and specify the roles and responsibilities of the licensee, construction organization and contractors for reporting, correcting non-conformances and preventing similar non-conformances."	Preventing non-conformances is an important part of the process.	A			Clause modified to focus only on reporting and prevention added in next para
110	4.54	In addition, this system should ~~incorporate~~ be consistent with the regulatory requirements applicable ~~approval process~~ for handling any non-conformance.	There may not be an approval process by the regulator			R	The sentence has been modified to focus on safety significant
111	4.55 to 4.57	"corrective and preventive action" instead of "corrective actions"	Preventing non-conformances is an important part of the process.	A			

112	4.58	Due to the challenging nature of construction projects such as tight schedules~~,~~ or new technology ~~or limited availability of resources,~~ corrective actions to non-conformances may require long time and may stay as pending issue even after handovers from one party to	Limited resources is not a good excuse. As the guide recommends to have adequate resources…			R	Limited resource is a valid reason for corrective actions taking time
113	4.58	A comprehensive tracking system should be managed to ensure that these non-conformances are resolved ~~as soon as possible~~ and records maintained and that the relevant parties are informed.	To be consistent with 4.59			R	Comment not valid due to modification of the para based on UK comments
114	4.58	At the end, add : Whatever long is the time needed to resolve non-conformance, preventive actions should be implemented early to prevent similar non-conformance : these actions should be recorded	Resolving a non-conformance can be long if new studies have to be done but leading preventive actions can be done at once non-conformance is detected.	A			With modification
115	5.2	The construction schedule should be managed continuously by the construction organization during the construction and communicated ~~by the construction manage~~r to relevant parties.	No need to precise who communicates.	A			
116	5.3	Some may be specified by the licensee ~~and~~ or regulatory body.	Clarification	A			With modification

117	5.4	The construction planning, scheduling and work sequence should include requirements for off-site manufacturing and assembling under an adequate management system including quality assurance programme.	Quality assurance is one part of the management system	A			
118	5.5	The examination of specifications, documents and drawings, and plans and schedules should ~~identify~~ result in defining which off-site/on-site manufacturing, assembling, installation, and inspection and testing activities should be performed.	Off-site activities should be considered.			R	This clause is specific to on-site activities.
119	5.6	There should be regular meetings at which the contractor's methods are discussed with the design team~~.~~ as There is the potential for the contractor's methods to undermine design assumptions.	Clarification	A			
120	5.7	Special consideration should be given to the form of cast-in items and plant fixings~~.~~as Post-drilling of concrete for the installation of plant fixings may be unacceptable and undermine safety.	Clarification	A			

121	5.7	Last sentence to be modified as follows: Post drilling of concrete for the installation of plant fixings may be implemented only on an exceptional basis in order not to undermine safety and only after dedicated calculations have been performed.	The FA3 feedback shows that for a FOAK, post-drilling will occur. Nevertheless targeting very low level is key as well as mitigating are necessary.	A			With modification
122	5.9	The procurement specifications relevant to items important to safety should emphasize the safety requirements including ~~implementation of~~ those relevant to technical characteristics, safety culture and quality management.	Not to forget technical requirements.	A			
123	5.10	The safety classification of items important to safety should be included in the procurement specifications so that the supplier can determine the necessary codes and standards (including inspection requirements), ~~where~~ if these have not been specified by the designer.	Clarification			R	“Where” is more appropriate

124	5.10	The safety classification of items important to safety should be included in the procurement specifications so that the supplier can determine the necessary codes and standards (including inspection requirements), if ~~where~~ these have not been specified by the designer. Any change in the safety classification, resulting for example from final safety studies, should be notified to the supplier and the impact on already manufactured equipment should be assessed.		A			
125	5.11	"Storage, installation, preservation and test instructions;"	Usually items are installed a long time before tests and operation : manufacturer is able to define the best way to ensure preservation of item when it is installed (for example, conservation of pumps needs specific actions when pumps are installed but not in operation) -> see 5.32 + 5.35	A			
126	5.15	The licensee should have in place emergency planning and emergency measures to ensure worker and public safety in the case of an accident occurring at or affecting the ~~on-site or external event that may occur during~~ construction site.	Clarification on which accidents should be considered (covering a construction site at a site where there are operating units).	A			New paragraph 2.12

127	5.15	Locate 5.15 after 5.17	More logical order	A			Moved to paragraph 2.12
128	5.17	The construction organization should have in place contingency plans for on-site critical construction activities, including measures to cope with electric power outage, loss of water supply, disruption of concrete batching, disruption of concrete pumping and any other interruptions which may cause unexpected deterioration in work quality.	Disruption of concrete pumping can be critical for in work quality.	A			Moved as new 4.19
129	5.19	The environmental conditions such as temperature, pressure, humidity, heavy rain, snow, dust, dirt, airborne salt, wind, and electromagnetic conditions	Heavy rain is important for keeping buildings out of water. Snow needs to be taken into account for temporary structures that can affect safety.	A			
130	5.21	The construction organization should put in place measures and controls necessary to protect items important to safety from internal and external ~~contamination~~ aggression by dirt, dust and foreign material from its environment, including thoses generated by nearby construction activities.”	Aggression seems to fit better for foreign material + environment includes near activities for construction.			R	Contamination is the correct word. Source of contamination need not to be specified

131	5.23	In addition, "Checking installation of temporary devices (for example, temporary caps in piping) before cleaning and withdrawal if needed after cleaning."	Temporary devices can be forgotten after cleaning and may induce safety difficulties during commissioning and operating.	A			
132	5.26	For transportation of large or heavy components, all roadways and bridges on the routes ~~are~~ should be appropriately assessed to ensure	Clarification	A			
133	5.28 (i)	(i) Radiation protection ~~from any sources and their appropriate markings~~.	Superfluous			R	This is particular to the radiation sources
134	5.36	This verification should be formally documented to confirm the items important to safety have been constructed to the specified requirements and comply with the acceptance criteria, including those detailed in the licensing documentation.	To make a clearer link with the safety case submitted to the regulator	A			
135	5.39	Any use of radioactive sealed sources and radiation devices during such activities as radiographic examinations, gauging (density, thickness, moisture, etc.) or material analysis should consider protection of workers ~~and sensitive items in the area~~ as required by the	Clarification The BSS deals with protection of people, not of items…	A			With modification. First comment accepted. 2nd part retained after shifting the words "and sensitive items in the area" outside the reference.

136	5.40	The ~~quality assurance programme for~~ management system covering manufacturing and assembling activities should provide for the review of procurement documents for the item to be manufactured	Quality assurance is only a part of the management system scope	A			With slight modification
137	5.41	Add a bullet: "(j) the need for equipment qualification, and the associated type-tests if needed"	Qualified equipment is needed	A			
138	5.42	The licensee should ensure that manufacturer's management system ~~quality assurance programme~~ includes the identification and control of processes	Quality assurance is a part of the management system.	A			
139	5.43	Where special equipment such as tooling, jigs, fixtures, unique inspection gauges, computers and computer software are required to aid the manufacturing or assembling process, these should be properly qualified or validated for use as required, and their application and limitations known to those carrying out the activity.	To insist on limitations	A			
140	5.51	Such consideration should also include ~~consequence~~ impact assessment of environmental discharges that are cumulative for all facilities on a site.	Clarification	A			

141	5.52	The responsibilities of the construction organization and of the existing <u>installation</u> operation organization should be defined before the start of construction activities	Clarification			R	Recognizing that the site may have one or more licensees this para is modified to reflect this.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: : **Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)** (with comments of RWE Technology GmbH, TÜV Nord and GRS) Country/Organization: Germany Date: May 22 , 2012 Note: Relevanz: 1 – Essentials 2 – Clarification 3 – Wording/Editorial							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
142 (Relevanz 3)	Title page	change title: "Construction <u>of</u> ~~for~~ Nuclear Installations"	Editorial (compare with DPP).			R	During the development of the draft (after DPP acceptance), authors and some NUSSC reps concluded that the technical recommendations on civil and architectural engineering, mechanical, electrical, and welding are not appropriate for the level of technical detail that is usually expected of the IAEA Safety Guide.

							Therefore these sections are decided to be left out for TECDOC and the title was changed to "Construction for NIs" in order to not to mislead readers that this guide includes technical guidance on how to construct NIs. In addition, the change will make it consistent with NS-G-2.9 "Commissioning for NPPs".
143 (Relevanz 3)	Title page	document category: either "Draft <u>General</u> Safety Guide" or "Draft <u>Specific</u> Safety Guide"	Clarification regarding the new classification system for IAEA Safety Standards.	A			"Specific"
144 (Relevanz 2)	Whole document	please check the use of the terms "supervision", "oversight" and "regulatory oversight", respectively	The term "oversight" is used neither in other IAEA Safety Standards nor in the IAEA Safety Glossary. If there are any differences between "supervision" and "oversight" then proper definitions should be added.	A			Consider need to add to Safety Glossary?
145 (Relevanz	1.3	last sentence: "… although no nuclear material	Wording.			R	

3)		may be present during ~~the~~ construction."					
146 (Relevanz 3)	1.5	Footnote 1: "NS-G-2.3 "Modifications to Nuclear Power Plants" [9] provides guidance …"	Correct title of NS-G-2.3.	A			
147 (Relevanz 3)	1.7	4th bullet point: "… assessing contractors' qualifications and performance~~.~~;"	Editorial.	A			
148 (Relevanz 2)	1.7 add new point	- To assist contractors and sub-contractors in understanding of the technical aspects that should be considered when performing the works.	This Safety Guide should apply also for contractors and sub- contractors.			R	SG does not cover technical aspects and is not meant for contractors and sub contractors
149 (Relevanz 1)	2.3 4th line	"… technical support organisations, architect engineers, consultants …"	The wording 'architect engineer' is a broadly used term in most of the current nuclear new build projects.	A			
150 (Relevanz 2)	2.5	2nd sentence: "… a well-resourced and technically competent licensee; a well-established safety culture, qualified and experienced vendors, …"	As mentioned in paragraphs 4.2 – 4.8 good safety culture is also required in order to achieve the highest level of safety possible.	A			
151 (Relevanz 3)	2.5	4th sentence: "… and an appropriate technical support infrastructure for the regulatory body and the licensee."	Wording.			R	Editorial
152 (Relevanz 3)	2.6	2nd sentence: "Recommendations and guidance for the construction license requirements are provided in the Specific Safety	Completeness.	A.			Reference to 12 provided and other duplicate details deleted

		Guide "Licensing Process for Nuclear Installations" [12]."					
153 (Relevanz 3)	2.9	2nd sentence: "… should be developed and monitored as construction proceeds.~~.~~"	Editorial (redundant punctuation mark).	A			
154 (Relevanz 3)	2.10	1st sentence: "… commencement of the activities, especially for a first-of-a-kind technology."	Uniform spelling of the term "first-of-a-kind" in the draft (see also paras 4.11 (f), 4.42 and 4.43).	A			
155 (Relevanz 1)	2.13	last sentence: "Further guidance on interaction with existing facilities is provided in paras ~~5.42 – 5.44~~ 5.51 – 5.53."	Wrong paras cited.	A			
156 (Relevanz 2)	2.17	1st sentence: "…where those conditions are not otherwise ~~detected~~ prevented by engineering and performance barriers…."	Engineering and performance barriers will not detect conditions but prevent conditions to occur.			R	Comment not valid as clause deleted to avoid duplication with new 2.11
157 (Relevanz 3)	2.18	last but one bullet point: "… after work completion and environmental qualification~~.~~;"	Editorial.	A			
158 (Relevanz 1)	2.18 last point	"… are all designed to withstand all kind of weather impacts in general, as wells as meteorological and hydrological hazards such as earthquakes, floods, fires, heavy rains, snow, ice, strong winds etc., during the construction."	Wording 'weather impacts' and 'strong winds' added.		A See comments		This bullet rewritten based on large number of comments received
159 (Relevanz 2)	2.18 4th point	"- Location and approach/exit roads expecially for large component transportation as well as a comprehensive	Requirements added.		A See comments		Modified to include transportation routes

		transportation and delivery concept;"					
160 (Relevanz 1)	3.1	add new last sentence: "… the recommendations provided in Refs [12, 17-20]. With respect to the involvement of technical support organizations, consultants and third party surveillance activities during construction, the Safety Guide "External Expert Support for the Regulatory Body" [22] provides additional guidance."	The Safety Guide "External Expert Support for the Regulatory Body" (DS429, approved by the CSS for publication) should cover the issues regarding the involvement of technical support organizations and consultants carrying out independent review and assessment. DS441 should complement this. Thus, a reference to DS429 is needed while maintaining consistency. See also the last bullet point of para 1.7 which needs further improvement.	A			
161 (Relevanz 3)	3.2	1st sentence: "...oversight during construction refers to monitoring and direct observing ~~directly~~ of construction work..."	Changes should increase the readability.	A			New clause is 3.3
162 (Relevanz 3)	3.7	1st sentence: "… the communication between the licensee and the regulatory body and any other authorized bodies as appropriate should be formally defined before construction begins."	Wording.	A			
163 (Relevanz 1)	4.5	„The licensee should have adequate control and oversight of the supply chain and have robust systems and procedures in	This chapter does not fit the content on this site. In chapters 2.4 to 4.8, the theme of "Safety Culture" is treated.			R	Comment not valid now as the clause has been modified to include safety

		place to monitor this“.	Section 4.5 can indeed be seen as an introduction to Section 4.6, but this requirement should be moved to the chapter 4.20ff.				culture
164 (Relevanz 3)	4.7	1st sentence: “… and monitored during the construction stage.~~.~~”	Editorial (redundant punctuation mark).	A			
165 (Relevanz 2)	4.15	4th bullet point: - Internal and external audits on the management system of contractors based on the graded approach. The licensee should perform surveillance to verify that the contractors’ activities are in compliance with all relevant safety requirements from both technical and management system perspective and that safety culture is well established;	Safety culture is described in 4.2 – 4.8. Consequently it should be made clear how safety culture should be imposed by the licensee.			R	Management system includes safety culture
166 (Relevanz 3)	4.15	6th bullet point: “… which the regulator verifies but does not substitute for~~.~~;”	Editorial.	A			
167 (Relevanz 2)	4.20	Construction management is a leadership function primarily concerned with the organization, co-ordination and control of large human, equipment and material undertakings, with many constraints in order to correctly build an approved design.	Construction management should be described also by its aim (mentioned in para. 1.1). Otherwise the paragraph 4.20 would be too unspecific and would fit as description for many other kinds of management as well.	A			
168 (Relevanz	4.26	1st sentence: “The licensee~~s~~ should ensure	There should be only one licensee – hence singular	A			

2)		that all...”	form of licensees.				
169 (Relevanz 2)	4.26	last sentence: “…commission items important to safety. ~~Reliance should not be placed on just quoting codes and standards.~~”	It is unclear what should be expressed by: “Reliance should not be placed on just quoting codes and standards.” The guide should be more specific.			R	Sentence need to be read with the whole para.
170 (Relevanz 1)	4.27	The ~~construction organization~~ licensee should be responsible for ensuring that the traceability records required ~~by the licensee~~ from the construction organization are provided ~~to them~~.	The licensee is the overall responsible – as mentioned in 4.13, 4.14, 4.15 and 4.26. Of course the construction organization has to obey the demand of the licensee.	A			
171 (Relevanz 3)	4.27	last sentence: “… that the traceability records required by the licensee are provided to them.~~.~~”	Editorial (redundant punctuation mark).	A			
172 (Relevanz 3)	4.43	split the 5th bullet point into two separate bullet points: “- Necessary expertise to carry out the work or service; - The extent of evidence available that the appropriate quality can be demonstrated;”	There is no need to combine both recommendations.	A			
173 (Relevanz 3)	4.47	“~~Contractors should ensure that e~~Each contractor should organize~~s~~ daily tool-box meetings where work process, schedule, … should be discussed and confirmed.”	Clarification to improve understanding.	A			
174 (Relevanz 3)	5.1	2nd bullet point: “The planned sequential order_ (taking into account pre-requisites) and duration …”	Editorial (missing space).	A			

