DS 484 – Site Evaluation for Nuclear Installations

COMMENTS BY REVIEWER Reviewer: Page.... of.... Country/Organization: Belgium – FANC/Bel V Date:				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.3/bullet ii	To assess the site …	typo	O.K.			
2	2.2/bullet (a)	To limit the effect of radiation exposure and the release of radioactive material on people and the environment to acceptable levels	In the current text people are only affected by radiation exposure and the environment only by release of radioactive materials. There is no need to make this separation.			x	I agree with your comment but this is a quote from Fundamentals Safety Principles, paragraph 2.1.
3	4.6	*Delete second sentence "*A site …*"*	The first sentence is sufficient. A basic site characterization should in any case be carried out.	O.K.			
4	4.7/bullet (c)	*Delete first "*of*"*	typo	O.K.			
5	4.7/bullet (e)	*Replace first "*for*" by "*of*"*	typo	O.K.			
6	4.19	*Rephrase or delete*	There is no added value to this requirement. Does this suggest that events with a medium probability and medium consequences can be screened out?	O.K.	Replaced by: "4.19 The scope of evaluation of external events shall cover the full range of severity and frequency of occurrence relevant for the design and		

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					safety assessment including those of high severity but low probability that could contribute to the overall risk."		
7	4.19	*Delete numerical values (footnote 3)*	1. A probability threshold higher than the cut-off value for CDF/LERF will not guarantee to reach such value of CDF/LERF. This value should be lower… 2. Is there a clear definition of a threshold for CDF/LERF – if yes where is it defined? INSAG-3 presents "objectives" for CDF	O.K.			
8	4.20	*Delete or rephrase second sentence "*Events maybe …*"*	Enveloping is not the same as screening out.	O.K.			
9	4.20	*Rephrase first sentence "*With respect to …*"*	The effects of many, not to say "all", events are "bounded" – this term is not well understood.	O.K.	"4.20. For the screening out events, it shall be ensured that all effects relevant for design and/or		

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					safety assessment (e.g., loads) resulting from these events are bounded by other events or a set of events."		
10	4.20	*Replace "*loaded*" by "*load*"*	typo	O.K.			
11	4.20	*Delete or move to Requirement 7 (could be integrated in 4.22 or 4.27)*	The verification of the fact that the effects of an event are bounded implies a first evaluation of those effects and associated loads. In that case, is the event really "screened out"? This event is more "enveloped" than "screened out"			x	Paragraphs cannot replace the Requirement. Paragraphs 4.21 to 4.27 are under requirement 7 sealing with "Evaluation of the external natural and human induced hazards".
12	4.37	*Rephrase, suggestion: "*The potentially combined effects shall be evaluated in function of the area affected by the identified hazard scenarios.	The usage of "*correlation*" is not well understood in this sentence	O.K.			
13	5.(12)	*Add a new § - similar to §5.3 (capable fault & existing nuclear installation) for "capable volcano"*	The same approach should be used in both cases (seismic hazards and volcanic hazards) for existing installations			x	There is a big difference between "Capable faults" dealing with permanent ground

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							deformation and Capable Volcanoes dealing with more than a dozen of hazards generated by volcanic activity.
14	5.25	*Replace in second sentence "*address*" by "*addressed*"*	typo	O.K.			

Form for Comments
Site Evaluation for Nuclear Installations (DS484)

COMMENTS BY REVIEWER Reviewer: M-L Järvinen Page.... of.... Country/Organization: STUK Date: 23th October 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.1 and 4.12	Definition of the term "site" would be helpful. The term "site are" has a clear definition. How the term site should be interpreted in the case adjacent or close by site areas? The expression "multi-site" is used in connection with radiological impacts but not in connection with hazards to the installation.				x	The site area is defined in Paragraph 1.7 consistent with the definition from GS-R part 7.
2	1.3.c	… difficulties for carrying out emergency response actions effectively.	Incomplete clause.		"(c) Analysing the characteristics of the population and the area surrounding the site aimed to determine if would be significant difficulties for implementation of the emergency response actions effectively."		
3	1.3.i	Clarification of the expression	External to the		Paragraph was		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		"external to the installation" would be helpful	installation is not necessarily unambiguous in the case of multi-unit or multi-facility site. Common understanding of the internal and external hazards is important to avoid gaps in the identification and analysis of hazards.		modified as following: "i. to identify the external natural and human induced events that could challenge the safety of the nuclear installation" The meaning of external events is explained in Safety Glossary.		
4	1.3.ii	assess the site	Misprint	O.K.			
5	1.9	… throughout the lifetime of the site. The site(s) are evaluated before submission of the construction license application of a nuclear facility and the preceding license (or e.g. decision in principle) applications and the results presented in the applications.	Something general should be written about how the site evaluation is connected with licensing of a nuclear facility.	O.K.	On sentence was added: "Detailed site evaluation (for the selected site) provides input to preliminary and final Safety		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					Analysis Report."		
6	4.7.c	Missing word or unnecessary "of"		O.K.			
7	4.20	… (e.g. load cases) ...			Resolved by comments suggested by other MS.		
8	4.34	New item could be added: e) water depth and its variability (sea, lake)	Adequate water depth is important in all situations. The water depth can change, not only due to the water table itself, but also due to sedimentation in the bottom of the water area.	O.K.			
9	4.39		Is the "external region" the same as the "external zone" defined in the Safety Glossary?	O.K.	In this paragraph the meaning is External Zone as in Safety Glossary. Region was replaced by zone.		
10	5.1 (footnote)	A new sentence in the end of the footnote 4 (a) could be added: However, in low active areas, where multiple glaciations have obscured all older features of the ground surface, the assessment can be	In glaciated areas, ground movements are related mostly to retreating ice sheets and they take place just after the ice melting. Hence, in this situation,			x	I agree since only tectonic features are relevant (geological offsets); deformation due to glacial phenomena

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		focused to postglacial time.	ground movements are related to glaciations, not plate tectonism. Furthermore, it may be impossible to observe any older faults in areas that have been reworked by glaciations. Ten thousand years is a possible assessment time, sometimes tens of thousands of years, but not hundreds of thousands of years. It could be noted that an NPP doesn't have to stand through the next glaciation.				are not relevant for faults capability but this should be detailed in the guidelines.
11	6.5	… carried out for at least one full year and the results of it used in the analyses …	Site evaluation report is not mentioned anywhere else than here and in Para 6.6, why should it mentioned here?		The sentence was changed as following: "6.5. A programme of measurement shall be carried out prior to hydrogeological		

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					investigations to gather data relevant for the assessment of radionuclide movement in the affected hydrological units." The logical sequence shall be: measurements, investigations and documentation.		
12	6.6	… carried out and the results of it used in the analyses …	Site evaluation report is not mentioned anywhere else than here and in Para 6.5, why should it mentioned here?	O.K.	6.5 provide input for hydrological investigations. The end results will be documented in the Site Evaluation Report. 6.5 was modified (see above)		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
13	Req. 26	**The distribution of the population within the region over the lifetime of the installation shall be determined and evaluation of the potential impact of radioactive releases, on the population shall be kept up-to-date.**	The requirement is partly the same as the requirement 12 (just a comment, no new text proposed). Repetition of requirements should be avoided. the up-dating-the evaluation could be emphasized in Req. 26.		Modified as suggested using different wording: "The distribution of the population within the region over the lifetime of the installation shall be determined and evaluation of the potential impact of radioactive releases, either due to normal operation or under accident conditions, on the population shall be performed and periodically updated"		

COMMENTS BY REVIEWER Country/Organization: FRANCE Date: pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	4.1	which address all stages of the project lifetime (siting, design, construction, commissioning, operation, including for a waste repository the surveillance and monitoring stages, and decommissioning,)	Take into account waste repository			x	According to IAEA Safety Glossary Waste repository are not included in Nuclear Installations. They are addressed by other safety standards developed by NSRW
2	4.5	The level of details needed in an evaluation to meet the requirements established in this publication shall be commensurate with the risk associated with the facilities and its site and vary according to the type of installation located at the site.	Suppress "nuclear power plants will generally require the highest level of details", as for reprocessing plant and waste repository is even more important.	O.K.			