175 (Relevanz 3)	5.2	2nd sentence: "The construction programme should be fully integrated with a procurement programme highlighting long lead ~~in~~ items."	Editorial.	A			
176 (Relevanz 3)	5.3	2nd sentence: "Some may be specified by the licensee and the regulatory body."	Wording.	A			
177 (Relevanz 3)	5.7 last sentence	"Post-drilling of concrete for installation of plant fixings ~~may be unacceptable~~ should be avoided and undermine safety."	Wording changed			R	Para modified as per French comments
178 (Relevanz 2)	5.14 add sentence	"Contractors should prepare WorkPlans (in respect of constructions methods) and Risk Assessments (in respect of Health and Safety items) for construction steps where necessary."	Requirements added. Risk Assessments are closely linked to Work plans and should therefore also be mentioned in this context.			R	5.1 covers planning and 5.8 covers risk.
179 (Relevanz 2)	5.21	(e) Contingency plans.	In order to increase comprehensibility: Which contingencies are meant to be addressed for the protection of contamination by dirt, dust and foreign material? Which are possible contingency measures (examples) to be planned?	A			Elaborated by adding "if the protection measures and control fail".
180 (Relevanz 2)	5.23	1st bullet: - Checking of actual ~~circulation~~ flow path to satisfy specified requirements ...	For rinsing and flushing there might be a flow path without circulation. Omitting "circulation" will make the clause more general.	A			
181	5.39	"… should consider protection	The new International Basic	A			

(Relevanz 2)		of workers and sensitive items in the area as required by ~~the~~ GSR Part 3, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards ~~(the BSS) for Protection against Ionizing Radiation and for the Safety of Radiation Sources (the Basic Safety Standards or BSS)~~ [21]."	Safety Standards (GSR Part 3, Interim Edition) were published in November 2011. Compared to the Safety Series No. 115, the title has slightly changed.				
182 (Relevanz 1)	5.44	"The licensee and the construction organization should establish and implement requirements and procedures for the verification … of items important to safety as mentioned in paras ~~5.32 – 5.35~~ 5.36 – 5.39."	Wrong paras cited.	A			
183 (Relevanz 2)	5.46	... The level of traceability for individual component or batch identification should be highlighted in the inspection and test plan for items important to safety.	It is unclear what should be expressed by this phrase: - The different levels of traceability should be defined or a reference should be given in order to be clear about the understanding of the different levels. - It should be explained how the levels affect the documentation during inspection and testing.	A			Para modified based on WNA comments and clarifications provided.
184 (Relevanz 3)	Ref. [4]	INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants: Design, IAEA Safety Standards Series No. SSR 2/1, IAEA, Vienna	The new Safety Standard was published in January 2012.	A			

		(2012). ~~(in preparation). [DS414; submitted for approval by Commission on Safety Standards meeting May 2011]~~					
185 (Relevanz 3)	Ref. [21]	replace Safety Series No. 115 by GSR Part 3	The new International Basic Safety Standards (GSR Part 3, Interim Edition) were published in November 2011.	A			
186 (Relevanz 2)	Ref. [22]	INTERNATIONAL ATOMIC ENERGY AGENCY, External Expert Support for the Regulatory Body, Safety Guide (in preparation). [DS429; approved by the CSS for publication]	See comment to para 3.1. The Draft Safety Guide DS429 should be added to the list of references. The new Safety Standard will be published in 2012.	A			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Sjafruddin (S), Djoko Hari Nugroho (N), Eri Hiswara (H): Combined by G J Vaughan Country/Organization: Indonesia/BATAN Date: May 2012							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
187 (S)	General	There is no chapter on definition of stake holders in this document, for example: licensee, contactors, regulatory body etc.	Reader can know scope of stake holders that have responsible in nuclear installation construction.			R	Exists in Safety Glossary
188 (S)	General	Add: Organization structure of Construction Organization in picture at appendix.	Reader can know position of stake holders in the organization.			R	Organization structure will depend on local features
189 (S)	General	In this document there is no sentence of : the independency of auditor/ inspector against other stake holders.	This is important for audit/inspection result objectivity.	A			This is covered in management system which is now referenced in 4.13

							and independent audit added in 1st bullet
190 (H)	P1 1.1/2	Change 'this' after 'accomplish' with 'that goal'.	To avoid the use of the word 'this' twice in one sentence.	A			The sentence has been modified to bring in more clarity.
191 (H)	P1 1.2, line 3 from above	After 'nuclear installations', add ', which are a nuclear fuel fabrication plant, research reactor (including subcritical and critical assemblies), nuclear power plant, spent fuel storage facility, enrichment plant or reprocessing facility [ref],' Ref: IAEA Safety Glossary 2007 Edition.				R	Definition of "nuclear installation" includes this
192 (N)	P1 2/3	….. existing nuclear installations. Nuclear installation vary greatly in type, size, utilization, risk, and ……	Variances in nuclear installation risk should be emphasized for grading of nuclear installation	A			
193 (N)	P2 2/6	….. reliably in the expected performance over its lifetime ……	the expected performance should be obtained as the objective of installation construction			R	Comment no longer valid as text has been modified based on comments from other member states
194 (N)	P2 3/3	….. manufacturing and assembling the components, carrying out of civil and architectural work, mechanical and electrical/instrumentation work, installation …	the construction includes civil, architectural, mechanical, electrical/instrumentation works			R	Too detailed for the scope
195 (N)	P3 3/15	….. consultants as third party to carry ~~carrying~~ out independent	editorial correction		A See comments		Sentence modified

		review and assessment, as well as ~~or third party~~ inspection					
196 (H)	P3 Chap 1.7	Add the definition of 'stakeholders'	Para 1.7 line 4 from below mentions about stakeholders, but no explanations who be the stakeholders are.			R	Stakeholders covered in Glossary
197 (N)	P6 1/1	….. importers, ~~sellers~~, suppliers, ~~subcontractors~~, technical support organizations, consultants and ……	term 'subcontractors' is not the same level as the other term in the sentence. "subcontractor" is include on "their subsidiaries".	A			
198 (H)	Para 2.5, line 2 from below	Change 'should be sufficiently' into 'shall be fully'.	To emphasize the importance of meeting the legal and governmental framework.			R	Comment not valid in view of modified text
199 (H)	Para 2.7, first line	Delete '_'.	Typo	A			
200 (H)	Para 2.7, line 2 from above	Change 'i.e.,' into 'e.g.'.	The area that are regulated are not only those mentioned, but include also others such as land and use, manpower, etc.	A			
201 (N)	P7 5/6	….. adequate resource for qualification activities such as R&D activities, numerical simulation, or mock-up/full size …	numerical simulation is also beneficial to predict the non-conformance and deviations			R	Given are few examples only and proposed is too detailed
202 (N)	P9 3/1	2.16. Necessary fire protection measures at the construction site should be available until final plant fire detection, protection, and suppression system are installed and operational. The measures against earthquake	effect of earthquake should be considered in the emergency preparedness for employers			R	Not applicable at this stage.

		should also be available. Details of …….					
203 (N)	P10 2/11	Plan for industrial safety and radiation safety of workers including escape route when accident occurs ……	plan for non-nuclear industrial safety is very important to prepare besides plan for radiation safety			R	This is part of construction safety manual
204 (N)	P10 2/addition al point	Safety culture promotion and reminder in the form of banner and poster should be placed in the strategic locations	safety culture attention should be reminded any time for all employers in the construction phase			R	Too prescriptive
205 (H)	Para 3.4, line 1 and 2 from below	Add reference for the requirements of the inspectors. add certifications, complexity of nuclear installation that refer to paragraph 1.2	The requirements for the inspectors have to be clear and explicit.			R	Inspectors requirements covered in Ref [20] which is referred at the start of this chapter
206 (N)	P12 5/6 point 3.7	….. documentation. The communication should be documented, easy to retrieve and traceable.	The communication should be recorded and traceable to avoid the controversy between regulatory body and licensee or construction organization			R	This is part of management system GS G 3.1 (ref 2)
207 (N)	P16 1/4 4.7	….. cover ~~not only~~ contractor's organizations and ~~but also~~ ~~staff~~ all employee including managers	safety culture should be implemented by all employers mainly managers as leader			R	Organization and staff includes everybody
208 (N)	P16 5/2 4.11	(a) Identification of structures, systems and components important to safety based on preliminary safety analysis report; (b) ~~(a)~~ The qualicication of special construction processes such as	identification of structures, systems, and components should be referred first before considering the detail construction which related to the safety			R	This is part of design

		welding or …. (c) etc					
209 (N)	P18 1/17	…events as required by the regulatory body and issuing a corrective action document to avoid or minimize the non-compliances;	The licensee reports the safety significant non-compliances and issues an action plan to avoid it	A			New bullet on process for dealing with events added
210 (H)	Para 4.18, point (d), line 1	Add ‘and environmental’ between ‘industrial’ and ‘safety’	Environmental safety should also be observed	A			
211 (N)	P20 1/15	… programme and schedule, including, where appropriate, coordinating the activities of …	programme and schedule are two parameters that can not be separated in project planning and monitoring	A			
212 (N)	P23 3/5	(a) As build drawings; (b) Components datasheet; (c) ~~(b)~~ Manufacturing and assembling details; (d) ~~(c)~~ Inspection reports; (e) (d) On-site traceability including marking and tagging; (f) ~~(e)~~ Construction and test records (to be used as baseline data)	Components datasheet is very important to be documented to assure the components quality and to find the equivalent characteristic for replacement in the construction and also operation phase			R	Important details of components will be included in manufacturing details
213 (N)	P24 3/4	… management system documentation including reports and should be included …	reports can articulate coordination among units/organizations			R	Requirements are set up in management system document. Reports are made as per these requirements
214 (N)	P29 1/10	(h) Site training, (i) Emergency preparedness and response	contractor should provide emergency preparedness training for the site employers			R	Emergency preparation is part of site training

215 (N)	P29 2/1	4.45. The construction organization should be informed of all subcontractors selected ~~used~~ by the contractor …..	editorial correction	A			
216 (N)	P31 add to point 4.50	The construction organization should provide the design improvement especially for safety related system to the licensee.	Design improvement is very beneficial for lesson learned			R	Out of scope of this document
217 (H)	Para 4.51, line 1	Change ‘process’ into ‘procedure’.	To make it more strong managerially.			R	Process is the appropriate term here
218 (H)	Para 4.53	Who is independent assessor?	Independent assessor who will perform independent assessment should be clearly appointed and defined.			R	Independent assessor is explained in GS-G-3.1 para 6.22-6.43. This reference added in the para
219 (N)	P32 1/6	… system should incorporate the regulatory approval process for handling any safety significant non-conformance;	Licensee approval for non-safety non-conformance is enough; but approval for safety significant non-conformance should be approve by regulatory body	A			
220 (N)	P33 1/3	….. lessons learned implemented to minimize the included difference between design and actual ~~for the enhancement of quality and safety~~. Criteria should be ……	lesson learned implementation is beneficial to next project to avoid the difference between design and actual			R	Unclear what the comment means
221 (H)	Para 4.60	Change the sentence into ‘The licensee should be pro-active in sharing safety related experiences by participating in international meetings in the	To make it clearer how to share their experiences.			R	How to do is not part of this guide

		related area'.					
222 (N)	P37 2/2	… safety significant mechanical, electrical, instrumentation and ~~&~~ control, and structures from internal and …	editorial correction	A			
223 (H)	Para 5.26	Add sentence in the last line 'If necessary, security escort should be considered'.	Transport security is also an important issue that cannot be ruled out.			R	Transport safety and security are dealt with in other IAEA standards
224 (N)	P40 2/7 poin 5.28	(f) Preventive and Periodic maintenance	periodic maintenance is better than preventive maintenance for storage			R	Does not add any value
225 (N)	P41 6/2	….. important to safety ~~are kept under an appropriate preventive or corrective maintenance plan~~ should be protected from the environment and construction work impact to ……	there are no preventive and corrective maintenance program before plant operation			R	This para is about having preventive or corrective maintenance plan to during construction
226 (N)	P42 1/3	(a) identification of the structure, system or component (b) ….. (c) (i) Name, position, and institution of the verifier	- verifier should be described	A			
227 (N)	P45 3/1-2	5.48 ~~The~~ In the case of procurement of item ~~may~~ starts long before the construction licen~~c~~se is issued, ~~Regardless of the time of procurement~~, the licensee should ensure……	procurement of items conducted long before the construction license is usually implemented for a special case; because the more storeroom used means the more care and cost	A			

228 (H)	Page 51, reference No. 21	Change the reference to 'IAEA, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards. Interim Edition. General Safety Requirements Part 3. IAEA, Vienna (2011).	Replace the old document with the new one.	A			
COMMENTS BY REVIEWER Reviewer: Country/Organization: Japan/NISA Date: 2012				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
229	2.10/L3	for a first-of-a-kind technology	Editorial error	A			
230	2.13/7	related risk. Further guidance on interaction with existing facilities is provided in paras ~~5.42 5.44.~~5.51-5.53.	Editorial error	A			
231	2.14/L2	The maximum amount of hazardous material present at any given time and the process in which it is used should be taken into consideration. Pipelines for hazardous materials should be included in the category of items to be identified. <u>The identification will also facilitate the planning of work during decommissioning.</u>	The identification of hazardous material would be important to the safety assessment of decommissioning.			R	It is just explanation
232	2.17/L9	As a minimum, security measures within and around the site should include physical barriers, posting, surveillance and monitoring capability,	In this DS441, "surveillance" should use as the term for quality management.			R	Clause deleted to avoid duplication with new 2.12

		uniformed security personnel, barriers, posting, ~~surveillance~~ patrol and monitoring capability, uniformed security personnel, communication capability, and control personnel access.					
233	2.18/L15	- Construction processes and equipment such as cranes, scaffolding, temporary structures, portable equipment, and flammable equipment are all designed to withstand meteorological and hydrological hazards such as earthquakes, flooding ~~floods~~, fires, heavy rains, snow, ice, etc., during the construction.	Please refer to DS433 "flooding" includes "tsunami" and "floods".		A See comments		This bullet has been simplified based on large number of comment received
234	3.11	3.11 should be correct the sentence as follow.. The regulatory body should make arrangements for analysis to be carried out to identify lessons to be learned from construction experience and regulatory experience ~~and for the dissemination of the lessons learned and for their use by authorized parties; the regulatory body and other relevant authorities.~~ The regulatory body should require appropriate corrective actions to be carried out to prevent the recurrence of safety significant events.	Non-conformances of safety significance should be analyzed to reveal basic causes and those lessons learned should be incorporated into implementation in other nuclear installations.			R	Non conformance is covered under 4.54-4.57

		Then, The following sentence should be transferred to "Non-conformance and corrective actions" on page 32. Concerning non-conformances of safety significance, arrangements for their use by authorized parties, the regulatory body and other relevant authorities should be made.					
235	4.4	Construction programmes and methodologies should be developed and implemented to help ~~all~~ interested parties	We don't think the contractors who finish their work before fuel loading need the project strengthen safety culture and monitor their safety culture. These contractors need strict QMS, but do not need safety culture.			R	Safety Culture attributes are valid even for work done before fuel loading
236	4.5	The licensee should ... have ~~robust~~ appropriate systems and procedures in place to monitor this.	What is 'robust systems'?		A With modification, see comments		Robust deleted and replaced by adequate
237	4.6	The licensee should ensure all contractors and subcontractors in the supply chain ~~or involved in surveillance activities~~ are fully aware of the safety significance of what they have been contracted to supply.	What is 'surveillance activities'? If the surveillance activities are not clear, these words should be deleted.		A See comments		More generalized wording “work that they have been contracted to do” used
238	4.9/4.10/4.11	4.9: graded approach 4.10: grading process 4.11: grading approach	If they have same meaning, these words should be unified.	A			
239	4.15/4th	**Internal and external audits** on	Specify the content of internal			R	Internal and

	bullet	the management system of contractors based on the graded approach.	and external audits. Are they contractor's self assessment and contractor's assessment for subcontractor?				external audits which are part of independent assessment are discussed in GS-G-3.1
240	4.18 (a)	Controlling and supervising contractors both on-site and off-site manufacturing and assembling.	Clarify the off-site as same as the paragraph 5.4.	A			
241	4.27/L1	Traceability of items important to safety from initial design through ~~construction and then to commissioning~~ lifetime is an important aspect of ensuring safety.	Traceability of materials and components would be necessary to in order to use them as input information for the safety assessment of decommissioning. Furthermore, items important to safety and their component are important for ensuring safety during decommissioning.	A			Accepted with small modification as per French comment
242	4.36 (b)	Pre-commissioning inspection and pre-commissioning ~~functional~~ tests should be carried out and the results recorded.	As para. 2.1 states that the pre-commissioning tests are functional tests of individual subsystems of components, it is no need to use "functional".	A			
243	4.42	Move this paragraph to a footnote of sub-title 'Contractor oversight'	This is explanatory statement. Then, this paragraph should be a footnote of the sub-title.			R	This explanation is important and helpful in understanding the need for contractor oversight
244	4.44(g)(h)	Illustrate (g) **Site security** and (h) **Site training**	Specify the content of site security and site training.			R	Site security details is part of security documents. Site

							training details will be part of construction organization documents
245	4.54	4.54 … In addition, this system should incorporate the regulatory approval process for handling any non-conformance <u>of safety significance</u>.	The non-conformance should be specified.	A			
246	5.31	Before installation of any items important to safety, they should be inspected against **the requirements**…	Specify the requirements. Are they safety and quality requirements, and specific requirements?			R	“requirements” is sufficiently wide to cover all aspects
247	5.37	**Whenever relevant**, test and verification should be performed by a qualified ~~third~~ party <u>in accordance with national regulatory resume</u>."	Clarify the situation of "whenever relevant". And, change "a qualified third party".	A			Specified for safety systems. Third party replaced by independent party.
248	5.46	Level of traceability for individual components or **batch identification** should be highlighted…	Specify the content of batch identification	A			Sentence modified
249	5.50 (l)	(l) Storage ~~should be~~ <u>has been</u> controlled to prevent inadvertent installation or use.	Change this same statement as others.	A			
250	5.51/L9	(digging, excavation, **spurious fall of cranes**, collapsing of items, use of explosives, etc.)	Clarification What does "spurious fall of cranes" mean?	A			Clarified by change of words

COMMENTS BY REVIEWER	RESOLUTION
Reviewer: Pakistan Nuclear Regulatory Authority Country/Organization: Pakistan Date: 26-6-2012	

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
251	1.4	The objective of this Safety Guide is to provide recommendations and guidance based on international good practices in construction of nuclear installations, as currently followed in Member States, which will enable construction to proceed with high quality, consistent with bases on which the regulatory body issued the authorization for construction, applicable codes, standards, and design requirements as part of the demonstration that the product can be commissioned and is capable of operating safely and reliably over its lifetime	The construction should follow the submissions of the licensee that have been approved by the regulatory body while issuing authorization for construction.	A			
252	2.2	The “construction organization“ is either the licensee, or that part of the licensee or the contracted organization that is responsible for construction. This construction organization is the entity managing the construction activities such as civil and architectural works, manufacturing, assembly, installation and testing of items	The strikethrough part may be deleted as this does not fit in the definition.		A Part of proposal accepted and reflected in the document		

		important to safety at the level of the installation. ~~If the licensee is unable to fulfil this function, it may appoint a contractor or contractors to carry out specific functions for part or all of the installation. The responsibilities of the contractor(s) should be clearly defined and controlled by the licensee. In addition, the contractor's governance of activities and the activities themselves should be inspected by the licensee. The use of contractor(s) in no way replaces or reduces the responsibility of the licensee for safety.~~					
253	2.4	The construction should start only after obtaining authorization from the regulatory body (please refer to SSG-12 for details of authorization process) and the licensee has satisfied itself by means of verification that the main safety issues in the design have been resolved . If the construction starts before obtaining authorization from the regulatory body, the licensee bears the risk that the product may fail to meet necessary regulatory requirements and rejected by the regulatory body.	Simplification of the existing text of the draft guide and establishing interface with SSG-12.		A With small change in wording. Item now is 2.6		

254	2.5	The highest level of safety, that can be achieved in the construction of nuclear installations, requires: a. a sound legal basis; b. an appropriate governmental infrastructure, including a regulatory body with well defined responsibilities and functions; c. an established regulatory framework including necessary regulations and guides to regulate the design and construction; d. a well resourced and technically competent licensee; e. an appropriate technical support infrastructure for the regulatory body and licensee; and f. qualified and experienced vendors, designers, manufacturers and construction organizations. ~~The legal and governmental framework should be sufficiently implemented for~~	Some minor modification and restructuring for more clarification and correcting the order. The strikethrough sentence may be deleted as it is not clear neither adding any value.	A			

		~~proper regulation during construction~~					
255	2.14	This para may be deleted.	The para is covered during site evaluation stage and actions, if any needed for safety, are covered during site authorization stage. This has no direct relevance here except to ensure implementation of the actions as agreed during site authorization process.			R	This relates to on site during construction
256	2.18, 9th bullet page 10	All infrastructure support systems should be in place including required electricity, gas and water supply, **first aid medical facility**, protection or coverage after work completion and environmental **control**.	Due to potential industrial hazards during construction, first aid medical facility is considered necessary. Moreover, environmental qualification is not relevant here rather infrastructure support for controlling the environmental within the required level is necessary.			R	Not an infrastructure issue
257	2.18 Bullet# 4 Page 10	Location and approach /exit **transportation routes** especially for large component transportation	Text may be replaced with new proposed text since transportation of equipment is not only through roads but other routes like railroads, waterways, etc also used	A			
258	2.21	Add new para 2.21 as follows: Manufacturing of some long	The item is not covered in the pre-requisites.		A Partly covered in new 2.6		

		lead items may initiate before issuance of construction authorization by the regulatory body. Any such activity should be brought to the notice of the regulatory body well in advance for any assessment and oversight by the regulatory body. Nevertheless, the authorization decision may require modifications in the item or processes involved in the manufacturing and the licensee shall undertake full responsibility for meeting the regulatory requirements including the risk for rejection of the completed activities.					
259	3.2	The regulatory oversight during construction ***should focus on the management system of licensee and its contractors/sub-contractors as well as*** monitoring and observing directly of construction work practices, items, and equipment. It also includes inspection and assessment of safety related construction activities through such methods as: discussions and interviews with relevant personnel; examination of procedures, records and documentation; and	Oversight of management system is highly important to keep the licensee aware of its ultimate responsibility for safety and the contractors/sub-contractors of their responsibility for achieving highest quality.	A			New para is 3.3

		measurements and tests.					
260	New para 3.12	The regulatory oversight during construction phase should also give due attention to licensee's preparation for safe operation of the plant. This includes development of organization structure for operation, recruitment and training of operation and maintenance personnel, availability of necessary infrastructure for such training including simulator, preparation of necessary documentation such as operation and maintenance procedures, including those for accident management, etc.	Operation preparations start during construction phase and require necessary regulatory attention.			R	This is out of scope of this document
261	4.2	This involves an understanding that deviations from procedures and specifications, or failure to understand the safety significance of structures, systems and components may have ~~unforeseen~~ **serious** consequences in the future.	For clarity			R	"unforeseen" is correct as the potential problem for nuclear safety may not be clear to the constructors.
262	4.19 to 4.22	Recommendations on construction project scheduling (which generally comprises various levels) may also be included such as by including a sub-heading ***"Project Scheduling"*** with following	One of the main aspects of construction project management is scheduling which is not clearly addressed in the safety guide			R	These details are covered in NP-T-2.7 which is now referenced in 4.17 (ref 25)

		recommendations. ***"Project scheduling should cover the entire construction activities and may include various levels of schedule such as:*** • ***Level 1 schedule – providing main activities and milestones*** • ***Level 2 schedule – providing details of milestones of level 1 schedule and schedules of sub-activities.*** • ***Level 3 schedule – providing detailed schedules for each activity such as construction of containment, manufacturing of equipment, etc.*** ***The construction project schedules should be regularly reviewed and updated.*** The above recommendations are only for illustration purposes and recommendations other than these that may serve the purpose					

		can be formulated.					
263	4.25, page 23	------the relevant requirements are known, understood and **accepted by all those within the supply chain. Any conflict or difference of opinion should be resolved at an earlier stage.**	If the requirements are not acceptable to any one from the supply chain a conflict may arise which should be resolved.	A			
264	4.27, New bullet page 23	Also include the following in the traceability aspects: **(f) Record of modifications**	A number of modifications are made during construction and maintaining traceability of modification records is very important for configuration control and future reference.	A			With modifications as per UK comment
265	4.27 – 4.29	These paragraphs are provided under the sub-heading of traceability whereas this is covered under document control system of the management system. Please look into these para from this perspective.	The subject is relevant to document control system.	A			Traceability is moved under design control
266	4.30, page 24	Please add one recommendation for interface arrangements between the licensee and the regulatory body such as: **The licensee shall establish appropriate interfaces with the regulatory body for the purposes of regulatory oversight of construction activities, information exchange**	Interface between licensee and the regulatory body is very important for purposes of regulatory oversight, information exchange, reporting of events and non-conformance, obtaining approval on modifications, etc.			R	Suggestion refers to regulatory oversight and no interface management. Regulatory oversight is already covered in the document.

		on construction activities, reporting of construction related events and non-conformances of significant nature, modification approval, etc. In certain cases the regulatory body may place resident inspectors at construction site or set-up its separate office for construction oversight. In such cases the licensee should establish interfaces with the resident inspectors or site office alongwith the headquarter of the regulatory body.					
267	4.38	Resources should be estimated, planned and secured for the construction of items important to safety, consistent with the project schedule.	Resources need to be managed in such a way to ensure availability consistent with the project schedule.	A			
268	4.39	Licensee should maintain and implement training and retraining program for its personnel engaged in construction management, supervision and oversight activities. The training should emphasize on both technical and management system aspects. The training and retraining program should be periodically reviewed and updated, as necessary, with the development stages of	The paragraph limits training to personnel involved in commissioning and operation, whereas training of personnel involved in construction management and oversight is missing.			R	This para is specific to involvement of licensee staff (who will commission and operate) in construction. Qualified and experienced staff is specified in 4.41

		construction project.					
269	5.51, page 46	-----potential contamination from **construction site to operating as well as from operating site to construction site**	Contamination hazard probability can arise from either side.	A			
270		Recommendations may be included for the regulatory body and the licensee to keep public informed about the construction activities and important issues.	Important for transparency and openness.	A			New para 2.21 introduced which talks about interaction with all stakeholders

COMMENTS BY REVIEWER Reviewer: A.Bukrinsky, S.Sharanov Country/Organization: Russian Federation/SEC NRS, Rosenergoatom Concern OJSC Date: 29 June 2012				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
271	1.5	This Safety Guide is applicable to the construction stage of a new nuclear installation and the modification of an existing nuclear installation **connected with performance of construction work**, including the process of manufacturing and assembling the components, carrying out of civil and architectural work, installation and maintenance of components and equipment, and performing the associated tests.	In the first sentence after words « nuclear installation » to insert words « connected with performance of construction work » as the term of "modification" includes also other works not connected with construction, such as changes of instructions, the software, etc.			R	Does not add any value

272	2.	It seems reasonable to include here also a definition of the term "Facility"	The term "facility" being used throughout the document is implicitly equal to the term "power unit startup complex" in use in RF. While the term "facility" as it is used in RF means a part of the "power unit startup complex" (which may comprise up to dozens of "facilities")			R	Already available in Safety Glossary
273	2.2	**Construction organization is the entity contracted by the licensee[1] to manage the construction activities on the site such as** civil and architectural works, manufacturing, assembly, installation and testing of items important to safety at the level of the installation. The responsibilities of the contractor(s) should be clearly defined and controlled by the licensee. In addition, the contractor's governance of activities and the activities themselves should be inspected by the licensee. The use of contractor(s) in no way replaces or reduces the responsibility of the licensee for safety.	It is abnormal, when the licensee (the operating organization) is also the construction organization. Therefore it is offered to change edition of this item, having written down that construction organization is the organization contracted by the licensee for management of construction activity on a site such as ... and further under the text. At a word "licensee" to make a footnote with explanation of that if the construction group and the licensee is included into one organization, the group of construction and the group reflecting interests of the organization as the licensee, should be separated from		A With modification. In many countries licensee is also construction organization. Role of contracted organization clarified by adding Fig 1 from France.		

[1] «If the construction group and the licensee is included into one organization the group which will operate installation after end of construction work should represent interests of the licensee, it should be separated from the group responsible for construction, and interface between them should be settled by corresponding organizational-administrative documents»

			each other, and interface between them should be settled by corresponding organizational administrative documents. Thereupon the group which will operate installation after end of construction should reflect interests of the organization as the licensee.				
274	2.4	The construction should start only after the licensee has satisfied itself by means of verification that the main safely issues in the design have been resolved and that relevant authorizations have been issued.	To exclude the second sentence of this item as without reception of the license or other authorizations it is inadmissible to begin construction and there is no still a licensee. If to speak about works which can be authorized before reception of the license it there should be specific requirements.			R	This sentence addresses manufacturing of long lead items etc. which is exiting industry practice.
275	2.9	Adequate completion of design, including acceptance criteria, and engineering work commensurate with the authorization process should be verified prior to start of construction. Before construction begins **the team of design, should be generated at the site for maintenance of construction work,** a forward action plan covering remaining	After words «Before construction begins» to insert a word «on the site the team of designers should be generated for maintenance of construction work »			R	Too prescriptive and not required till all requirements are met.

		design and engineering works and the necessary resource requirements should be developed and monitored as construction proceeds.					
276	2.20	Some activities, such as ground investigation, may be carried out before a license has been granted. Arrangements should be put in place to ensure that, if the outputs of these activities are incorporated into the permanent works or can have an influence on them, any pre-licensing activities are planned, executed, monitored and documented to standards equivalent to activities carried out post-licensing. **Applicant should inform regulatory body about the beginning of such works.**	To add this item with the following sentence «Applicant should inform regulatory body about the beginning of such works»			R	Not required as regulatory involvement is ensured by following license standards if the involved work has any bearing on safety.
277	3.4	Well in advance of the beginning of the construction, the regulatory body **should receive from the licensee the network schedule of construction activities and** schedule resources to ensure a consistent and responsive oversight, according to the progress of the construction activities **receiving updates of this network schedule.**	After words «regulatory body should» of the first sentence of this item to insert words «receive from the licensee the network schedule of construction activities and». And in the end of this sentence to insert words «receiving updates of this network schedule».		A Comment partly reflected by revising 3.6 to include "application for construction authorization"		
278	3.8	During construction, the regulatory body should review	To add as the first marker the following sentence «reports		A With modification, see		Review of licensee reports included in

		and assess: - **reports of the licensee on results of its supervising activity during construction above all carried out works, including works of all contractors;**	of the licensee on results of its supervising activity during construction above all carried out works, including works of all contractors»		comments		first two bullets of new 3.9
279	3.9	To gain assurance that the licensee has met the regulatory requirements and can move forward in the construction programme, the regulatory body should make use of hold points or witness points such as excavation to rock head/formation level, first concrete, major safety significant equipment installation, fuel on site, entering commissioning, or following a major deviation from the requirements **and especially for the checking of work outcomes which in the further will be hidden by construction structures or concrete.**	To add in the end of the first sentence the following words «and especially for the checking of work outcomes which in the further will be hidden by construction structures or concrete			R	Proposed text is too detailed
280	4.16	The licensee should formally **agreed appointment** of the construction manager to be responsible for construction activities. The construction manager has the responsibility to ensure that the construction meets all relevant safety requirements.	To exclude words «appoint an individual from its own organization as » and footnote as it is wrong that the licensee (the operating organization) appointed an individual from its own organization as the construction manager to be responsible for construction			R	

			activities as it will lead to the conflict of interests. The licensee should supervise construction and work of the construction organization and other contractors as it is specified in item 4.14 and 4.15. To manage the construction should the representative of the construction organization. Instead of the excluded words to insert words «agreed appointment of».				
281	4.18	Arranging the controlled handover of completed work and records from one group to another.	To exclude words «or to the construction organization» as it is impossible to handover completed works to the construction organization which on its own has finished	A			
282	4.44 The last paragraph, second sentence	The licensee should be notified of these arrangements and approve as appropriate.	To exclude the text in brackets: « (particularly if the construction organization is not the licensee) », as the information of the licensee on work of contractors is equally important in all cases, as normally construction organization should not be the licensee (the maintaining organization).			R	This text has word “If” in which gives the option
283	4.45	The construction organization should be informed of all the subcontractors used by the contractor. Any new	To add this item with words «Appointment of any contractor or the subcontractor should be			R	Requirements on contractors detailed in 4.44

		subcontractors appointed after this agreement should be made known to the construction organization before relevant work begins**. Appointment of any contractor or the subcontractor should be approved by the licensee and regulatory body.**	approved by the licensee and regulatory body». It is necessary proceeding from the responsibility of the licensee for safety and a role of regulatory body.				
284	4.54 The third sentence	This system should define non-conformance and specify the roles and responsibilities of the **regulatory body**, licensee, **designer**, construction organization and contractors for reporting and correcting non-conformances.	To add the list of organizations which role and the responsibility in the decision of a problem of non-conformances is defined, the regulatory body and designer.			R	Role of regulator is addressed in last sentence of para. 4.54. Also, the paragraph relates to correcting construction activities, not design issues, so only if the non-conformance cannot be corrected would the designer consulted.
285	5.35	During the entire construction phase, the licensee **and the construction organization** should ensure that the items important to safety are kept under an appropriate preventive or corrective maintenance plan to maintain their functionality as required by the design. This should be continued until operational maintenance programmes are initiated.	In Russian Federation, at the initial stage of construction the items important to safety are not transferred to the licensee, and responsibility for keeping preventive or corrective maintenance is laid on the construction organization and contractors.	A			