3	4.17	The site and the region shall be studied to evaluate the present and foreseeable future characteristics that can have an impact on nuclear safety. This includes evolution of external natural phenomena during the installation operating planned lifetime, distribution of the population in the region, the present and future use of land and water, the development of existing installations and human activities or the construction of facilities that can impact on the safety of the installation and the feasibility of planning to implement emergency response actions effectively.	Add the site as foreseeable future characteristics are important for both the site and the region. Add evolution of external natural phenomena (e.g. global warming, sea rising…) Also said in Requirement 10, maybe not required.		Changes related with evolution of external natural phenomena are covered by requirement 10.		
4	4.34	Add algae? Included in suspended solids and biochemical changes ?	Some problem occurred in Normandy due to algae.			x	It is included in biochemical changes

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of TÜV NORD, SÜD, SÜD ET and GRS) Country/Organization: **Germany** Date: 2017-09-25				RESOLUTION			
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2	1	1.10	The non-radiological aspects of the environmental impact of the site and the installation are not ~~explicitly~~ covered in this publication.	For better understanding. With "explicitly" it remains unclear, what is covered implicitly.	o.k.			
2	2	2.4 (b)/5	In addition, in order to assess the feasibility of implementation of emergency response actions in the	The feasibility of the implementation of emergency response	o.k.			

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Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			region, the site evaluation process shall identify the site characteristics that can affect the interactions between nuclear installation, other nearby installations**,** the environment and the population.	actions can also be affected by other installations nearby such as chemical plants, dikes, etc.				
2	3	3.5/4	The assessments of site related external natural and human induced hazards shall be independently reviewed by a third party.	It should clearly be stated that a third party should conduct the independent review.	o.k.			
2	4	4/without (new)	Move paragraphs 4.1 and 4.2 to requirement 4; remove requirement 2 and put the content into chapter 1 as new paragraph 1.11.	Requirement 2 is more a description than a requirement. Paragraphs 4.1 and 4.2 are not coherent with requirement 2, which is about characterization and providing input for the safety demonstration. Acceptance criteria are not needed for characterization and		The paragraphs 4.1 and 4.2 have been reformulated to provide the link between Fundamental Safety Objective, Site Safety Objectives and Site Evaluation Safety Requirements: 4.1. The site safety objectives are derived based on the fundamental safety objective (see para. 2.2 and [1]) related with to		

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				providing input for the next steps, but for assessing the site suitability, which is requirement 4.		both short and long term radiological impact to people and the environment. 4.2. Demonstration of compliance with the safety requirements presented in this document provides the basis for demonstration of achieving the site safety objectives which address all stages of the project lifetime (siting, design, construction, commissioning, operation and decommissioning) as well as emergency preparedness and additional matters as appropriate.		
2	5	4, Requirement 2	**The main safety objective in site evaluation for nuclear installations shall be to characterize the natural and ~~man made~~ human induced hazards that may challenge the safety of the nuclear installation and to provide adequate input for demonstration of protection of the**	Keep in line with wording of the rest of the document	O.K.			

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Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			public and the environment from the radiological consequences of radioactive releases due to accidents.					
3	6	4.6/3	A site can be screened out ~~from~~ following…if ~~no~~ unacceptable radiological consequences….	1 - Wording 2 - Is the double negative intentional?		Modified by other MS.		
3	7	4.7 (c)	The thermal power ~~of~~ in case of research reactors;	Wording	O.K.			
2	8	4.24/1	Deterministic <u>and /</u> or probabilistic	Please add consistency throughout the document	O.K.			
2	9	4.34 (new)	Add new bullet <u>g) Maximum and minimum water levels on tidal sites, considering astronomical and storm tides</u>	Completeness to cover all sites, also in coastal regions			x	Minimum and maximum water level are included in bullet (f) already
2	10	4.38 (new)	Add a sentence in the paragraph: <u>The evaluation shall also consider existing radiological exposure situations.</u>				x	4.38 is under requirement Potential effects of nuclear installation on

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								public and the environment. It talks about prediction of such effects. There is no basis to assume that the public was already exposed to radiation other than the normal background.
1	11	Requirement 20, Para 5.xy (new)	<u>The potential for tsunamis or seiches from meteorological phenomena shall be evaluated as appropriate for the region.</u>	Tsunamis and seiches resulting from meteorological phenomena are missing. New para should be added where appropriate.			x	Wind generated waves, storm surges and other meteorological phenomena are covered by 5.16. Tsunami and seiches are generated due

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Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
								to earthquake, and other geological phenomena (not by meteorological phenomena)
3	12	5.4/3	Hazards due to earthquake induced ground motion shall be assessed for the site with account taken of the seismic sources characteristics of the regional seismotectonics, seismic waves propagation characteristics and site specific conditions using ~~proper~~ established methods. or (alternative) … using state of the art methods.	"proper" as before is self-evident			x	Formulation "Proper methods" is better since methods used for conventional facilities may not be proper for nuclear installations (e.g. NPPs). State of the art (unless is clear defined for the context is used) generally does

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Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
								not have same meaning for all industries.
3	13	5.6/1	The effect of ground motion shall be considered ~~in combination with other~~ as well as seismically induced hazards.	Wording			x	Proposed text is changing the meaning and is softening of the requirement.
1	14	Requirement 21, Para 5.xy (new)	If the potential for soil liquefaction is found to be unacceptable, the site shall be deemed unsuitable unless practicable engineering solutions are demonstrated to be available.	This acceptance criterion from NS-R-3 (Rev.1) is missing and should be addressed. Add para where appropriate			x	It is covered by for all external hazards by Requirement 4 Site Suitability.
1	15	Requirement 24, Para 5.xy (new)	If the assessment indicates that the hazards are unacceptable and if no practicable solutions are available, then the site shall be deemed unsuitable.	This para from NS-R-3 (Rev. 1) should be added in the section "Aircraft crashes"			x	It is covered by for all external hazards by Requirement 4 Site Suitability.
1	16	Requirement 24, Para 5.xy (new)	A site shall be considered unsuitable if such activities take place in its vicinity and there are no practicable solutions available.	This para from NS-R-3 (Rev. 1) should be added in the section "Chemical Hazards"			x	It is covered by for all external hazards by Requirement 4 Site Suitability.