COMMENTS BY REVIEWER Reviewer: Swedish Radiation Safety Authority Country/Organization: Sweden Date: 2012-06-18				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
286	2.2 / 1-2	”The ´construction organisation´ is either the licensee, or that part of the licensee responsible for construction or the contracted organization hired for construction.”	In accordance with IAEA SF-1 principle 1, the prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risks. Therefor we suggest using the word “hired” instead of “responsible”, in the first sentence.		A With modified language		
287	4.39	Licensee personal, whom will be involved in the operation of the nuclear installation, should in an early stage undergo training in a realistic environment, under realistic conditions, to enable deeper understanding for the facility and identifications of potential weaknesses in the design.	We suggest adding a new paragraph related to “Training of human resources” in accordance with the proposed new text.			R	The proposal does not relate to construction

COMMENTS BY REVIEWER Reviewer: (Taken from comments on draft document attached to email from Premek Skopal by G J Vaughan) Country/Organization: UAE Date: 8 August 2012				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

288	1.7	It would be useful to expand by adding the bullet on providing a guidance to licensee how to implement oversight that would ensure delivery of service by the entire supply chain in compliance with the licensee's quality and safety requirements.				R	Dealt with elsewhere in the document
289	2.2	How is the control of all contractors by licensee achieved? What are the pre-requisites for the licensee in terms of its competency, planning of the oversight, scope and depth of the oversight?				R	Dealt with elsewhere and in other IAEA documents
290	2.13	The regulatory body should ***ensure*** that the licensee(s) ….	"Encourage" might be better word. Ensuring may mean that the regulator is responsible. Responsibility risk and threat assessment should be with the licensee.			R	It is the regulator's responsibility to ensure that the licensee meets its obligations.
291	4.5	The licensee should have adequate control and oversight of the supply chain	This could be appropriate place to provide more specifics and discuss pre-requisites (on the licensee's side) for implementing the adequate control and oversight of the supply chain by the licensee. It is important		A Much of text in part 4, particularly paragraphs 4.44 onwards has been modified to cover these issues		

			to include components like procurement process, monitoring system, qualification requirements for people doing the oversight, and also sufficient numbers of the oversight staff. What is the definition of licensee oversight?				
292	4.6	The licensee should ensure all contractors and subcontractors in the supply chain or involved in surveillance activities are fully aware of the safety significance of what they have been contracted to supply.	Very good. More specific guidance on how to ensure and verify implementation of this function would be useful.		A - As above		
293	4.13	The licensee has responsibility for the nuclear installation being built in accordance with all legal and regulatory requirements. The licensee may contract construction but retains the primary responsibility for safety, quality and security.	As above. This is legally very true statement. Implementation needs more insights.			R	Unclear what was the nature of what was requested – this is so fundamental
294	4.14	The licensee should develop and maintain its ***capability*** to control all activities for which the license has been granted.	What capabilities e.g. in terms of technical qualifications? What would be the recommended approach to assessing the supply chain by licensee?		A The licensee has prime responsibility and must therefore be able to control all activities – see paragraphs 4.13, 4.46-4.51		

295	4.15	The licensee should take the responsibility during construction for all activities that could affect safety of the installation regardless of location.	Does it mean the licensee must have knowledge at the same level as those doing the work to verify all activities? What level of knowledge, skills, qualification, and understanding is sufficient to exercise the responsibility			R	See paragraph 4.13 and footnote on "intelligent customer"
296	4.15 Bullet 1	licensee should establish a construction supervision plan for the items important to safety	Very good. The question is how much of that all should be done. How to establish the right mix of direct audits, reliance on audit reports by others, etc? How to ensure visibility of results of the vendor's performance?			**R**	The guidance has to be interpreted: there is no absolute right level. This is not a specific nuclear safety issue – it applies to any major construction project
297	4.1 Bullet 2	"***intelligent customer***"	This is very important concept that may deserve more extensive discussion, e.g. what it takes to become the IC.			**R**	See comment on point 295
298	4.15 Bullet 4	perform surveillances to verify that the contractors' activities are in compliance	As above. How many contractors to audit, what to do about those not seen by the licensee directly (e.g. reviewing the audit reports done by other delegated suppliers), and what licensee's competencies are required? Is it acceptable that licensee is only sampling?			R	Response as point 296

			How should be the sample? What level of confidence achieved by the sampling is desirable? Note: Regulatory oversight is based only on sampling – what would be the difference from the licensee oversight				
299	4.18	The principal activities of the personnel in the construction organization should include, as a minimum:	All the requirements are correct and relevant (however, the list is open ended by saying "as a minimum" – does it mean that by following the list would be sufficient?). What would be a guidance on how to assess upfront that the licensee is ready (or not) to implement all these duties (e.g. licensee personnel qualification, staffing in general, schedules for oversight, audits, reviews, sampling, etc.).			R	"As a minimum" means that more should be considered On the second point, this is not a matter for construction but for licensing – see SSG-12
300	4.22	The licensee, construction organization and other contractors should have adequate organization, resources, experience, competence and procedures to manage a nuclear installation construction project and maintain documentation to	As above. Good statements. Difficult to translate this guidance into practical actions.	A But that's what a regulat-or etc. has to do.			

		demonstrate them. Experience has shown that a construction project can involve the use of temporary workers with various skills, multi-layered and multi-national contractors with various languages, cultures, legal and regulatory backgrounds, and different conventions for measurements (units, measurement methodologies, measurement equipment/devices, uncertainty, etc.).					
301	4.26	The licensees should ensure that all information supplied by the design organization is ***sufficiently clear*** and explicit	This wording is not very useful. Should be avoided if it is not followed by a discussion that would provide content to these words.			R	"sufficiently clear" implies sufficient information is provided. To try to detail would lead to unnecessary prescription
302	4.29	Comprehensive photographic and, where appropriate, video records and computer simulations should be compiled, particularly in areas that will later be eventually inaccessible or will be subject to intense radiation.	This is very good point. However, security considerations are often making implementation of this very reasonable requirement problematic.			R	Noted, but the point still stands that such records are useful
303	4.40	the licensee should be notified of the contractors	Not sure how to interpret. Is the notification required before the qualification audit	A			New paragraph 4.44 modified to say "proposed"

			takes place, or after the qualification audit is done and supplier chosen plus submitting the audit/qualification report and possibly contractor's oversight plan?				
304	4.44	demonstrate its appreciation of safety culture should be finalized and agreed before any contractor's activity starts.	High level statement. What is the mechanism for demonstrating appreciation of safety culture by contractors?			R	Covered in other IAEA documents
305	4.47	Contractors should ensure that each contractor organizes daily tool-box meetings where work process, schedule, any deviation, and any other important aspects of work that is relevant to safety and quality should be discussed and confirmed.	Is such a detail instruction necessary in this document? Daily or less frequent meetings are dictated by operational needs and this is the decision in hands of the relevant managers responding to specific conditions.	A			New paragraph 4.51 modified to "regular"
306	4.48	as far as can be assessed	It would be useful to provide more specific explanation what must be assessed and what is acceptable to skip. How do these words reconcile with requirements as e.g. the licensee has full and uncompromised responsibility for safety, ensures that all safety characteristics are in place,			R	This is a quote from another document so cannot be changed.

			etc?				
307	4.49	The licensee should control the drawings, design codes and documentation which describe the basis for licensing the construction	In some cases the Prime Contractor is contracted to provide this function early in the project and during the construction. Licensee may take over only from the operating stage.			R	The licensee should at all times have overall control of all the licensing documentation.
308	5.42	The licensee should ensure that manufacturer's quality assurance programme	Does it mean that the licensee should see and/or review audit reports on QA programs of all safety related manufacturers?			R	This is part of the licensee's responsibility for safety which must be discharged as it deems necessary.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: S Hinley / L Smith Country/Organization: UK , ONR Date: June 2012							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
309	Para1.1, line 4	Recommendations rather than recommendation	Editorial , plural	A			
310	Para 1.3 line 11	*Replace* "although no nuclear material may be" *with* "even though there may be no nuclear material"	Existing text infers a requirement that there is no nuclear material present whereas this may not be the case on a multi-facility construction site.	A			
311	Para 1.7 bullet 3 line 1	*Replace* "organization" with "organizations"	Editorial, plural	A			

312	Para 1.7 bullet 5	*New text:* "-To assist stakeholders in understanding the roles and responsibilities of the range of contractors involved in the construction of nuclear installations. This includes technical support organizations and consultants responsible for independent review and assessment and organizations responsible for third party inspection.	Rewording requested in draft		A With small modifications, see comments		Sentence included following bullets
313	Para 1.10 line 3	"recommendations on the management"	Editorial (word missing)	A			
314	Para 2.1 line 9	*Replace last sentence with* "Due to differences in the construction schedule for each item, the commissioning and construction stages for the installation may occur concurrently.	Clarity	A			
315	Para 2.2 line 10	*Change of wording:* The use of contractor(s) in no way replaces or reduces the responsibility of the licensee for all matters related to safety.	Emphasis on Licensee responsibility for safety		A With modification reflecting SF-1		
316	Para 2.3 line 1	*Delete word:* The contractor means ~~to~~ any individual or organization who provides items or..	Correction	A			
317	Para 2.4	*Alter wording:* The licensee should verify that the design is of the appropriate standard and sufficiently complete before construction	Current sentences too long which makes meaning unclear.			R	Not valid as item has been modified base on comments from MS (Pakistan). Item is

		starts. Any major safety issues should be resolved prior to construction when there is greater flexibility for design changes. *Add New para:* The relevant authorisations must be obtained before construction starts. If this is not done, the licensee bears the risk that the product may fail to meet the necessary requirements.		A. Item is now 2.6			now 2.6
318	Para 2.5, line 3	*Add word;* licensee; suitably qualified and…	Quality and clarity	A			
319	Para 2.5 line5	*Add word;* "responsibilities, powers and functions"	Clarity, Definition of powers is important		A With modification, "power" replaced by "authority"		
320	Para 2.5 final line	*Change word;* "..sufficiently implemented for competent regulation during construction."	The word "proper" seems rather vague in this context.	A			Para modified
321	Para 2.7 line 1	*Delete* "_"	Editorial	A			
322	Para 2.7 line 2	*Replace* "i.e." with "e.g."	These are examples rather than fixed items.	A			
323	Para 2.9 line 5	*Delete second* "."	Editorial	A			
324	Para 2.10, line 3	*Insert* " novel " *instead of* "first of a kind"	Better wording			R	FOAK is commonly used terminology
325	Para 2.10, line 3	*Replace* "More quality non-conformance and re-works are expected" *with* "Increased quality nonconformance and	Better wording	A			

		rework are to be expected".					
326	2.11 line 2	*Replace last sentence with* "In accordance with these requirements, on-site arrangements, including the physical protection of items important to safety against sabotage during use and storage, should be implemented."	Better wording		A With modification. Additional details provided.		
327	Para 2.11, line 2	*Add After last sentence:* Security of design documentation provided to contractors should be controlled to maintain intellectual property rights and protect national security.	Documentation security not addressed	A			
328	Para 2.12, line 2	*Add:* "of" after account and *change:* followings to "following"	Editorial	A			
329	Para 2.12, bullet 3	"alarms for all"	Word missing			R	Para modified
330	Para 2.13, line 3	*Replace:"*These risks depend on the site and construction method which therefore should be analysed for each individual site". *With* "Each individual site should be analyzed for site specific and construction method related risks."	Better wording	A			
331	Para 2.14, line 4	*After* "should be taken into consideration. *" Add sentence* "The cumulative effects of such materials should also be	The site may contain more than one of the materials listed earlier, and an incident involving one material may	A			

		considered”	cause a “domino” effect.				
332	Para 2.17	*Replace Para with* “Site security procedures should describe the actions to be taken during the construction phase. The procedures should consider, detect and deter conditions that would otherwise impair site security. Security measures employed should consider: control of personnel, materials, and vehicles; random patrols/ inspections; and screening (pre-employment screening and gate clearance) for access to secure and safety controlled areas. As a minimum, security measures within and around the site should include physical barriers, fencing, surveillance and monitoring capability, uniformed security personnel, communication capability, and personnel access control.”	Better wording		A With modification		Proposed wording reflected in new para 2.13
333	Para 2.18, bullet 3	*Replace with* : “All arrangements necessary to accommodate the nuclear installation workforce for the site (labour colony)	Better wording	A			
334	Para 2.18, bullet 6	*Delete* “(radiation source handling and hazard)	All aspects should be covered	A			
335	Para 2.18, bullet 6	*Insert new bullet following*: “The hazard due to radiation sources on site and procedures	Considers specific text from previous Bullet 6	A			Text modified

		for handling them."					
336	Para 2.18, bullet 10, line 2	*Reword after* "and flammable equipment…" *to read:* "are designed to withstand all relevant hazards contingent upon site circumstances, such as seismic activity, floods, fires, heavy rain, snow, ice, wind etc., during the construction."	All relevant hazards should be considered and these will be contingent upon the circumstances.	A			Bullet simplified in view of large number of comments received
337	Para 3.2, line 1	*Reword following* "during construction refers to" *to read:* "the direct monitoring and observation of construction work practices, …"	Better wording		A With small modification		New para is 3.3
338	Para 3.3, line 1	*Add missing word:* The regulatory oversight should satisfy the regulatory body that the licensee is …..	Missing word.	A			New para is 3.2
339	Para 3.8, 1st bullet	*Change wording to read:* "…..design is carried out under a formally constituted management system"	The word "proper" seems rather vague in this context.		A See comments		Text modified which now exists as para 3.9 and "proper" removed
340	Para 3.9, 1st bullet	*Add after* "..irreversible steps are made ", or there is the potential to proceed towards an unacceptable increased level of risk."	The level of risk should remain at acceptable levels.		A With modification. Sentence modified and term safety included.		Para is now 3.10
341	Para 3.11, line 1	*Rewording:* "…for analysis to be carried out by the licensee to identify lessons to be learned from construction and regulatory experience, the dissemination of which can be used by authorized	Clarification,		A With modification. Licensee responsibility included		

		parties, "…					
342	Para 4.1, line 4	*Add word*: "impact on the future safety of"	Word missing	A			
343	Para 4.4, line 2	*Add "," after:* …"involved in the construction project"	Editorial, clarity			R	Not valid as sentence modified by adding "to" based on French and WNA comment
344	Para 4.15, bullet 4	*Change word*: "audits of the"	Better wording	A			
345	Para 4.15 bullet 6	*Add and change wording*: "..which the regulator may verify but for which they are not responsible"	Better wording		A With modification based on WNA comment		
346	Para 4.18	Points are lettered unlike other bulleted points in the rest of the text	Editorial	A			Bullets in the whole document to be harmonized during editorial work
347	Para 4.18, bullet(c) line 1	*Change wording after*…"construction activities" *to read:* "…development and maintenance of guides on the use of…"	Better wording		A With modification based on French comments		
348	Para 4.18, bullet(d) line 2	*Change word:* "… for issue…"	Better wording	A			
349	Para 4.18, bullet(e) line 3	*Change word*: "with regard to" not with regards to	Editorial , Better wording	A			
350	Para 4.18, bullet(g) line 1	*Add missing word:* "by the construction"	Word missing			R	Not valid as sentence has been modified

351	Para 4.18, bullet(k) line 1	*Plural of sample:* "material samples"	Editorial	A			
352	Para 4.19, line 2	*Add reference* to "IAEA Nuclear Energy Series No. NP-T-2.7 "Project management in nuclear power plant construction : guidelines and experience", 2012	Latest IAEA Guidelines	A			
353	Para 4.21, line 2	*Delete* "due" *and insert* "full"	Stress importance of safety			R	Sentence now also includes environment and security as per WNA comment.
354	Para 4.25, line 2	*Delete* "might" *and insert* "may"	Better wording	A			
355	Para 4.26	*Add additional sentence*: Additional supervision should be provided where components for subcontracted equipment is further subcontracted down the supply chain to ensure competence and compliance with the original requirements	Problems with the quality at the far end of long supply chains.	A			Added in 4.25, modified slightly "..where the supply of components.."
356	Para 4.27	*Recommend list should include*: f) design calculations, g) design change documentation, h) commissioning details and testing	This data is essential to downstream engineering substantiation process and configuration management		A f) and g) accepted. h) not part of the document		
357	Para 4.27, final sentence	*Rearrange wording:* "The construction organization should be responsible for providing the traceability records	Clarity		A With modification as per German comment		

		as required by the licensee"					
358	Para 4.29, line 2	*Delete* "eventually"	Previous wording infers that this is a remote possibility.	A			
359	Para 4.29	*Add new paragraph:* "The records compiled during construction are to be retained and maintained in accordance with the requirements and specified durations of the regulators and/or legislative requirements."	It is important that records are retained for the requisite duration, as specified in any national requirements.			R	Covered by 4.13 bullet 9
360	Para 4.31	*Replace text with:* "The construction organization should establish and implement a suitable communications plan to link on-site and off-site construction activities in an adequate and timely manner. This should also include the design organization and licensee as appropriate."	Clarity	A			
361	Para 4.34, line 4	*Add at end of sentence* "…along with any identified deficiencies."	Important consideration	A			
362	Para 4.40, line 4	*Word change- plura*l "services" *not service. Also delete underlining*	Editorial	A			
363	Para 4.42, line 4	*Delete* "the" and add "a" to read: " a first-of-a-kind project"	Better wording	A			
364	Para 4.42, last sentence	*Word correction ;* "Con**tr**actor" *not* "contactor"	Spelling	A			

365	Para 4.43, bullet 5	*Form new bullet:* *Move* "The extent of evidence available that appropriate quality can be demonstrated" *into a new bullet point*	Editorial	A			
366	Para 4.43, last sentence.	*Add Sentence* : The licensee shall inform the regulatory body of significant deficiencies within an appropriate timescale.	It is important for regulator to know ASAP in case action is required.			R	This is covered under Licensee responsibility in 4.47
367	Para 4.45, line 3	*Add words:* "…organization and approved before.."	Supply chain oversight and control		A See comments		With modification. "Agreed" used in place of suggested "approved"
368	Para 4.47	*Replace paragraph with:* " Each contractor should implement daily meetings to discuss work processes, schedule, deviations, and other important aspects of work relevant to safety and quality."	Better wording	A			With minor changes
369	Para 4.58, line 1	*Replace first sentence with*: "Due to the challenging nature of construction projects (such as tight schedules, new technology or limited availability of resources), actions to correct non-conformances may require extended time scales for resolution and may remain as pending issues even after handover from one party to another."	Clarity	A			With small modification
370	Para 5.5, line 1	*Delete* : "The examination of"	Not required.	A			

371	Para 5.6	*Add Sentence*: "The designer should ensure that the design can be constructed safely, and early contractor involvement can influence design options at the appropriate stage. Assessment of construction risk and mitigation by suitable choices in design is a statutory requirement in some countries."	Construction risk mitigation important	A			With slight modification
372	Para 5.10, 2nd line	*Delete* " so that the supplier can determine the necessary codes and standards (including inspection requirements), where these have not been specified by the designer. " *and replace with new sentence:* "If the supplier determines codes and standards (including inspection requirements), then the designer/ licensee should formally agree to these."	Wrong emphasis: The selection of codes and standards for safety significant equipment should not be left to the supplier – this is the responsibility of the designer, and ultimately the licensee.	A			With modification. Designer/licensees agreement and check for use of codes specified.
373	Para 5.13	*Replace wording with :* "The project programme should allow sufficient time between completion of the design documentation and start of construction to ensure quality of instructions, procedures and works information."	Better wording	A			With modification to make it consistent with para 2.10
374	Para 5.21, bullet (b)	*Add to bullet point:* "The disposal of	Disposal of environmentally hazardous waste not			R	Waste is covered under para 2.15

		environmentally hazardous waste generated as part of the construction process shall be undertaken in accordance with international standards"	addressed				
375	Para 5.23, line 1	*Add "s" – plural to read:* "Specific procedures…."	Editorial	A			
376	Para 5.29, line 3	*Add wording to end of sentence to read:* …are dealt with in an appropriate timescale.	Important to ensure non-conformances are addressed promptly to maintain acceptable conditions.	A			With small modification
377	Para 5.33	*Reword Paragraph :* "The contractor needs to ensure that the use of temporary structures does not adversely effect items important to Safety"	Clearer text	A			
378	Para 5.42, line 1	*Add word:* "The licensee should ensure that each manufacturer's quality"…..	Missing word.	A			
379	Para 5.53, last sentence	*Add sentence* : "Procedures shall be put in place to ensure that the operator of existing facilities endorses a change of status for those common buildings or services before implementation by the construction organization."	It is essential that the operator of existing facilities agrees to any change as nuclear safety of his facility could be jeopardised.	A			
380	General/ References	*Add:* NP-T-2.7, Project Management in Nuclear Power Plant Construction: Guidelines and Experience	NP-T-2.7 published in May 2012. Sections 1-3 have relevance to DS 441. Document should be referenced and a cross check applied for consistency and definitions.	A			

381	Para 5.21, line 3	*Change* " Those" *to* "These"	Editorial- typo	A			

COMMENTS BY REVIEWER Reviewer: U.S. Nuclear Regulatory Commission Country/Organization: United States of America Date: 6/22/2012				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
382	1.2, 2nd sentence	Nuclear installations vary greatly in type, size, utilization and other characteristics so that judgement has to be exercised on the measure of the following recommendations "applicability to a specific installation **and site-specific applications**.	Due to site-specific plant layout (plant footprint), topography and barriers (e.g., rivers, cliffs), that may pose as obstacles at some facilities may add to the security/safety at other facilities. The descriptions contained within each construction security plan should identify and account for site-specific conditions that impact the specific measures needed to meet the performance objectives and effectively implement Commission requirements.	A			
383	Section 2.2	**~~If t~~ The** licensee **~~is unable to fulfill this function, it~~** may appoint a contractor or contractors to carry out specific functions for part or all of the installation. The responsibilities of the contractor(s) should be	Should the guide limit the licensee's choice to appoint a contractor(s) to carry out specific functions for part or all of the installation only if licensee cannot fulfill the function(s) described in the		A With modification		Sentences reworded and "should" used in guides.

		clearly defined and controlled by the licensee. In addition, the contractor's governance of activities and the activities themselves should be inspected by the licensee. The use of contractor(s) **shall** in no way replace~~s~~ or reduce~~s~~ the responsibility of the licensee for safety.	previous sentences? Since the use of contractor(s) shall in no way replace or reduce the responsibility of the licensee for safety, shouldn't the licensee be permitted to choose a contractor for other reasons (for example greater experience and expected increased effectiveness)?				
384	2.13 Insert between sentences 4 and 5.	The security provisions augment the safety requirements for a licensed operating reactor during construction. Activities for a new reactor plant within the Owner Controlled Area of the current operating plant's Protected Area should be clearly articulated in the guide to describe requirements for equivalent physical protection against radiological sabotage of the licensed operating reactor with adjacent reactor power plants under construction.	Safety and security impacts of construction interaction with existing facilities should be considered together.		A Aspects of security for sites with existing NPPs have been included in 2.13 (was 2.11)		
385	2.13, Last sentence	The reference to paragraphs 5.42-5.44 appears to be to information now in paragraphs 5.51-5.53.	Editorial	A			
386	4.18 (a)	"Controlling and supervising contractors ~~**both**~~ on-site ~~**and off-site**~~;"	How is off-site supervision to be accomplished? Is this an extension of a behavioral observation program and/or drug and alcohol program? If		A See comment		Supervision changed to monitoring and manufacturing and assembling added as

			this was not the intent, then "off site" should be deleted.				per Japan comment
387	General	The document did not address design and construction issues to minimize waste generation. For example, construction to minimize releases to the environment and to minimize subsurface contamination need to be addressed. Perhaps as part of Section 4.	Completeness in addressing design/construction issues pertaining to waste minimization.	A			Old 2.15 (new 2.16) modified to include this
388	General	DS441 Safety Guide did not address certain issues pertaining to construction in order to facilitate installations decommissioning. In this regard we suggest the document address design and construction to facilitate decontamination and removal of large components (such as RPVs) for decommissioning. Perhaps as part of Section 4.	Completeness of the guide to consider decommissioning aspects during the construction phase to facilitate decontamination, remediation, and removal of large components. Also, to be consistent with DS450, decommissioning should be considered throughout the lifecycle of a nuclear facility.	A			Included in 2.11
389	General	Para 1.5 stated: *"This Safety Guide is applicable to the construction stage of a new nuclear installation and the* ***modification of an existing nuclear installation..****."* In this context, we note that modification of existing facilities may result in unintended releases or discovery of historical releases or leakages	Completeness to address potential releases resulting from constructions involving modification of existing facilities or adjacent facilities.			R	Paras 2.14/2.15 cover these issues. Also NS-G-2.3 (ref 4)

		during new construction modification. The current document lacks guidance on: • Containment & minimization of releases • Reporting of newly identified releases • Addressing new modification in design and construction if necessary. We suggest adding a new Para after Para #5.52 addressing this issue. The above comment also applies to new constructions adjacent to pre-existing facilities.					
390	General	The document needs to address construction issues to facilitate monitoring for leakages or environmental releases to ground water or surface water. This issue is significant, especially in the design and construction of infrastructure systems. Perhaps as part of Section 5.	Completeness to address construction issues to facilitate monitoring.	A			See new para 2.15

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Thomas Fröhmel [thomas.froehmel@eon.com] Country/Organization: WNA/CORDEL Date: 06-19-2012							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

391	General 1 1 / Contents	Need guidance based on international good practices in construction of nuclear installations, particularly covering the applicable codes, standards, methods and techniques. It is to be strongly suggested to implement additional appendices to cover the following topics:- a. Civil & architectural b. Mechanical c. Electrical & Control Instrumentation d. Welding e. Modular Construction	The objective (para 1.4) and the scope (para 1.7) mention that this guide is to provide guidance on these topics but nothing is included. Earlier version of the DS441 had some very good technical guidance based on international best practice.			R	During the development of the draft since its DPP acceptance, authors and some NUSSC Reps concluded that the technical recommendations on civil and architectural engineering, mechanical, electrical, and welding are not appropriate for the level of technical detail that is usually expected of the IAEA Safety Guide. Therefore these sections are decided to be left out for TECDOC or other related technical documents. And the title has been changed to "Construction ***for*** NIs" in order to not to mislead any readers that this guide includes technical guidance on how to construct

							NIs.
392	General 2	In general, it has to be noted that the Background, Objective, and Scope sections may benefit from an additional review by the authors as they seem to cover broad areas of intent that deviate from the specific content of the document. Although well written and apparently comprehensive as determined from our brief review, we find it contains a very high level philosophical approach to nuclear installation construction.			A See comments		Some modifications to the text
393	General 3	It would be helpful to use the word the works consistently to mean the output from "construction activities". The word work is an activity.	Improved clarity and consistency	A			
394	General 4 CONTEN TS TOC	Review the TOC for consistent use of Capitol Letters and Lower Case letters. (see following example)	The TOC is inconsistent with the use of upper case and lower case letters…	A			
395	General 5	Part 4 on the Management System for the Construction of Nuclear Installations has a confusing structure with several aspect of PROJECT MANAGEMENT being given the same heading font. For	Inconsistent headings and structure.			R	Structure is consistent with other related IAEA documents like GS-G-3.5

		example, CONTROL AND SUPERVISION OF CONTRACTORS is part of project management and should have a font that recognizes this. An improved structure has been proposed.					
396	1.1/3	...supplements the ~~requirements,~~ recommendations and guidance...	If it guidance then there are no mandatory requirements	A			
397	1.2/2-3	...and the **modification** of existing nuclear installations.	There is a need to clarify "modification": are all modifications concerned? That seems extreme. The clarification in "SCOPE", para. 1.5 is not clearer.	A (Modification clarified)			
398	1.3/1	components ~~or~~ of nuclear	Correction			R	We are referring to both SSC and the overall nuclear installation
399	1.4	The objective of this Safety Guide is to provide recommendations and guidance based on international good practices in construction of nuclear installations, as currently followed in Member States, which will enable construction to proceed with high quality, consistent with applicable codes, standards, and ...	Either include the guidance on codes and standards or change the objective. The rest of the report is inconsistent with the objective stated in para 1.4	A			Objectives modified
400	1.4/2	...in the construction	Grammatical correction	A			

401	1.5/3	...of ~~civil and architectural~~ architectural and civil work, installation and maintenance of components and equipment and systems,	Self-explanatory clarification for consistency		A With modification, see comments		System replaced by SSC
402	1.5/5	...associated **tests**	"Tests" would need to be better defined.	A (Purpose of tests included)			
403	1.7 / 3	The text says, " ...- To support the development, implementation, assessment and improvement of the **construction methods, procedures and techniques**" but nothing has been provided to improve construction techniques	The rest of the report is inconsistent with the scope stated in para 1.7	A			Construction activities removed from the scope
404	1.7 / 7	The text says, " ...- To assist licensee and construction organization in providing technical specifications to a contractor" but nothing has been provided to assist in providing technical specifications.	Suggest additional appendices to provide guidance on preparing technical specifications otherwise the scope is inconsistent with the rest of the report.			R	Suggested topics may be covered by TECDOCs
405	1.10	Need to change the report structure to provide more practical technical guidance.	The current structure of the report focuses on 'management' which is inconsistent with the scope stated in para 1.7			R	Scope modified and technical details are not the focus of this document
406	1.10 line 4	"…management systems for construction. "	Add an "s" of systems since there can be multiple management systems.	A			

407	1.10/3	recommendations on the management	Grammatical correction			R	
408	1.1/2-5	...components of a facility, the supply of contractor's apparatus, equipment, plants, goods and materials required for the execution of temporary and permanent works, the carrying out of civil engineering, the transportation and installation of components, ~~and~~ equipment and systems and the performance of ~~associated tests are referred in this guide as~~ pre-commissioning tests. Pre-commissioning tests are functional and performance tests of individual subsystems of components, equipment and systems. ~~and.~~ ~~t~~They are prerequisites for performing	Improved clarity and consistency with later definitions in the text			R	Existing definition is as per Safety Glossary
409	2.1/7-9	...been installed, inspected, tested (i.e. pre-commissioning tests have been conducted, but not any tests defined as part of commissioning) and, if appropriate ~~necessary~~, transferred to a commissioning group appointed by the licensee.	Improved clarity and consistency with later definitions in the text		A Partly by including "inspected" and rest of the sentence modified		
410	2.2 Line 10 Page 5	...The use of contractor(s) in no way replaces or reduces the responsibility of the licensee for all matters related to safety.	Better wording		A With modification reflecting SF-1		
411	2.2 foot note 2	**...pre-commissioning tests**	Improve the definition of pre-commissioning tests. The		A Reference to Pre-		

			distinction or limit that this guide tries to make between pre-commissioning test and commissioning is not clear and may benefit from a better definition. Introducing this notion of pre-commissioning might not be so helpful?		commissioning tests deleted and text modified		
412	2.2/3-4	This construction organization is the entity managing the construction activities. These may generally cover the construction activities themselves, but also all the preliminary and necessary activities to the construction phase itself: detailed design, reception, storage and assembly of material and equipment supplied by the vendors, or their procurement in accordance with all the vendor and license specifications. This also covers activities such as architectural activities, design engineering, preparation and execution of construction methodologies, works of civil engineering, ~~and architectural works~~, manufacturing, assembly, installation and testing of structures, systems and subsystems, components and	The construction organization does not limit itself to constructing the works that are important to safety.			R	Para re-worded and diagram added. The proposal deals with details of contractors responsibilities which are covered later.