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Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	17	6.2	A programme for meteorological measurements shall be prepared and carried out at or near the site with the use of instrumentation capable of measuring and recording the main meteorological parameters at appropriate elevations and locations. Data from at least one full year shall be collected and used in the analyses, together with any other relevant data that can be available from other sources. <u>The meteorological data shall picture the 'up-to-date' climate and meteorological parameters in an appropriate manner.</u>	It should be pointed out that the data shall be up-to-date and not older than a specific given timeframe.	O.K.			
1	18	6.5/8	[…] A program of investigation and measurements […] shall be carried out for at least one year prior to submittal of the site evaluation report and used in analyses to determine […] and along exposure pathways. <u>The data shall picture the 'up-to-date' surface hydrology and groundwater parameters in an appropriate manner.</u>	It should be pointed out that the data shall be up-to-date and not older than a specific given timeframe.	O.K.			

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Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	19	7.1/2	This monitoring shall be commenced no later than the start of construction and shall be continued up until the end of the decommissioning phase. or (alternative) This monitoring shall be commenced no later than the start of construction and shall be continued up until ~~decommissioning~~ the radioactive inventory has been reduced to an amount where it bears no more harmful effects of ionizing radiation for the public and the environment**.**	It should be pointed out that the monitoring should be conducted until the end of decommissioning or until most of the radioactive inventory has been removed from site.			x	Is better to keep this more general since it is likely that the monitoring plan may change one the installation starts decommissioning as compared with the one used during operation.
1	20	General remark		References to SSG 35 would be useful where appropriate		It was done in Footnote #2		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	§ 4.23, line 4	evaluation.	Typing error (By MVM Paks NPP Ltd.)	o.k.			
2.	§ 4.25,	4.25. Probabilistic hazard curves shall be developed if they are needed for specific applications (e.g. in some areas of design, probabilistic margin evaluation, probabilistic safety assessment, hazard monitoring, and emergency planning).	Except for probabilistic safety assessment, the availability of hazard curve isn't unavoidable. The design and margin assessment as well as the hazard monitoring and emergency planning are feasible without knowledge of the hazard curves. The paragraph contradicts to the 4.24. (By MVM Paks NPP Ltd.)		Paragraph was changed based on comments received from other MS.		
3.	§ 4.34. b)	Oil and chemical spills;	Typing error (by MVM Paks NPP Ltd.)	o.k.			
4.	§ 4.37	Delete 4.37. The potential effects of nuclear installations located at nearby sites (e.g., 'multiple sites') on what? shall be evaluated based on their correlation in relation to the size of the area affected by the identified hazard scenarios.	First interpretation could be: 4.37. The potential effects of nuclear installations located at nearby sites (e.g., 'multiple sites') on the public and the environment shall be evaluated… This is part of the	o.k.	4.37. The potentially combined effects of nuclear installations located at nearby sites (e.g., 'multiple sites')		

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			documents (FSAR) of that installation. Second interpretation could be: 4.37. The potential effects of nuclear installations located at nearby sites (e.g., 'multiple sites') on the given nuclear installation shall be evaluated… This is already written in Requirement 9. § 4.36. is requesting the evaluation of effects that can be caused by all installation at the site. (by MVM Paks NPP Ltd.)		on the public and the environment shall be evaluated function to the area affected by the identified hazard scenarios		
5.	§4.39	4.39. The requirements for site evaluation apply also to the infrastructure and other characteristics of the external region where emergency response actions may be warranted.	Seems to be typing error (by MVM Paks NPP Ltd.)		4.39. The requirements for site evaluation apply also to the infrastructure and other characteristics of the external zone where emergency response actions		

COMMENTS BY REVIEWER Reviewer: Page 1 of 3 Country/Organization: Hungary/Hungarian Atomic Energy Authority Date:05.12.2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					may be warranted.		
6.	§ 5.3	5.3. If a capable fault is identified in the vicinity of the site of an existing nuclear installation, the site shall be deemed unsuitable if the safety of the installation at the site cannot be demonstrated.	The safety of the installation at the site shall be demonstrated. An adequate conclusion could be made when considering the site features and the design together. What does it mean "existing nuclear installation"? In the IAEA SSG-9 there is a clear difference made regarding capable fault issue for operating and new nuclear power plant. A more clear distinction between new and operating facilities should be here, especially if we consider the most recent development in dealing with surface movement. (by MVM Paks NPP Ltd.)	o.k.	Paragraph was changed based on comments received from other MS also.		
7.	5.27.1	If the evaluation shows that there is a potential for collapse, subsidence or uplift of the surface that could affect the safety of the nuclear installation, practicable engineering	The cited paragraph is included in the previous version of the document. There is no reason to delete this paragraph.			x	This is covered for all hazards by Requirement 4 Site Suitability

COMMENTS BY REVIEWER Reviewer: Page 1 of 3 Country/Organization: Hungary/Hungarian Atomic Energy Authority Date:05.12.2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		solutions shall be provided or otherwise the site shall be deemed unsuitable.	Responsible authority and licensee should act accordingly. (By Paks 2. Ltd.)				
8.	5.27.2	If there do seem to be practicable engineering solutions available, a detailed description of sub-surface conditions obtained by reliable methods of investigation shall be developed for the purposes of determination of the hazards	The cited paragraph is included in the previous version of the document. There is no reason to delete this paragraph. Responsible authority and licensee should act accordingly. (By Paks 2. Ltd.)			x	This is covered for all hazards by Requirement 4 Site Suitability
9.	5.28.1	If the potential for soil liquefaction is found to be unacceptable, the site shall be deemed unsuitable unless practicable engineering solutions are demonstrated to be available.	The cited paragraph is included in the previous version of the document. There is no reason to delete this paragraph. Responsible authority and licensee should act accordingly. (By Paks 2. Ltd.)			x	This is covered for all hazards by Requirement 4 Site Suitability

COMMENTS BY REVIEWER Country/Organization: AERB Date: October 24, 2017 pages				RESOLUTION			
No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	Gen	In many sections, the sentences are too long. This could create confusion on the intended meaning of the clause					
1	2/1.9-b	Second sentence of Section 1.9(b) is repeated in the following paragraph	First sentence of next paragraph may be deleted.	o.k.			
2	5/4.0	The main safety objective in site evaluation for nuclear installations shall be to characterize the natural and human induced hazards that mav challenge the safety of the nuclear installation and to provide adequate input for demonstration of protection of	Better terminology	o.k.			
3	6/4.6	A site can be screened out from following a formal site evaluation process if яe unacceptable radiological consequences would be likely for workers or for the public or for the environment.	Screening out is required only when consequences are unacceptable		Sentence deleted due to comments from other MS.		
4	7/4.9/last line	Please clarify either upon initial analysis or after subsequent reviews.	The terms 'initial analysis' and 'subsequent reviews' are not clear? Do they correspond to site screening stage & site evaluation stage OR site evaluation stage and periodic safety review stage?		Part of the sentence that may generate confusion was deleted.		
5	8/4.10	Conservative criteria can be developed in relation to site specific scenarios; in such a case, their consistency with the generic criteria for site suitability shall be demonstrated.	Intent of the sentence, especially last part containing 'generic criteria' is not clear?		The word generic was deleted.		