		equipment, including items important to safety at the level of the installation.					
413	2.2/7	...by the licensee and may include responsibilities during the commissioning stage.	The construction stage and the commissioning stage may overlap in practice, with sections of the works handed over to the commissioning team by the construction organization before other sections.			R	Construction is the subject of this document – other IAEA SS deal with the issue.
414	2.3 Line 1 Page 5	The contractor means ~~to~~ any individual or organization who provides items or	Correction	A			
415	2.3 and following	ADD: **Design organization** 2.4 The design organization means the organization that developed and detailed the design of the installation or facility, including drawings, plans, calculations, software and specifications. Where the contractor is responsible for the design of any part of the facility the extent of the contractor's obligations must be defined. **Licensee** 2.5 The licensee means the organization that holds an operating licence from the regulatory body granting authorization to operate a nuclear installation or an authorized facility.	Additional definitions to provide consistency with the remainder of the document.		A Definition added but wording as per SSR-2/1		Definition of stakeholder and Licensee already exists in Safety Glossary

		Stakeholders 2.6 The stakeholders at the construction stage will include several interested parties such as the local government, neighbours, existing and potential customers, personnel and their representatives (e.g. trade unions) in addition to those organizations mentioned above.					
416	2.3/line 1	"~~The contractor means~~ A contractor is defined as to…"	This change is required for clarity.	A			
417	2.5/1	To achieve the highest level of safety ~~that can be achieved in~~ the construction	Use of English improved	A			
418	2.6/line 4	... Before construction starts, a preliminary safety analysis report (or pre-construction safety analysis report that supports the application for authorization for siting and/or construction) should be available to describe the nuclear installation and its safety features with key design characteristics and updated as appropriate[2]. new footnote: 2 This recommendation implies a two step licensing process. Regulatory bodies in some member states allow an NPP licensing option of a combined	This recommendation implies a two step licensing process...1) a construction permit and 2) and operating license. In some countries the construction and operating license are approved at one time allowing the utility to build a certified design. A note is appropriate here to clarify this.			R	Not valid as the para has been modified to be in line with reference 12.

		construction and operating license instead of requiring a construction permit and a separate operating license.					
419	2.7/line 1	"The licensee should– identify and understand jurisdictional boundaries and…"	Delete underline between "should" and "identify". It is not necessary.	A			
420	2.8/2	...personal ~~responsabilities~~ duties / concerns	Only the licensee is responsible			R	Not valid in view of modification based on comment from Belgium. Now 2.9
421	2.9	The design schedule, including acceptance criteria and engineering work commensurate with the authorization process should be verified prior to start construction. Before construction starts, readiness review should organize to ensure availability of engineering documents on time. A forward action plan covering remaining design and engineering works and the necessary should be developed and monitored as construction proceeds….	Due to the interaction between design process and procurement and the necessary integration of contractor methods in the execution design, the execution design is developed by sequence in advance of construction. Having all the design done when construction starts would imply equipment contracts to be signed several years in advance of the real needs. This would be especially difficult to achieve for a first of a kind.	A			
422	2.9/1	Adequate completion of design … and engineering work	If manufacturing is included in construction, this seems difficult to achieve for long lead items which may be ordered well in advance like	A			Sentence deleted

			large components for the reactor.				
423	2.9/4	should be developed by the licensee or agreed by the licensee and monitored	Clarification of who is responsible	A			Responsibility identified
424	2.9/6	contract	Which contract are we referring to?? Not clear.	A			Sentence modified
425	2.9/line 5	"...construction proceeds.~~.~~ Care should be taken to ensure that the form of contract does not…"	Delete second period. It is not necessary.	A			
426	2.10/3	~~technology~~	What are the links between activities and technology?			R	Wording considered adequate
427	2.10/4	"...non-conformances and re-works are expected when new methodologies are applied…"	Add an "s" to "non-conformance" and delete the "s" from "re-works" This reads better and is grammatically correct.	A			
428	2.10/6	"...adequate resources for qualification activities such as R&D activities…"	Add an "s" to resource. There can be multiple resources.	A			
429	2.11/2-4	...safety considerations by the licensee. Conflicting requirements should be identified and resolved. According to those requirements, on-site arrangements and measures should be implemented by the construction organization, including physical protection of items important to safety at the installation level against contamination, weathering and	Clarification of who is responsible and of the risks and use of English improved		A First part accepted. 2nd part rejected as this para deals with safety and security not with contamination, weathering and other natural events		

		other natural events, accidental or malicious damage or sabotage in use and in storage ~~of items important to safety~~ (see 2.17).					
430	2.12 Line 1 Page 8	For sites with existing nuclear installations, emergency preparedness should take into account the followings	Correction	A			
431	2.12 Line 6 Page 8	Provision of additional alarms for all personnel at the site; and,	Correction	A			Sentence modified
432	2.12/1	For sites with existing or nearby	Sometimes, neighbouring nuclear sites might have different names.			R	This para refers to onsite arrangements (operating as well as construction installation)
433	2.12/6-7	"Provision of additional alarms all personnel at the site~~;~~ and,…" - Provision of additional alarms all personnel at the site; The need to ensure that all personnel on site are able to hear an alarm, even in areas with a high level of noise or in sound-proofed areas, through, for example, the ~~P~~provision of additional alarms or more	This statement is not clear and must be rewritten. The meaning is very ambiguous. Do you mean additional alarms caused by the additional construction workers at the site? What do you mean by provisions - be able to accommodate more alarms? Proposal to improve clarity. Flashing lights might be used for example.		A With modification, see comments		Appropriate arrangements taking into account site specific activities added.

		appropriate means ~~all personnel at the site~~ which are adapted to the work situation;					
434	2.12/7	The various phases of construction and commissioning with their inherent risks. The risks associated with the various phases of construction and commissioning ~~with their inherent risks~~.	Improved English.	A			
435	2.13/6-8	The findings of the risk and threat assessment should be made available to the construction organization and ~~P~~preventative measures should be proposed to the licensee and adopted ~~taken~~ by the construction organization to manage the construction related risk. Further guidance on interaction with existing facilities is provided in paras. 5.49~~2~~ – 5.51~~44~~.	Clarification of who is responsible.		A Comment recognized the affected licensee has been identified as the responsible agency.		
436	2.14/2-4	...should be identified. The maximum amount of hazardous material present at any given time and the process in which it is used should be taken into consideration. ...should be identified during the risk and threat assessment. The maximum amount of hazardous material present at any given time and the process in which it is used should be taken into	Expansion of the text to be clearer and more comprehensive.	A	A First part accepted. Second part too specific.		

		consideration in defining construction methods.					
437	2.15/line 1	"Environmental monitoring and ~~protection~~ protective measures at the site should be in place to …"	Change "protection" to "protective" . This is grammatically correct.	A			
438	2.17 Line 1 to 5 Page 9	The security measures that describe actions taken during construction should consider, detect, and deter conditions that would impair the capabilities of security- and items to perform their intended safety functions, where those conditions are not otherwise detected by engineering and performance barriers to ensure that items are installed and tested as designed.	No proposal of modification to this sentence, but it shall be modified; it is quite difficult to understand the meaning of it. What means "security- and items"? This sentence is a run on sentence and is very confusing. It is not clear what you are requiring here. It needs to be broken into two unambiguous sentences so the reader knows what the recommendation is that needs to be addressed.	A			Clause deleted
439	2.17	~~"The security measures that describe actions taken during construction should consider, detect, and deter conditions that would impair the capabilities of security-and items to perform their intended safety functions, where those conditions are not otherwise detected by engineering and performance barriers to ensure that items are installed and tested as designed."~~	~~This sentence is a run on sentence and is very confusing. It is not clear what you are requiring here. It needs to be broken into two unambiguous sentences so the reader knows what the requirement is that needs to be addressed.~~ (merged to one statement)	~~A~~			Clause deleted to avoid duplication with new 2.13

440	2.17/2-5	...capabilities of items that are security-sensitive or have a ~~and items to perform their intended~~ safety functions~~, where those conditions are not otherwise detected by.~~ Eengineering and performance barriers and checks to ensure that items are installed and tested as designed should be considered.	Expansion of the text to be clearer and more comprehensive.	A			Clause deleted to avoid duplication with new 2.13
441	2.17/line 10	"...communication capability, and control of personnel access. .."	Add "of" between "control" and "personnel" It is required for this sentence to read correctly.	A			Clause deleted to avoid duplication with new 2.13
442	~~2.18~~	~~- Construction processes and equipment such as cranes, scaffolding, temporary structures, portable equipment, and flammable equipment should de designed to withstand meteorological and hydrological hazards such as earthquakes, floods, fires, heavy rains, snow, ice, etc., during the construction when there is a risk for the environment.~~	~~As long as there is no risk from dissemination of radiological fission products, (no nuclear fuel on site), the risk is only an industrial one, not a nuclear safety related one and needs to be managed as any other industrial risk.~~ (merged to one statement)	A			
443	2.18/10	- Marking ~~of nuclear~~ as licensed construction site ~~boundary~~ according to national information rules for industry projects	Is that something done everywhere?		A See comment		Clause modified
444	2.18/13	~~- All infrastructure support systems should be in place including required electricity, gas and water supply, protection~~	The meaning of this bullet is unclear and it needs to be reworded. It is as if a section of the statement has been		A See comment		Clause modified

		~~or coverage after work completion and environmental qualification.~~	dropped. As the statement stands the readers will not understand what the recommendation is.				
445	2.18/16 Page 10	Construction processes and equipment such as cranes, scaffolding, temporary structures, portable equipment, and flammable equipment are all designed to withstand meteorological and hydrological hazards such as ~~earthquakes,~~ floods, ~~fires,~~ heavy rains, snow, ice, etc., during the construction, and this up to defined and normal limits according to the site conditions.	This recommendation is extremely constraining and cannot be fulfilled as written. Cranes and scaffoldings for example are not designed to withstand an earthquake. As long as there is no risk from dissemination of radiological fission products, (no nuclear fuel on site), the risk is only an industrial one, not a nuclear safety related one and needs to be managed as any other industrial risk.		A See comment		Clause simplified in view of large number of comments received
446	2.18/17	...to withstand ~~meteorological and hydrological~~ natural hazards such as...	Text is more comprehensive; e.g. it now covers earthquakes.		A See comment		Same as 445 above
447	2.18/3	" The Licensee~~'s~~ should develop a manual on site construction quality management which is approved by the regulator;	Change is required to understand the recommendation fully.		A With modification, Regulatory approval included		
448	2.18/4	"Design reports of items important to safety ~~having~~ referenceing ~~to~~ construction consent"	Changes required for clarity and to make the statement grammatically correct.		A With modification		
449	2.18/5	- Arrangements to accommodate specialized nuclear installation work force ~~to~~ at the site (labour	Improved English. Is this point relevant to this paragraph?		A Sentence reworded		

		colony);					
450	2.18/5	"…installation work force ~~to~~ at the site…"	Change "to" to "at". This is grammatically correct.		A Sentence reworded		
451	2.18/7	"…Location ~~and~~ of approach/exit roads…"	Delete "and" and insert "of". This is grammatically correct.		A Sentence reworded		
452	2.18/9	"…handling and hazards …"	There could be multiple hazards…Change "hazard" to "hazards".		A Sentence reworded		
453	3.3/1	"…~~The~~ ~~r~~Regulatory oversight should satisfy the regulatory body that the licensee is in…"	Changes are required to make the statement grammatically correct.		A 2nd editorial comment accepted		New para is 3.2
454	3.4/1	"Well in advance of the beginning of ~~the~~ construction, the regulatory body…"	Delete "the" It is not necessary for understanding here.	A			
455	3.4/line 3	"…of ~~the~~ construction activities."	Delete "the" It is not necessary for understanding here.			R	Editorial review will address any detailed grammatical changes
456	3.5	The regulatory body should develop requirements or guidelines governing its oversight of construction activities according to a graded approach. This extends to contractors manufacturing and assembling items important to safety.	Wherever they take place, in factories or on site, the inspections are always against the licensee's specification.			R	Proposed text is same as original text
457	3.7/3	...appropriate should be formally defined before the construction	Expansion of the text to be clearer and more		A Reporting of non conformance		

		works are procured or started ~~begins~~. This should include an adequate system for reporting non-conformities of safety significance according to a well understood and commonly agreed graded approach. This may covers deviations that may just need to be recorded at the contractor level when the quality insurance in place allows him to perform the corrections pending proper documentation of the process, to more serious problems which may require the timely information of the licensee and even the regulator, and their agreement before going ahead with corrective measures.	comprehensive.		is covered under new 4.57 and 4.58		
458	3.9/11	ADD to end: The provision of timely information to the licensee and regulatory body of any arising issue is the key to the timely addressing of these problems.	Expansion of the text to be clearer and more comprehensive.	A			
459	3.9/6	as early as possible and prior to the construction works procurement to allow	Text is more comprehensive.			R	It may not be practical in all cases to identify hold points before procurement.
460	4.1/line 4	"…construction work has significant impact on the future safety of nuclear installations, …"	Insert "the" and add an s to "installations" There could be more than one installation. Changes are required to make the statement	A			

			grammatically correct.				
461	4.2/1	"A strong s~~S~~afety culture is important in all phases of the life cycle of a nuclear installation ~~life cycle~~."	This reworded sentence emphasizes the importance of a strong safety culture throughout the life of a NPP.	A			
462	4.2/3-6	...to ensure safety during the construction phase and in the commissioning, operational and decommissioning phases. This involves an understanding that deviations from procedures and specifications, or failure to understand the safety significance of structures, systems and components may have unforeseen consequences in the future. Safety culture ensures that health protection and safety issues receive the attention warranted by their significance.	Expansion of the text to be clearer and more comprehensive.			R	Word "construction" already exists in the sentence. 2nd proposal is definition of safety culture which already exists in IAEA Safety Glossary
463	4.3/2-7	...budget pressures, managing the employment of temporary workers with various levels of skills, from various cultures and languages on some occasions, and of numerous contractors, and undertaking works influenced by weather conditions and external environments. In addition, construction activity necessarily involves managing change and people on a constant basis. These factors are known to be some of the prime conditions	Expansion of the text to be clearer and more comprehensive.		A See comments		Last sentence rejected as too detailed

		that can induce poor safety culture. Goal conflicts between schedule, cost and safety should not adversely affect conservative decision-making and the maintenance of an open and questioning attitude at all levels of management (including first-line supervisors). Application of safety culture principles ~~attributes~~ should be implemented in all participating organizations and individuals. It is also important that everyone acknowledges their own limitations so to report to the adequate level of supervision – in and then even outside their proper company if this sis a contracted work- any arising problem or unexpected difficulties(see 4.6).					
464	4.3/line 5	"…are known to be some of the prime conditions that can induce a poor safety culture. …"	Insert "a". This is grammatically correct.			R	Not valid in view of changes made based on French comments
465	4.4 Line 2 Page 15	Construction programmes and methodologies should be developed and implemented to help all interested parties involved in the construction project to strengthen safety culture particularly in organizations less familiar with nuclear safety requirements.	Correction	A			

466	4.4/2	"…to help all interested parties involved in the construction project strengthen the safety culture…"	Insert "the". This is grammatically correct.	A			
467	4.4/3	~~Train~~ induct	Consider the use of the proper English term.			R	Training includes induction part
468	4.6/5	"…have experience ~~of~~ working for the nuclear industry.	Delete "of" It is not necessary for understanding here.			R	Editorial review will address any detailed grammatical changes
469	4.7/2	"…evaluation and monitored during the construction stage.~~.~~ …"	Delete the extra period at the end of this sentence.	A			
470	4.7/3	Monitoring and evaluation should cover not only contractors' procedures and organization but also involve their personnel (and their representatives) ~~staff~~.	In this context it is better to mention 'organization' as encompassing 1) the institution and 2) how the work is managed. 'Staff' can be misinterpreted as excluding sub-contracted people, so 'personnel' is a more comprehensive description. A safety culture should engage people, so personnel (and their representatives, e.g. trade unions) should be involved in the evaluation itself.			R	New 4.5. Organization includes procedures
471	4.8	To support the safety culture principles, there should be a process for reporting safety concerns directly to	On order not to undermine the primary responsibility of the licensee, design and construction issues should be		A See comment		New 4.7 Reporting to management first and also awareness of reporting to

		management, in first instance, and the regulatory body according to the procedure in force. This process should include capability of anonymously reporting a non-conformance or concern.	raised first to him.				regulator introduced.
472	4.8, after	APPLICATION OF A GRADED APPROACH	Self-explanatory.	A			
473	4.10/2	...management system requirements to the risks associated with construction activities and their potential impact upon the commissioning, operation and decommissioning of the installation.	Expansion of the text to be clearer and more comprehensive.		A See comment		Risk part added in new 4.9. Remaining part not valid for this guide.
474	4.11	In developing the grading approach, the following should also be considered: ~~(a) The qualification of special construction processes such as welding or non-destructive testing and the qualification of the personnel that will carry them out;~~ ~~(b) The necessary level of detail and the need for inspection and test plans;~~ (c) The safety significance of equipment, materials, procedures, records and other documents; ~~(d) The level of in-process controls and the need for hold or witness points;~~	delete a), b) and d), these are more consequences of the application of a graded approach than criteria on how to apply it.			R	New 4.9. The para also covers what all gets effected by graded approach