6	8/4.11	A decision regarding site suitability shall be based on the installation's characteristics, the amount and nature of potential releases and their impact on the humans and the environment.	Radiological impact on humans is also important	o.k.			
7	9/4.19	4.19 .Events of high severity but low probabilityS And foot note 3 For example the low probability could be defined as the annual probability smaller than the threshold used for defining the hazard severity for design (e.g. 10-4) but higher that threshold for CDF/LERF (e.g. 10-5/10-6). Change screening probability level from lO^tolO -7	The currently proposed screening probability directly contradicts footnote a of page 15. In regions with low seismicity, faults which are not active in tens of thousands of years or even 10л5 years could get screened out with proposed criteria. As per IAEA NS-G-3.1, a value of 10"7 is suggested as screening probability level.	o.k.	Paragraph was re-formulated to accommodate comments fro other MS also.		
8	FT #3	For example the low probability could be defined as the annual probability smaller than the threshold used for defining the hazard severity for design (e.g. 10"4) but higher that-than threshold for CDF/LERF (e.g. 10" 5/10-6).	Editorial-correction.	o.k.	FT#3 was deleted after re-formulation of para. 4.19.		
9	R8	The need for site protection measures shall be evaluated if the projected design of the nuclear installation is not able to safely withstand either the impact of external natural and human induced hazards defined as design basis during the early site evaluation stage or resulting from the…	Clarification The document does not define a stage of 'early' site evaluation.	o.k.	Early site evaluation stage was deleted.		

10	11/4.31	multi-installation site on other installations located at the same site shall be assessed. Impact of engineering solutions provided for one facility (see 4.29) on other collocated facility shall be assessed	e.g. Protection bund provided for one facility may divert more flood water to other facility			x	DS484 is dealing with site evaluation only not engineering solutions which are part of the design process of the facility. It is obvious that engineering solution for site protective measures are not acceptable if they create a new hazard for the collocated site.
11	12/4.34	Add q) Drawdown during tsunami, floating debris h) sudden spurt in bio fouling (e.f. jelly fish)	Additional scenarios that can result in loss of UHS included		Drawdown is included in Tsunami hazards. Floating debris was added. Chemical and biochemical covers the bio fouling.		
12	13/4.42	In the site evaluation, it shall be demonstrated that the radiological risk to the population associated with accident conditions, including those that could warrant emergency response actions being taken in the external region, are compliant with the site safety objectives.	To be changed as " In the site evaluation, it shall be demonstrated that the radiological risk to the population associated with accident conditions, including those that could warrant emergency response actions being taken in the external region, is compliant with the site safety objectives."	o.k.			

13	14/4.43	Data regarding external natural and human induced hazards with the potential to give rise to adverse effects on the safety of the nuclear installation shall be collected throuqhout ever the lifetime of the installation ~~shall be collected~~. Data shall be confirmed to be spatially and temporally pertinent to the site with preference given to site-specific data.	Better readability shall be collected	o.k.			
14	14/4.44	The extent, (spatial as well as temporal), objectives and scope of the data collection....	Both spatial as well as temporal aspects of data collections is important			x	Covered by 4.43
15	14/4.45 (f)	The word "circulation at" can be replaced by "movement at"	Better readability	o.k.	Was replaced with: “site infrastructure”		
16	15/4.49	Prehistoric, historical and instrumentally recorded information and records of the occurrences.... This para. Pertains to initial assessment. Shift this paragraph before 4.46 as 4.46 pertains to periodic assessment.	Better readability	o.k.			
17	15/R 15	Faults beyond a certain size and within a certain distance of the installation critical to site safety shall be evaluated to identify the capability of the fault and potential challenge to the site safety in terms of fault displacement hazard	With respect to fault displacement, there is no upper limit of fault beyond which fault has not effect on installation. Hence 'range' word is removed.	o.k			
18	15/5.3	If a capable fault is identified in the vicinity of the site of an existing nuclear installation, the site shall be deemed unsuitable if the safetv of the site Nuclear installation cannot be demonstrated.	To bring in Clarity to requirement can be rewritten as "If a capable fault is identified in the vicinity of the site of an existing nuclear installation, the site shall be deemed unsuitable if the safety of the nuclear installation cannot be demonstrated	o.k.	Modified to accommodate comments from more MSs.		

19	16/R16	A ground motion hazard evaluation shall be conducted to provide the input needed for the seismic design or safety upgrading of the structures, systems and components of the nuclear installation, as well as for performing the deterministic and/or probabilistic safety analyses necessary during the lifetime of the installation	To bring in Clarity to requirement	o.k.			
20	16/5.8	The hazards of capable volcanoes shall be evaluated to provide the input needed for the design or re-evaluation of the nuclear installation, as well as the deterministic and/or probabilistic safety analyses performed during the lifetime of the installation.	To bring in Clarity to requirement	o.k.			
21	17/5.13	Appropriate methods shall be applied for deterministic or probabilistic evaluation of the hazard considering the available amount of data (measured and historical data), and known past changes in relevant characteristics of the region.	To bring in Clarity to requirement	o.k.			

22	18/5.16	The potential for flooding in the region due to one or more natural causes such as storm surge, wind generating generated waves, extreme precipitation (including in combination due to a common cause or due to relatively high frequency of occurrence), which can affect the safety of the nuclear installation shall be evaluated.	To be written as" The potential for flooding in the region due to one or more natural causes such as storm surge, wind generated waves, extreme precipitation (including in combination due to a common cause or due to relatively high frequency of occurrence), which can affect the safety of the nuclear installation shall be evaluated.	o.k.			
23	18/5.21	The hazards associated with tsunamis or seiches, with account taken of any amplification due to the coastal configuration at the site, such as nearshore bathymetry and coastal topography, shall be assessed adopting appropriate methods	Original incomplete sentence	o.k.			
24	20/5.30	The stability strength of the strata underlying the foundation material and potential excessive settlement under static and seismic loading shall be assessed, if the performance of the foundation strata and/or foundation system cannot be engineered to be commensurate with requirements from static and dynamic loadinq. the site shall be rejected.	The same is used for other parameters also. The stability of strata is an important for site suitability hence the same should be mentioned		Modified to accommodate comments from more MSs.		

25	20/5.31 / New Bullet under Require	As per current understanding, local effects on site due to global climate change shall be considered in site evaluation process.	(New Bullet under Requirement 23) Impact of global climate change w.r.t. site is the concern over design life of a plant.			x	This aspect is addressed by Requirement 10. It applies to more hazards not only to those covered by Requirement 23.
26	20/5.34	Human activities which may influence the type or seventy of natural hazards, such as resource extraction or other significant re-contouring of land or water—construction of flow training /coastal protection structures and modifications to river/lake/sea bathymetry shall be	Additional information added. 'Re-contouring' of water is a incorrect terminology.			x	Such details should be for the guidelines not requirements.
27	20/5.35	The potential for accidental aircraft crashes on the site shall be assesse	Terrorist attacks are related to security issue.	O.K.			
28	21/6.2	A programme for meteorological measurements shall be prepared and carried out at or near the site with the use of instrumentation capable of measuring and recording the main meteorological parameters at appropriate elevations and, locations and **samplinq intervals.** Data from at least one full year shall be collected and used in the analyses, together with any other relevant data that can be available from other sources	Sampling intervals is an important factor in the programme	O.K.			