		...					
475	4.11, After	ALLOCATION OF ~~LICENSEE~~ RESPONSIBILITIES	This sub-section includes paragraphs (4.17 and 4.18) describing the responsibilities of the construction organization so the headings must reflect this.			R	Licensee could be the construction organization also
476	4.11/1	"In developing the ~~grading~~ graded approach, the following should …"	Change "grading" to "graded". The specification refers to the "graded approach" to safety.	A			
477	4.15/11	- Internal and External audits on the management	Internal and External to who/ what?? It needs more precisions.			R	Internal and external audits which are part of independent assessment are discussed in GS-G-3.1
478	4.15/15	"Inspections, tests and verification of items important to safety.~~, which t~~The regulator verifies the inspections, tests and verifications however this does not alleviate the licensee from the responsibility of performing them.~~but does not substitute for.~~ …"	There are two thoughts in this statement and it is not clear what you mean. I suggest the following statements if this is the intended meaning.	A			
479	4.15/16-18	regulator … regulator regulatory body … regulatory body	Consistency with line 21.	A			
480	4.15/16-18	regulator … regulator regulatory body … regulatory body	Consistency with line 21.	A			

481	4.15/21	...and events as required by the regulatory body or the Licensee in its related contractual requirements.	Not only: the licensee or its first tier contractor may also ask for this reporting but not all go to the regulatory body level, part of the graded approach.			R	This clause focuses on higher level regulatory requirements
482	4.15/21	...by the regulatory body or the Licensee in its related contractual requirements.	Not only: the licensee or its first tier contractor may also ask for this reporting but not all go to the regulatory body level, part of the graded approach.			R	Repeat item of 481
483	4.15/22	Ensuring that appropriate records relevant to safety are generated and preserved;	Improved precision in wording.		A See modified wording		
484	4.15/24	Taking into account tests performed during construction; Taking into account tests performed during construction and their proper recording;	Expansion of the text to be clearer and more comprehensive.		A See comments		Established in place of generated used as per French comment
485	4.15/27	...moving gradually from construction to decommissioning.	The construction stage and the commissioning stage may overlap in practice.			R	Construction to commissioning may be a gradually move but transfer of documents for a SSC will be a point in time.
486	4.15/6	...witness/ and hold points	A witness point may not be a hold point.	A			
487	4.15/line 5	"…supervision plan for ~~the~~ items important to safety…"	Delete "the" It is not necessary for understanding here.			R	Editorial review will address any detailed grammatical changes

488	4.15/Note 5	"An "intelligent customer" ~~is~~ ~~which~~ ~~the~~is defined as an organization has…	These changes are required to clearly "define" an intelligent customer.	A			Definition of Intelligent customer modified to be in line with that give in GS-G-1.4 (ref 24)
489	4.15/Page 18/line 10	"…both a technical and a management system perspective;	Insert "a" – two places. This is grammatically correct.	A			
490	4.15/Page 18/line 6	"…provided by contractor(s) or design/construction organization(s);	Add "(s)" to the end of organizations…There could be multiple organizations.	A			
491	4.16	INSERT: 4.16 The licensee should have in place emergency planning and emergency measures to ensure worker and public safety in the case of an on-site or external event that may occur during construction.	Move 5.15 to become 4.16.	A			5.15 moved and is now 2.12
492	4.16 onwards	Renumber 4.16 as 4.17 and similarly for following paragraphs.	Self-evident.	A			
493	4.16/1-3	The licensee should formally appoint an individual from its own organization as the construction manager to be responsible for construction activities. The construction manager has responsibility to ensure that the construction meets all relevant safety requirements.	There could be confusion between the construction manager appointed by the licensee and the construction manager appointed by the construction organization (see 5.2).	A			Term construction manager deleted in 5.2

494	4.16/1-3	The licensee should formally appoint an individual from its own organization as the construction manager to be responsible for construction activities. The construction manager has responsibility to ensure that the construction meets all relevant safety requirements.	There could be confusion between the construction manager appointed by the licensee and the construction manager appointed by the construction organization (see 5.2).	A			Repeat item
495	4.17/2	construction organization which may ~~be or~~ include contracted staff to manage the construction works.	Improved clarity of meaning.			R	"Be or" deleted.
496	4.17/line 2	"…which may be (or include) contracted staff. The role and …"	Grammatical changes required for clarity.			R	Contrary to comment 495
497	4.18 / 3	~~Off site~~	Off site is not necessarily under the construction management as procurement could be under a different individual responsibility.			R	Ultimately the responsibility lies with the construction organisation for all equipment quality
498	4.18 After	~~5.17~~4.20 The construction organization should have in place contingency plans for on-site critical construction activities, including measures to cope with electric power outages, loss of water supply, disruption of concrete batching and any other interruptions which may cause unexpected	INSERT: Move 5.17 to become 4.20 There could be multiple outages. Change "outage" to "outages"	A			New paragraph 4.19

		deterioration in work quality.					
499	4.18/3	… and ~~off site~~;	Off site is not necessarily under the construction management as procurement could be under a different individual responsibility.			R	Manufacturing and assembling added as per Japan comment to make off-site clear
500	4.18/8-22	(c) Identification of generic activities, developing and maintaining guides ... (f) Planning and monitoring the progression of work to fulfill the construction (g) Ensuring that work by the construction organization	Use of English, spelling error and missing word.	A			
501	4.18/Page 21/item (k) line 1	"Acquiring, installing or maintaining material samples for a long term monitoring and analysis program of ageing material ~~ageing monitoring and analyses~~; …"	Changes are required for statement clarity.	A			
502	4.20/2-3	...the organization, co-ordination and control of large human, equipment and material undertakings, with many constraints. the organization of processes, co-ordination of activities and control of ~~large~~ resources (human, ~~equipment~~ informational and material) on a large scale and under ~~with~~ many external constraints.	Improved clarity of wording.	A			

503	4.21/2	They should take due account of safety. They should take due account of safety and security and environmental impact.	Improved wording.	A			
504	4.22/1-8	The licensee, construction organization and other contractors should have adequate organization, resources, experience, competence and procedures to manage the construction of a nuclear installation ~~construction project~~ and maintain documentation to demonstrate them ~~these~~. Experience has shown that ~~a~~ construction projects can involve the use of temporary workers with various skills and languages; multi-layered and multi-national contractors with various ~~languages~~ cultures, legal and regulatory backgrounds; and different conventions for measurements (units, measurement methodologies, measurement equipment/devices, approaches to risk management ~~uncertainty~~, etc.).	Improved wording.		A See comments		See new para 4.21
505	4.23/Page 22/footnote 7/line 2	"…IAEA Safety Fundamentals~~Fundaments~~/ Requirements …"	Correct typo "Fundaments" should be "Fundamentals"	A			
506	4.27 Before	**Traceability** **Knowledge management**	The sub-section on CONTROL OF DESIGN			R	Knowledge management here

			INFORMATION should be inserted as part of Knowledge management.				becomes a very generalized topic and it is preferred to retain the existing clauses at their specific location. Hence 118-121 not accepted.
507	4.27 Before	ADD: 4.29 An integrated, systematic approach to collect, record, store and utilize knowledge should be established to permit the regulatory body and licensee, and the construction organization (if applicable), to form judgements, make decisions, plan and prepare options and learn from experience.	Self-explanatory.			R	Unnecessary detail
508	4.27 Before	INSERT: Arrangements for communication should be established between the design organization(s)[1] and the construction organization and between construction organization and its contractor(s) to deal with queries on the design.	Move 4.50 to become 4.30		A See comment		Now para 4.27
509	4.27 Before	INSERT: 4.31 Reference [5] states: "During construction and commissioning, a comparison shall be carried	Move 4.48 to become 4.31		A See comment	R	Now para 4.26

		out between the ‘as built’ plant and its design parameters. A comprehensive process shall be established to address non-conformities in design, manufacturing, construction and operation. Resolutions to correct differences from the initial design and non-conformities shall be documented” (para. 6.15). Furthermore, Ref. [7] states in paras 7.6 and 7.7 that: “The operating organization shall specify a formal procedure for design changes such that those made to the facility during construction are accurately recorded and their impacts are assessed. “‘As built’ drawings of the facility shall be provided to the operating organization. Following construction of the facility, the operating organization shall review the as built drawings to confirm that, as far as can be assessed, the design intent has been met and the safety functions					

		specified will be fulfilled. The operating organization shall, as required, seek agreement by the regulatory body to proceed to the commissioning stage." These requirements are also implicitly applicable to the licensee for the construction of nuclear installations.					
510	4.27 Before	INSERT: 4.32 The licensee should control the drawings, design codes and documentation which describe the basis for licensing the construction, commissioning and operation of the nuclear installation in order to maintain design configuration control.	Move 4.49 to become 4.32		A See comments		Now para 4.28
511	4.27 Before	INSERT: 4.33 A process should be established to address change proposals from the contractor(s) with regard to the design. If the proposal has an implication for safety, its resolution should involve the design organization(s), licensee and regulatory body as appropriate.	Move 4.51 to become 4.33		A See comments		Now para 4.29
512	4.27/6	ADD: (b) Associated electronic data in a format agreed upon and related to the actual plant configuration, with proper record of changes	Self-explanatory.			R	This is one of the ways of recording and too detailed

		made, and ability for the licensee to update these data with each configuration changes all along the plant life (the usage of international norms like ISO 15926, cited only as an example, may help guarantee the capability to address data management obsolescence issues);					
513	4.27/6	ADD: (e) Record of all deviations and anomalies encountered during the construction, in a graded manner as described before;	Self-explanatory.	A			With modification based on UK comment
514	4.27/6	ADD: (b) Associated electronic data in a format agreed upon and related to the actual plant configuration, with proper record of changes made, and ability for the licensee to update these data with each configuration changes all along the plant life (the usage of international norms like ISO 15926, cited only as an example, may help guarantee the capability to address data management obsolescence issues);	Self-explanatory.			R	Repeat of 512
515	4.27/6	ADD: (e) Record of all deviations and anomalies encountered during the construction, in a graded manner as described before;	Self-explanatory.	A			Repeat of 513

516	4.27/6-7	Renumber sub-paras (b) and (c) as (c) and (d).	Self-evident.	A			Numbers changed as per all comments accepted
517	4.27/8-9	Renumber sub-paras (d) and (e) as (f) and (g).	Self-evident.	A			Numbers changed as per all comments accepted
518	4.27/line 11	"…licensee are provided to them.~~.~~"	Delete the extra period at the end of this sentence.	A			
519	4.29/1-2	Considering a good practice which consists of making sure that comprehensive photographic and, where appropriate, video records and computer simulations are ~~should be~~ compiled,	Current wording appears to be a requirement not guidance.			R	Words "where appropriate' give flexibility of decision
520	4.30 Before	INTERFACE MANAGEMENT **Interface management**	Change the font of the sub-heading to be consistent with the section PROJECT MANAGEMENT	A			Fonts will be as per IAEA practice
521	4.30/1-5	4.30 Interface arrangements should be identified and agreed between the licensee, construction organization (if appropriate), design organization, contractors and other organizational units performing the work. The interface arrangements should be specified in management system documentation and should be included in procurement documents as appropriate. 4.37 Interface arrangements should be identified and agreed between the licensee,	Provides greater information on the responsibilities of the construction organization and inserts a missing word.		A Grammar correction accepted	R	Last line suggested is statement of obvious.

		construction organization (if appropriate), the design organization, contractors and other organizational units performing the work. The interface arrangements should be specified in management system documentation and should be included in procurement documents as appropriate. Interface management entails good communication between and within organizations and between personnel and management.					
522	4.32/1-3	4.32 The construction organization should define processes for identifying and resolving conflicts and misunderstandings between contractors, for instance concerning conflicts with construction schedules, activities, tools, work spaces. 4.39 The construction organization should define processes for identifying and resolving conflicts and misunderstandings between contractors, for instance concerning conflicts with construction schedules, activities, tools, work spaces. The construction organization should define procedures for	Provides greater information on the responsibilities of the construction organization.			R	We can't define procedures.

		ensuring good communication with personnel, including contractors' personnel, and for facilitating harmonious relations between employers and employees in accordance with legal, regulatory and contractual responsibilities.					
523	4.32/line 3	"…construction schedules, activities, tools, work spaces, etc. …"	Add etcetera to the end of the list. There may be other items not mentioned here.	A			
524	4.33 Before	TRANSFER OF RESPONSIBILITY **Transfers during construction** ~~**TRANSFERS OF RESPONSIBILITY**~~ *Transfers during construction*	Change the font of the sub-heading to be consistent with the section PROJECT MANAGEMENT and sub-section **Interface management**.	A			Fonts will be as per IAEA practice
525	4.34/line 4	"…should be agreed to by both groups. …"	Grammatical changes required for clarity.	A			
526	4.36 Before	**Transfers to commissioning** *Transfers to commissioning*	Change the font of the sub-heading to be consistent with the section PROJECT MANAGEMENT and sub-section **Interface management**.	A			Fonts will be as per IAEA practice
527	4.36/11	Corrective actions must be agreed, planned and scheduled accordingly	Precision to be added	A			With modification as new bullet (d)
528	4.36/14	With associated required configuration (open / closed)	Precision to be added	A			
529	4.36/21	ADD: (i) Data allowing adequate and precise plant configuration	Self-explanatory.	A			With modification. First line added to new bullet (h)

		management. This includes all software changes and data in digital and control systems implemented at the plant.					
530	4.36/8	(b) Pre-commissioning inspection and pre-commissioning functional and performance tests should be carried out and the results recorded.	Self-explanatory. Might still create some confusion about what are pre-commissioning tests?	A			With modification. Bullet modified to delete word functional tests
531	4.37 Before	The sub-section CONSTRUCTION RESOURCES should be moved to precede MEASUREMENT ASSESSMENT AND IMPROVEMENT	This restructuring of the text will improve the coherence of the subsection on PROJECT MANAGEMENT.	A			
532	4.39	The Licensee should promote that the personnel who will be involved in commissioning, operating and maintaining nuclear installations will be involved during the construction, so that they undergo hands-on training to gain special expertise in operation, maintenance and technical support.	This might be possible for only part of the staff, not all staff of the Licensee.			R	The essence of comment is captured by introducing “as far as possible” in the clause as per French comment. Now para 4.43
533	4.40 Before	CONTROL AND SUPERVISION OF CONTRACTORS **Evaluation and selection of contractors** ~~CONTROL AND SUPERVISION OF CONTRACTORS~~ **Management ~~Evaluation and~~**	Change the font of the sub-heading to be consistent with the section PROJECT MANAGEMENT	A			Fonts will be as per IAEA practice

		~~selection~~ of contractors					
534	4.42 Before	**Contractor oversight** **~~Contractor oversight~~**	Delete sub-heading	A			Will be as per IAEA practice
535	4.42/4-7	...and, in turn-key projects. These create challenges related to: the retention of expertise; the effective management of the interfaces between the licensees, the construction organization and contractors; and, the oversight of contactor manufacturing quality especially in the context of greater multinational diversity and international supply chains.	Improved clarity and punctuation.	A			
536	4.43/15	results to ~~the~~ other stakeholders.	The construction organization is a key stakeholder in the project and the sentence is self-contradictory as its stands.	A			
537	4.44/8	(d) Documents (paper and or in an agreed electronic format) and information to be submitted, including non-conformance reports and evidence that the 'as built' items meet~~s~~ the safety and quality requirements;	Improved English and clarification on document format.		A Editorial accepted	R	Comment in brackets is too much of detail
538	4.47	Contractors should ensure that each contractor organizes daily tool-box meetings where work process, schedule, any deviation, and any other important aspects of work that is relevant to safety and quality..	Graded approach is needed for both momentum on appropriate topics and efficiency on site.	A			Clause modified as per German and UK comment