29	23/7.3	Before commissioning of the nuclear installation the ambient radioactivity of the atmosphere, hydrosphere, lithosphère and biota in the region shall be assessed so as to be able to determine the additional effects of the operation of the nuclear installation	For better and clear understanding	o.k.			

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1.	1.3 ii Line1	Clarification requested/required.	While this paragraph contains the phrase "including those interactions," we consider that when the interactions are evaluated, discussion on improvement based on evaluation results should be undertaken by the nuclear power operating organization in consideration of the purpose of site evaluations. Is this interpretation correct?	Yes – the interpretation is correct. But if the plant operator's assessments are inadequate, it is the regulatory authority's responsibility to point out the inadequacy and to make necessary actions.			
2.	1.3 ii Line1	Clarification requested/required.	As a tool to quantitatively evaluate the interactions between the site and installation, PRA can be used. However, there is a discussion over the effectiveness of it. We would like to ask you to let us know other effective evaluation tools or methods including those used in	It is not the intention of this paragraph to suggest using PRA in assessing these interactions. PRA can be effectively used to demonstrate safety of the nuclear installations in case some of the site related parameters exceed the values considered in the licensing documents.			

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			other countries, if any.	However these aspects are beyond the scope of these requirements.			
3.	4.8. 4.9.	Clarification requested/required.	The item 4.9 states "The site shall be deemed unsuitable for the location of the nuclear installations" and three aspects for judging this are provided in 4.8. Concerning "the feasibility of planning to implement emergency response actions effectively" in 4.8 (c) above, can we say that there is a feasibility if it is in state of (1)? If it is not, can we say that there is a feasibility when it is in state of (2)? (1)Stage at which formulation of the emergency response plan for effectively taking emergency response measures in the corresponding region is required by laws and regulations concerning disaster countermeasures as a legal framework concerning site and the support systems, etc. for the formulation are established. (2)Stage at which formulation of the emergency response plan in	It does not seem there's an effective difference between the case (1) and the case (2). Paragraph 4.9 is basically saying the same as in previous version (cf. NS-R-3 Rev.1 Paragraph 2.2). Site suitability is considered for from the very beginning based on available data and information. It needs to be confirmed during detailed site characterization. But the statement form 4.8 and 4.9 remain valid. The Para 4.8 is modified accordingly.			

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			the corresponding region by the relevant local government and municipalities is underway.				
4.	**Req. 13**	Clarification requested/required.	(1) We wish to confirm the specific contents of "planning to implement emergency response actions effectively." For example, we want to know whether following efforts satisfy the term "planning to implement emergency response actions effectively." In addition, we would like to ask you to let us know any effort case studies other than the following that corresponds to the above. - Preparation of protection measures based on the IAEA international standard that should be taken depending on whether the nuclear emergency response based on the emergency preparedness category should be intensively implemented in the given area	Requirement 13 of "SSR-1" (now DS484) is talking only about site characteristics (e.g. population density, site infrastructure, external events etc.) that may influence feasibility of planning of implementation of emergency response actions effectively (as defined in GS-R-part 7). It is not talking about all emergency actions have to be in place (DS484 does discuss only those that depend on site characteristics).			

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			as well as according to the emergency classification. - Preparation of a system for communicating information and activity system of the organizations related to disaster prevention in case of an emergency - Development of an evacuation plan including reception center and shelters for evacuees and evacuation routes in case of an emergency, and periodical review and revision of the evacuation plan, if necessary. - Continued preparation of communication equipment and stocking equipment and materials for radiation protection that are required in case of an emergency - Implementation of training to continuously improve the emergency response plan (2) The above item presents GSR				

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			Part 7 as a method to assess the feasibility of development and implementation of an emergency plan for taking emergency response actions effectively. Is it correct to understand that based on GSR Part 7, this item requires, as a requirement, to develop an emergency response plan for specifically implementing a protection strategy from the viewpoint of protection of residents or to discuss their feasibility? If this is the case, we would like to know to which degree such an emergency response plan is assumed to be compliant with GSR Part 7. Is it correct to understand that it is up to each member country's judgment?				
5.	4.45. e)	Information required for ~~the establishment of emergency~~ planning to implement on-site and off-site emergency response actions in any environmental and installations conditions;	To maintain consistency with requirement 13.	Accepted with modification. "Information required to implement planned emergency actions on-site and off-site…"			

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6.	6.8.	Information on existing and projected population distributions in the region, including resident populations and to the extent possible transient population shall be collected and kept up to date over the lifetime of the installation. Special attention shall be paid to vulnerable populations and institutions such as schools, hospitals and prisons when evaluating the potential impact of radioactive releases and considering the feasibility to implement protective measures.	Since the requirement 26 is demanding to evaluate the potential impact of radioactive releases to the public, supplemental term 6.8 should be consistent with it.	Accepted.			

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7.	OBJECTIVE 1.4.	This publication is intended for use by ~~regulatory bodies and for~~ a person or organization who wishes to apply to a regulatory body for authorization to install some type of nuclear installations (i.e. future operating organizations) directly responsible for conducting site evaluation of nuclear installations, as well as by regulatory bodies in establishing regulatory requirements.	The most of the requirements described in main text are directed to the applicant who wishes to install some types of nuclear installation. The proposed text is coming from "OBJECTIVE" in para. 1.5. of SSR-2/1 (Rev. 1).	Rejected. The original text is more concise and is saying the same thing. The users of IAEA Safety Standards are indicated in every safety standard series publication, which is for instance, "APPLICATION OF THE IAEA SAFETY STANDARDS; The principal users of safety standards in IAEA Member States are regulatory bodies and other relevant national authorities…." (cf. NS-R-3 Rev.1 and SSR-2/1 Rev.1) Moreover the site/construction application is always done by the future holder of the nuclear license (from the legal point of view this cannot be a person).			
8.	SCOPE 1.6.	This Safety Requirements publication covers site evaluation for both new and existing nuclear installations. Requirements for hazard evaluation are applicable to both categories. Requirements except for hazard evaluation are mainly applicable to ~~new nuclear installations~~……	Clarification for the scope of other evaluation except for hazard.	Rejected. Requirements of this document concerning, for instance, Safety Principles (Section 2), Management Systems (Requirement 1), Site Safety Objectives (requirement 2), Site Suitability (requirement 4), and Site			