539	4.47 After	INSERT: CONTRUCTION RESOURCES **Provision of construction resources**	Improved coherence of the text of Part 4.	A			
540	4.47 After	4.52 The licensee and construction organization should ensure that suitably qualified and experienced people are available as required by the construction programme. Processes should be in place to ensure continuous qualification of the personnel.	Move 4.37 to become 4.52.	A			
541	4.47 After	4.53 Resources should be estimated, planned and secured for the construction of items important to safety, particularly for the long lead items.	Move 4.38 to become 4.53.	A			
542	4.47 After	INSERT: **Training of human resources**	Improved coherence of the text of Part 4.	A			
543	4.47 After	4.54 Licensee personnel who will be involved in commissioning, operating and maintaining nuclear installations should be involved during the construction, so that they undergo hands-on training to gain special expertise in operation, maintenance and technical support. In cases where different languages are to be used on site, the licensee should consider measures to facilitate communication and multi-lingual capability at the construction organization and	Move 4.39 to become 4.54. Additional sentence to cover language training is added.	A			

		among contractors.					
544	4.47/1	Contractors should The construction organization ~~Contractors~~ should	Clarification of who is responsible for this action.	A			
545	4.50/line 3	"…contractor(s) to deal with queries ~~on~~ concerning the design.	Change "on" to "concerning". This is required for the sentence to make sense.	A			
546	4.52/2-5	4.59 Project management processes and their performance should be periodically assessed by the licensee or, where appropriate, by the construction organization. Progress assessment should also be done to provide early diagnosis of performance, planning, or resource problems. Early remedies, adjusting human resource, revising the schedule, renegotiation of contracts should be considered to avoid compromising the quality of the works ~~product~~.	Clarification of who is responsible.	A			
547	4.54/2	Everyone engaged in construction should be made aware by the licensee that they are	Clarification of who is responsible. Renumber 4.54 to become 4.61.	A			
548	4.55/1-2	A process for determining and dealing with non-conformances should be agreed between the regulatory body and the licensee prior to the procurement of the construction works. This process should define the types of non-	Clarification and expansion of who is responsible. Clarification of who is responsible. Renumber 4.55 to become 4.62.	A			With modification. Regulatory body's involvement included.

		conformances that have ~~of~~ safety significance and which should be treated as events by the licensee to be reported to the regulatory body along with proposals for correction ~~and resolved via a corrective action programme~~ in a graded manner.					
549	4.57/2-3	...be maintained by the licensee. The effectiveness of the process to implement corrective actions and to prevent similar non-conformances should be monitored by the licensee.	Clarification of who is responsible. Renumber 4.57 to become 4.64.	A			With modification. Now para 4.56
550	4.58/2-5	...new technology or constraints on the availability of resources, corrective actions to non-conformances may require some ~~long~~ time for implementation and may stay as 'pending issues' even after handovers from one party to another. These pending non-conformances should be tracked to completion by the licensee.	Clarification of who is responsible and use of English. Renumber 4.58 to become 4.65.	A			Para has been modified based on UK comments. Suggestion of identifying the responsibility has been included. Now para 4.57
551	4.58/line 3	"…require a long time and may stay as pending issues even after handover~~s~~ from one party to …"	Grammatical changes required for clarity.	A			With modification. Now para 4.57
552	4.59/2-6	Construction experience and examples of good ~~best~~ practice~~s~~ not only from specific nuclear installations but also from nuclear and non-nuclear construction should be collected	Clarification of who is responsible and use of English. Renumber 4.59 to become 4.66.	A			

		by the licensee and any lessons learned disseminated ~~implemented~~ for the enhancement of quality and safety in the industry. Criteria should be established for reporting of construction related experience and measures put in place to ensure the dissemination of this information to the relevant parties. Mechanisms to enable sharing of construction experience in a systematic and timely manner should be put in place at the industry level (for example, by WANO).					
553	5.1 After	**5. MANAGEMENT OF CONSTRUCTION PROCESSES** **5. MANAGEMENT OF CONSTRUCTION ACTIVITIES ~~PROCESSES~~**	Consistency of heading with 5.1.	A			
554	5.1/line 3	"…verification and validation for digital I&C systems or environmental and	Change "system" to "systems" There are multiple I&C systems	A			
555	5.1/line 5	"The planned sequential order (taking into account pre	Add missing space between "order" and "(taking…"	A			
556	5.2/Page 34/line 1 & 2	"…relevant parties.– The construction programme" And "…long lead in items.–The regulatory bodies involved should be given …"	Delete underline (two places) it is a typo and unnecessary.	A			

557	5.5/line 2	"… assembling, installation, ~~and~~ inspection and …"	Delete "and" as indicated. It is unnecessary.	A			
558	5.6 footnote	The ~~principal designer or~~ design organization or authority has responsibility ~~refers to the organization responsible~~ for establishing the design requirements and ensuring that design output documents accurately reflect the design basis. The ~~principal designer~~ design organization or authority is responsible for design control and ultimate technical adequacy of the design process.	Consistency with 4.50 (design organization).	A			Definition of design organization added as new para 2.4
559	5.6/2-7	~~The construction organization should confirm the adequacy of construction methods~~ When the design organization has made particular assumptions on construction methods, those assumptions should be communicated to the construction organization and where applicable, to relevant contractors with reference to the ~~principal designer~~ design organization[10] where necessary. There should be regular meetings at which the ~~contractor~~ construction organization's methods are discussed with the	Consistency with 4.50 (design organization) and 2.2 (construction organization). .	A			With modifications based on comments received from UK

		design team. There is the potential for the ~~contractor~~ construction organization's methods to undermine design assumptions. Conversely, early involvement can assist the designer in the appreciation of the ~~contractor~~ construction organization's preferred method of construction and thus improve constructability.					
560	5.7	Last sentence to be modified as follows: Post drilling of concrete for the installation of plant fixings will be implemented only on an exceptional basis in order not to undermine safety. Dedicated calculations will be performed.	The FA3 feedback shows that for a FOAK, post-drilling will occur. Nevertheless targeting very low level is key as well as mitigating are necessary.	A			With modified wording
561	5.7/ 3	~~Special consideration…undermine safety~~	Is not that really too specific compared to the general guidance of this document??			R	Detailed but is important
562	5.8 Before	Procurement specifications	Note that procurement seems slightly out of scope of this guide??(para 1.5)			R	Scope of document under para 1.7 talks about providing specifications
563	5.10	The classification of those items will be confirmed with the final safety studies performed at the end of the detailed design.	Add the sentence for clarification			R	More a design activity. Term final safety study not used in this document
564	5.11/1	As part of procurement document for items important to safety there should the requirement	Improved English and clarification.	A			

		~~As part of~~ The procurement document for items important to safety ~~there~~ should ~~be~~ specify the requirement					
565	5.11/9-11	DELETE: - Operation and maintenance manual - Operating conditions and limits - Personnel training requirements ~~- Operation and maintenance manual~~ ~~- Operating conditions and limits~~ ~~- Personnel training requirements~~	An End of Manufacturing Report should only detail what happened during manufacturing. Those items related to operation and maintenance manuals should be standalone documents, with their own evolution which may well continue, be updated long after end of manufacturing, including during the pre-commission and the commission phase.			R	We should have operation and other manuals at this stage. They may however get modified at a later date
566	5.12/line 1	"Special attention should be paid to the procurement of commercial grade components or products that ~~is~~ are proposed to be a part of any safety function. The suitability of the products or components should be verified as described in Ref. [3]paras 5.35-5.37."	There could be multiple products and components that are part of a safety system. The requirement needs to be modified accordingly	A			
567	5.12/line 1	"Special attention should be paid to the procurement of commercial grade components or products that ~~is~~ are proposed to be a part of any safety function. The suitability of the products or components should be verified as described in Ref.	There could be multiple products and components that are part of the safety system. The requirement needs to be modified accordingly	A			Duplicate of 566

		[3]paras 5.35-5.37."					
568	5.14/line 1	"Contractors should obtain the approval of the licensee and/or construction organization before beginning work. ~~and~~ Contractors should ensure they have the relevant information including work schedule, instructions with drawings and compatible consumables prior to performing the work.	The additions to the requirement are necessary for clarification.	A			
569	5.16	"The documentation to be used for construction activities should be up to date, including latest design information, drawings and work procedures. These documents should also be consistent with licensing basis."	This is an identical requirement to 5.14....are both necessary? Suggest combining 5.16 and 5.14.	A			Para deleted after picking up few words into new paragraph 5.23
570	~~5.17/line 2~~	~~"…critical construction activities, including measures to cope with electric power outage~~s~~, loss of~~	~~There could be multiple outages. Change "outage" to "outages"~~ see new 4.20				See 498
571	5.18/1-2	~~5.18~~5.16 Construction work and environmental condition should be monitored by the construction organization to protect safety significant mechanical, electrical and ~~&~~ control equipment,	Clarification of who is responsible. Renumber 5.18 to become 5.16. N.B. Sub-paras 5.15 and 5.17 to become 4.16 and 4.20.	A			
572	5.18/line 1	"Construction work and environmental condition~~s~~ should be monitored	Change "condition" to "conditions" to be grammatically correct.	A			

573	5.19/3-4	...be specified by the licensee and periodically monitored by the construction organization to confirm	Clarification of who is responsible. Renumber 5.19 to become 5.17. **In Reality or more generally:** The licensee (must?) specifies the site environmental (outdoor) conditions. The Manufacturers should provide their own specifications for storage and installation conditions if not within the "outdoor" conditions given by the licensee.	A			
574	5.20 Before	**Cleanliness and foreign material control and exclusion**	Self-explanatory.	A			
575	5.21/8	(c) The control of access of personnel ~~workers~~.	Misunderstanding could arise from the use of the word 'workers' in this context. Renumber 5.21 to become 5.19.	A			
576	5.23/line 1	"Specific procedures should be developed and implemented for cleaning by flushing or …"	There will be multiple procedures developed.	A			
577	5.26/3-5	on the routes should be ~~are~~ appropriately assessed to ensure that transport is possible without causing hazards, ~~or~~ damage or injury to people, the items and anything else on the routes.	Self-explanatory. Renumber 5.26 to become 5.24.	A			
578	5.29/4	...and operation stages ~~in which case~~ according to the contractual	More appropriate expression. Renumber 5.29 to become			R	Sentence has been slightly modified by

		handover arrangements ~~should be established~~.	5.27.				adding word " suitable"
579	5.30/4	...should be implemented by the construction organization.	Clarification of who is responsible. Renumber 5.30 to become 5.28.	A			
580	5.31/2	remedial action taken by the construction organization or the responsible contractor.	Clarification of who is responsible. Renumber 5.31 to become 5.29.	A			
581	5.35/4	...programmes are initiated. These pending transfer arrangements are part of the commissioning transfer agreements.	Self-explanatory. Renumber 5.35 to become 5.33.		A See comments		Partly covered by inserting words " into commissioning"
582	5.36 / (c)	~~(c) The date and time of the check;~~	In practice, this not usually done for all NDT record (Nondestructive tests).			R	To do it is a good practice
583	5.36/12	DELETE ~~h) Confirmation by relevant parties that the check has been carried out.~~	(h) is covered by (b)	A			
584	5.36/1-2	The licensee and construction organization should ~~develop~~ agree a process to verify the completion of construction activities and hand over of the permanent works.	Self-explanatory. Renumber 5.36 to become 5.34. In fact already explained in 4.36??	A			With modification. Now para 5.43
585	5.37/1	Whenever ~~relevant~~ required,	Self-explanatory.	A			With modification specifying items important to safety. See para 5.43
586	5.38/2-3	~~The adequacy of tests (contents, results and timing) should be justified and the test coverage analysed against the specified requirements.~~	This is part of the Safety Case, and is not part of a construction responsibility.	A			With modification. See para 4.53

587	5.41 / (c)	~~The amount of manufacturing such as forming, heating…to be carried out~~	What is the point in this document which is mainly safety related?	A			
588	5.42/1	The licensee or construction organization - under licensee surveillance - should ensure that the manufacturer's quality assurance programme	Self-explanatory. Renumber 5.42 to become 5.40.			R	Licensee has to ensure. He may do it through construction organization. No need to mention here
589	5.43/4	and their nuclear application made known to those carrying out the activity.	Self-explanatory and use of English improved. Renumber 5.43 to become 5.41.	A			Sentence modified based on French comments. Nuclear application awareness is covered in 4.4 and 4.6
590	5.44/4	Paras 5.30-5.33	Self-explanatory.	A			
591	5.45/1-5	5.43 The technological expertise of the manufacturer and assembler should be verified by the licensee or construction organization, not only through final acceptance tests but also by checking that proven state-of-the-art technology is used where it is appropriate. Augmented monitoring and inspections, if needed, should verify that novel ~~new~~ manufacturing techniques and ~~new~~ prototypes of equipment meet relevant design requirements.	Self-explanatory and use of English improved. As a guidance document there should not be a requirement to use state-of-the-art technology for all structures, components and systems. Renumber 5.45 to become 5.43.	A			With modifications. Now para 5.20

592	5.46 / 2	And tested by the manufacturer ~~against safety and design requirements and also applicable codes and standards~~ according to the requirements specified in the procurements specifications.	Self-explanatory	A			
593	5.48/1	The procurement of items may start ~~long~~ before the construction licence is issued.	Self-explanatory and use of English improved. Renumber 5.48 to become 5.46.	A			
594	5.48/line 1	"The procurement of the item may start	Insert "the" here. It makes the requirement grammatically correct.	A			
595	5.50 (j)	Non conformances identified by receipt inspections or detected during manufacturing but to be corrected on site are recorded.	Clarification	A			
596	5.50/15	(j) Non conformances identified by receipt inspections are recorded. (j) Non conformances identified by receipt inspections or detected during manufacturing but to be corrected on site are recorded.	Clarification.	A			Repeat of 595
597	5.51/4-5	An assessment of safety and security during construction should be performed ~~and~~ by the licensee or construction organization to take into account all hazards The licensee(s) of the existing facilities need to assess the safety impact of the construction on their installations.	Clarification of who is responsible. Renumber 5.51 to become 5.49.	A			With slight modification. Now para 5.47

598	5.52/2-3	...should be ~~defined~~ agreed before ~~the start of~~ procurement and construction activities at the site. Close communication between the construction organization and the existing operation organization should be established where there is more than one licensee on the site or adjacent to the site.The existing facility's licensees need to confirm it.	Clarification of who is responsible. Renumber 5.52 to become 5.50.	A			First comment agreed. Recognizing that the site may have one or more licensees this para and one above is modified to reflect this. Now para 5.48
599	5.52/line 1	"The responsibilities of the construction organization and of the existing operations organization should be defined before the start of construction activities at the site. Close communication between the construction organization and the existing operations organization should be established. The licensee should ensure that the ability of the existing ~~operating~~ operations organization to maintain safe operation of the existing facility will not be affected by construction activities.	Many utilities refer to the organization at the site responsible for plant operation as the "operations" organization. I suggest that this requirement be written to be consistent with utility nomenclature.			R	IAEA Safety Glossary has been followed in the document.
600	5.56, after	ADD: **Site clearance** 5.55 Waste materials and consumables used during construction works should be	Extension of the responsibilities of the construction organization.	A			

		disposed of responsibly by the construction organization.					
601	5.56/1	Temporary devices and contractors' plant used during	Self-explanatory. Renumber 5.56 to become 5.54. Temporary devices might be referring to gaskets, blind flanges… some of which may be important to document in view of future commissioning tests. Contractors' plant could include cranes, derricks, scaffolding, trucks, etc. that will need to be removed before the hand-over of the works to the licensee but may be needed for pre-commissioning.	A			With modification. Now para 5.50
602	Before 4.27	INSERT: 4.32 The licensee should control the drawings, design codes and documentation which describe the basis for licensing the construction, commissioning and operation of the nuclear installation in order to maintain design configuration control.	Move 4.49 to become 4.32	A			New paragraph 4.28