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				and Regional Characteristics (requirement 5) are all applicable to both New and Existing nuclear installations. The application of these requirements could be different for new versus existing nuclear installations.			
9.	2.4.(b)	In addition, in order to assess the feasibility of ~~implementation~~ planning to implement ~~of~~ emergency response actions in the region, the site evaluation process shall identify the site characteristics that can affect the interactions between the nuclear installation, the environment and the population.	To keep a consistency with the description of Req. 13.	Accepted with modification. "to implement ~~of~~ planned emergency response actions"			
10.	**Req. 2**	**Site safety objectives in site evaluation for nuclear installations** **The main safety objective in site evaluation for nuclear installations shall be to characterize the natural and man-made hazards that may challenge the safety of the nuclear installation and to provide adequate input for demonstration of protection of ~~the~~ ~~public~~ people and the environment from the radiological consequences of radioactive releases ~~due to accidents~~.**	General comments: to keep a consistency with other paras, should be replaced "the public and the environment" to "people and the environment". The release of radioactive materials are not always due to accidents but included normal operations.	Accepted.			
11.	4.1.	The site evaluation process shall contain detailed acceptance criteria which are derived from	Clarification for the purpose of the criteria in accordance with the site	Accepted with modification. The paragraph was re-formulated to			

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		safety objectives (see para. 2.2 and [1]). These criteria shall together contribute to ~~demonstration of achieving~~ evaluation in light of the site safety objectives which address all stages of the project lifetime (siting, design, construction, commissioning, operation and decommissioning) as well as emergency preparedness and additional matters as appropriate.	safety objectives.	accommodate comments from other MS also.			
12.	4.2.	Site safety objectives shall be ~~defined with reference~~ related to both short and long term radiological impact to people and the environment. The objectives shall be ~~expressed~~ related in terms associated with radiological consequences for ~~individuals, public~~ people and the environment.	Better wording from "defined" to "related to" stated in NS-R-3 (Rev. 1) in general. Better wording from "expressed" to "related to" stated in NS-R-3 (Rev. 1) in general.	Accepted with modification. The paragraph was re-formulated to accommodate comments from other MS also.			
13.	4.6. /L1	The scope and depth of the site evaluation process necessary to support the installation's licensing documents ~~safety cases~~ shall be determined.	"Safety cases" are used in specific matter, so general description should be used here.	Accepted with modification. The paragraph was re-formulated to accommodate comments from other MS also.			
14.	4.7.	For nuclear installations other than nuclear power plants where a graded approach is applied to site safety evaluation, the following shall be taken into consideration: (a) The amount, type and status of the radioactive inventory at the site (e.g. whether solid or fluid, processed or stored);	The elements of description are coming from SSG-35, in which these are expressed with "should" statements. When these elements are described in this Requirements document, that is, the upper level documents of SSG-35, the	Rejected. We cannot use "may" in a requirement document. The governing principle for the graded approach is stated in Safety Fundaments Principle 5 Optimization of Protection, Paragraphs 3.22 to 3.24 Some of the elements are similar with			

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		~~(b) The intrinsic hazard associated with the physical processes that take place at the installation;~~ (~~c~~b) The thermal power of in case of research reactors; Other aspects below may be taken account with justification by applicant in applying a graded approach; (a) The intrinsic hazard associated with the physical processes that take place at the installation; (~~d~~b) The distribution and/or location of radioactive sources in the installation; (~~e~~c) The changing nature of the configuration and layout for installations designed for experiments; (~~f~~d) The need for active systems and/or operator actions for the prevention of accidents and for mitigation of the consequences of accidents; (~~g~~e) The potential for on-site and off-site consequences.	description should be strictly specified with focusing on only the underlying elements. From this point of view, elements (a) and new (b) would be suitable here. Other four elements are subsidiary, and then should be described as additional elements with requiring justification by applicants.	the ones listed in SSG-35. However these elements are general enough to be listed in this requirements document using "shall" statement because they support SF-1 Paragraph 3.24: "The resources devoted to safety by the licensee, and the scope and stringency of regulations and their application, have to be commensurate with the magnitude of the radiation risks and their amenability to control."			
15.	**Req. 4**	**Site suitability** **The site suitability shall be assessed in the early stage of the site evaluation ~~and shall be confirmed for the lifetime of the planned installation~~.**	Activities for the lifetime, such as monitoring and re-evaluation of the site and installation, are separately specified in requirements 28 and 29.	Rejected. Site suitability conditions have to be maintained and confirmed over the lifetime of the nuclear installation. There are many examples that site conditions revealed unsuitable after			

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				site is selected (e.g. capable faults crossing the safety related buildings, growth in nearby population or aviation traffic). Deleting the suggested part represent a flow in the requirements affecting the site safety objectives. Requirement 28 is dealing with Site Monitoring – is not talking about site suitability. Requirement 29 states the need of periodic re-assessment of the external hazards and site conditions – is not talking about site suitability.			
16.	4.8. (b)	The characteristics of the site and its environment that can influence the transfer to persons and to the environment of radioactive material that has been released;	Clarify the difference between "persons" and "people".	Accepted. We will use People instead of persons.			
17.	4.13.	In t~~T~~he overall evaluation of site suitability, ~~shall assess conditions for safe operation of the installation.~~ S~~s~~ite related parameters such as cooling water availability or extreme environmental conditions shall also be addressed in their potential role of affecting the safe, continuous operation of the installation.	Clarification. The purpose of the overall evaluation for safe operation is site related parameters, not a site suitability.	Accepted.			
18.	**Req. 6**	**Identification of the site specific hazards** **Potential hazards resulting from external**	The wording "of the site" is superfluous. Preceding wording	Accepted			

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		natural phenomena and human induced events and activities which can occur in the region ~~of the site~~ shall be identified through a screening process. External hazards not screened out shall be evaluated and selected for the purpose of establishment of design basis or re-evaluation ~~purposes according to~~ in accordance with their significance to the safety of the installation.	"the region" is defined in para 4.17. Editorial; addition of "the purpose of establishment of" and replacement of "according to".				
19.	Footnote 3 for para. 4.19.	Delete footnote 3. ~~For example the low probability could be defined as the annual probability smaller than the threshold used for defining the hazard severity for design (e.g. 10^{-4}) but higher that threshold for CDF/LERF (e.g. 10^{-5} /10^{-6}).~~	The probabilities in the footnote 3 is not typical practices in the Member States.	Accepted.			
20.	New para after 4.26.	4.26.B The assessments of site related external natural and human induced hazards shall be independently reviewed.	Moved from para 3.5. This sentence should be understood in the context of Req. 7.	Rejected Requirement of independent review is a crosscutting issue, and should belong to Requirement 1: Management System. Paragraphs 3.5 and 3.6 are necessary, supporting the Requirement 1. Requirement 7 concerns external hazard assessments only.			
21.	4.30. /L5	~~Also the site protection measures~~ When some equipment is added in the installation as the site protection measures, the equipment shall be classified, designed, built, maintained and operated as structures, systems and components	Clarification. Site protection measures are not limited to the design measures of the installation and some may be administrative measures.	Rejected. Site protection measures cannot be limited to equipment only. The current text covers everything: equipment, dike, admin measures, etc.			

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		important to safety.		If it is the case of an administrative measure – needs to be treated as safety related operation rule (training, drills, etc.).			
22.	4.33.	Taking due account of the uncertainties in the projections of ~~climatic variability and change~~ any changes with long term of the external hazards and site characteristics, appropriate safety margins shall be included in the related design envelope of the nuclear installation.	All of the external hazards include uncertainties in their projections of changes in time, and then more generic expression is favorable.	Accepted with modification.			
23.	**Req. 12**	**Potential effects of the nuclear installation on ~~the public~~ people and the environment of the region** **In site evaluation, to determine the potential radiological impact of the nuclear installation on the region for operational states and accidents that can warrant emergency response actions, appropriate estimates shall be made of expected or potential releases of radioactive material, with account taken of the design of the installation and its safety features.**	Req. 12 is corresponding to the para. 4.8 (b). Moreover, the same scheme is stated in NS-R-3 (Rev. 1) para. 2.22., "Potential effects of the nuclear installation in the region".	Accepted.			
24.	4.36.	The potential effects of the nuclear installation on ~~the public~~ people and the environment shall be evaluated considering co-located installations (e.g. 'a multiple installation site'), and their postulated accident scenarios	Clarification. Req. 12 and its associated paras are corresponding to the para. 4.8 (b). "The characteristics of the site and its environment that can influence	Accepted with modification. We cannot delete this part: " … *feasibility of planning and infrastructures, to implement emergency response actions effectively*			

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		(including resulting source terms)~~, feasibility of planning and infrastructures, to implement emergency response actions effectively at the site and in the region~~. These estimates shall be confirmed in conjunction to ensure that the radiation risks to ~~the public~~ people and to the environment associated with radioactive releases are acceptably low in light of the site safety objectives, when the design and its safety features have been established.	the transfer to persons and to the environment of radioactive material that has been released". Moreover, the criteria for these estimated should be stated in NS-R-3 (Rev. 1) para. 2.24.	*at the site and in the region*." Since is related to factors influencing the capability of DiD 5. Site conditions and associated infrastructure may affect feasibility of implementation of the emergency actions effectively.			
25.	**Req. 13**	**Feasibility of planning to implement emergency response actions effectively** **The feasibility of planning to implement emergency response actions effectively on the site and in the external region shall be evaluated taking account of the site characteristics, characteristics of the surrounding area and any external events that could significantly hinder the establishment of a set of ~~complete~~ emergency arrangements prior to operation.**	Better wording.	Accepted			
26.	4.40.	An assessment shall be made of the feasibility of ~~development and implementation of an emergency plan for taking~~ planning to implement emergency response actions effectively as required in GSR Part 7 [3]. The on-site and co-located installations shall be considered in the assessment, with special	To keep a consistency with Req. 13.	Accepted with modifications. "to implement planned emergency response actions"			

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		emphasis on nuclear installations that can experience concurrent accidents.					
27.	4.42.	In the site evaluation, it shall be demonstrated that the radiological risk to the population associated with accident conditions, including those that could warrant emergency response actions being taken in the external region, is acceptably low in light of ~~compliant with~~ the site safety objectives.	To keep a consistency with NS-R-3 (Rev. 1) para. 2.27 (b). Even if "site safety objectives" are identical to "main safety objective" described in Req. 2, the "main safety objective" does not include any criteria.	Rejected Criteria derived from the Site Safety Objectives are provided in Paragraph 4.1 and 4.2.			
28.	4.44.	The extent, objectives and scope of the data collection process shall be defined based on site safety objectives graded to the hazard posed by the installation to ~~the public~~ people and the environment.	To keep a consistency with other paras, replace "public" to "people".	Accepted.			
29.	4.45. e)	Information required for ~~the establishment of emergency~~ planning to implement ~~on-site and off-site~~ emergency response actions in any environmental and installations conditions	To keep a consistency with Req. 13.	Accepted with modifications. "to implement planned on-site and off-site emergency response actions"			
30.	4.47.	The data collection, analysis and processing methods for the site investigations shall be sufficiently detailed to support safety decisions. The data shall be maintained and the documentation shall be sufficiently detailed to permit an independent review.	Missing message for storage of collected data.	Accepted.			
31.	**Req. 15**	**Fault capability ~~displacement hazard~~ evaluation**	To keep a consistency with title and its overarching requirement.	Accepted.			

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		Faults within a certain size range and within a certain distance of the installation critical to site safety shall be evaluated to identify the capability of the fault and potential challenge to the site safety in terms of ground motion and/or fault displacement hazard.					
32.	5.2.	The influences of fault displacement ~~hazards~~ on the structures, systems and components shall be evaluated ~~to provide the input needed for the design or upgrading of the structures, systems and components of the nuclear installation, as well as the safety analyses performed during the lifetime of the installation~~.	We are understanding that the observation data of surface rupture are limited and there are not sufficient methods to be applied for fault displacement hazards assessment unlike seismic hazard analysis methods, and moreover, there are no practices/validations of design or upgrading of the SSCs of the nuclear installation, as well as the safety analyses performed during the lifetime of the installation against fault displacement.	Accepted with Modification. 5.1.“The effect of fault displacement on the safety related structures systems and components shall be evaluated.”			
33.	5.3.	If a capable fault is identified in the vicinity of the site of an existing nuclear installation and the safety of the site cannot be demonstrated, the site shall be deemed unsuitable ~~if the safety of the site cannot be demonstrated~~.	Editorial. Two “if” sentences should be combined grammatically.	Accepted with modifications. The paragraph was modified to accommodate comments from other MS also.			

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No.	Para/Line No.	Proposed new text	Reason				
34.	5.6.	The effect of ground motion shall be considered in combination with other seismically induced hazards, if any.	All of the cases are not included in combinations with other seismic induced hazards.	Accepted.			
35.	5.10.	The volcano hazards ~~assessment~~ shall be assessed ~~conducted using appropriately supporting numerical models, and shall~~ considering adequate~~ly the~~ uncertainties.	To clarify implication of the wording "using appropriately supporting numerical models". We are understanding that there are no numerical models recognized commonly used in the States for the assessment reflecting the state of the arts technology. So, it is preferable to be deleted as the proposed new text. If the original text is kept, we would like to confirm that both applicability of the methods in the standards and whether these should be introduced to the States regulations/guides or not are belonging to the States decision matters. The followings are points should be clarified; - identification of all specific models and their applicability, including the name of models, method and applicable ranges	Accepted with modification: "5.2 The volcano hazards shall be assessed using appropriate information and models and taking into account adequately the uncertainties." More details are provided in the Safety Guide SSG-21.			

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No.	Para/Line No.	Proposed new text	Reason				
			such as for caldera-forming eruptions or small capable volcano eruptions - especially the model applicable to evaluate the possibility of caldera-forming eruptions with some evidences for its applicability, - identification of the methods stated in 5.4 "Tephra Fallout", and 5.9. "Pyroclastic Density Currents" in TECDOC-1795 "Volcanic Hazard Assessments for Nuclear Installations" corresponding to the models in para 5.10, - demonstration of each candidate model through development status and applicable experiences based upon a scientific knowledge in the States, and - expectations for how to use "appropriately supporting numerical model" for the assessment taking some examples.				
36.	**Req. 19** footnot	"Rare" and "extreme" meteorological hazards	The requirement should be stand-alone one without referring to the	Rejected			

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No.	Para/Line No.	Proposed new text	Reason				
	e (7)	should be defined in this document, as follows; (footnote 7) The terms 'rare' and 'extreme' are ~~defined in IAEA document SSG-18~~explained as follows: "Extreme values of meteorological parameters are identified by means of statistical analysis of recorded parameters that are measured periodically on an ongoing basis (e.g. extreme temperature). Rarely occurring phenomena are unlikely to be measured at any specific location because of their very low frequency of occurrence at any single place and the destructive effects of the phenomena, which may result in damage to standard measuring instruments." Details are found in IAEA Safety Standards Series No. SSG-18 "Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations"	other safety guides.	The foot note is not part of the requirements. Just provides clarifications. Such clarification can be provided by referring a Safety Guide (in the foot note).			
37.	5.21.	The hazards associated with tsunamis or seiches, with account taken of any amplification due to the coastal configuration at the site, such as nearshore bathymetry and coastal topography shall be evaluate as appropriate for the region, including artificial structures.	Incomplete statement.	Accepted.			
38.	5.27.	The ~~hazards associated with the~~ potential for collapse, subsidence or uplift of the surface that can affect the safety of the nuclear installation over its lifetime shall be evaluated using a detailed description of subsurface conditions obtained from reliable methods of investigation.	To keep a consistency with description of para 5.26.	Accepted with changes The paragraph was also modified to accommodate comments from other MS.			

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No.	Para/Line No.	Proposed new text	Reason				
39.	5.31.	The ~~groundwater regime~~ physical and the chemical properties of the soil and groundwater shall be studied by appropriate methods and accounted for.	Clarification. Characteristics to be investigated are the physical and the chemical properties for the soil and the underwater.	Accepted with changes The paragraph was also modified to accommodate comments from other MS. Also due to numbering changes the para 5.31 is now 5.27.			
40.	5.32.	The design basis for other natural external hazards like wild-fires, drought, hail, sub-surface freezing of subcooled water (frazil), diversion of a river, debris avalanche and biological hazards (e.g. jelly fish, small animal, barnacle, etc.) shall be identified and assessed so that design basis for these events can be derived.	Add "debris avalanche" as one of the low level water intake for cooling. Debris avalanche may block the flow of river.	Accepted with changes The paragraph was also modified to accommodate comments from other MS.			
41.	5.37.	Hazards associated with chemical explosions in the installation or other chemical releases from the installation shall be expressed in terms of heat, overpressure and toxicity (if applicable), with account taken of the effect of distance.	Clarification. In contrast to para 5.36 that implies the chemical hazards from the outside facilities to the installation, this para is suggested to explicitly indicate the chemical hazards from the installation to off-site.	Rejected. This document deals with external natural and human induced hazards (See Section 1 – Scope Para 1.8 and Requirement 3). Releases or explosions in the installations are internal events – out of scope of DS-484/SSR-1.			
42.	**Req. 26**	**Population distribution and public exposure** **The distribution of the population within the region over the lifetime of the installation shall be ~~determined~~ projected and evaluation of the potential impact of radioactive releases,**	To keep a consistency with para. 6.8. Actually, it is difficult to determine the distribution of the population with the region over the lifetime of	Accepted.			

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No.	Para/Line No.	Proposed new text	Reason				
		either due to normal operation or under accident conditions, on the population shall be performed.	the installation.				
43.	7.4.	As part of safety reviews such as periodic safety reviews or safety assessments under alternative arrangements, external natural and human induced hazards shall be reassessed based on updated information throughout the lifetime of the nuclear installation, at regular intervals and as frequently as necessary (typically no less than once in ten years) and in the event of any of the following: (a) An update of the regulatory requirements; ~~(b) Inadequate design against external hazards;~~ ~~(c)~~(b) New technical findings~~, such as the vulnerability of selected structures and/or non-structural elements to any external hazards~~; ~~(d)~~(c) New experience and lessons from the occurrence of actual external events affecting the safety of nuclear installations or hazardous facilities; ~~(e)~~(d) Changes of hazards over time~~, for which new information and assessments are available;~~ ~~(f) To provide confidence that there are sufficient margins to prevent cliff edge effects;~~ ~~(g) As part of a programme of long term operation, or a life extension.~~	Reassessment other than regular reassessment should be carried out at the time immediate actions are necessitated, as referred to SSG-25 (PSR).	Rejected. Assessments other than reassessments at regular intervals have to be carried out at the timing when actions become necessary. (b) Confirmation of adequacy of the design basis in relation to external hazards can be one objective of periodic safety re-evaluations or ad-hoc reassessments. (c) New technical findings that may trigger "Re-assessment" could be related to vulnerability of SSCs against external hazards (this input may come from "Operating experience from other similar nuclear installations" (d) Deals with feedback from Operating Experience. – (e) Changes hazards over time for which new information and assessment are available (is more relevant). (f) to provide confidence that there are sufficient margins to prevent a cliff edge effect – respond to Requirement			

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No.	Para/Line No.	Proposed new text	Reason				
				17 para 5.21 from SSR 2/1 Rev 1. (g) As part of the programme for long term operation.			
44.	7.5.	The implications of such a ~~reassessment~~ re-evaluation of site specific hazards or of data relevant for the radiological impact assessment for the safe operation of the nuclear installation shall be ~~evaluated~~ considered to improve the installation.	Editorial. Evaluation of the implication of re-assessment (or re-evaluation) does not product anything. Clarification. Suggested to describe specific purpose.	Rejected. DS484/SSR-1 "Site Evaluation" cannot set requirements for improving the nuclear installations. Paragraph 7.5 states only that the impact of re-assessment of the site specific hazards or data relevant for radiological impact shall be evaluated in the context of safe operation.			

COMMENTS BY REVIEWER Reviewer: Civil & Site Studies Group, CNS Page.... of.... Country/Organization: Pakistan Date:				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.3/ Page 1	(b) Evaluating a site to ensure that the site related hazardous phenomena and characteristics are adequately taken into account **and addressed**, (b*) the site related **phenomena, events &** hazards are properly assessed and that the corresponding site specific design parameters are appropriate**ly established;**	The objective (b) may be rephrased into two parts. Firstly identification of site related hazards and secondly design parameters are established on the basis of well assessed site related hazards.			x	
2.	1.3 (ii)/ Page 2	ii. to assess ~~he~~ **the** site and site–installation interactions in operational states and accident conditions, over the projected lifetime of the installation, including those interactions that require guaranteed proper implementation of emergency response plans.	Typo error "he may be replaced with the"	o.k.			
3.	3.5/ Page 5	The assessments of site related external natural and human induced hazards shall be independently reviewed **separately from those who performed the work and shall have the relevant subject's expertise.**	The assessment shall be reviewed independently from those who carried out the evaluations and have the relevant expertise in area of subject.		Modified to accommodate other MS comments also.		
4.	4.8/ Page 7	(c) The population density, population distribution, **population growth** and other characteristics of the external region in so far as they can affect the feasibility of planning to implement emergency response actions effectively as required in GSR Part 7 [3] and the need to evaluate the risk to individuals	Population growth may be added as it affects the emergency planning up to the projected lifetime of installation. With increasing design life of nuclear installations, the population growth around plants may			x	Population growth is included in "…population distribution and other characteristics of the external region…"

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		and to the population.	become a challenge for implementing emergency measures and need to be considered reasonably at siting stage.				
5.	4.11/ Page 8	A decision regarding site suitability shall be based on the installation's characteristics, the amount and nature of potential **radiologica**l releases and their impact on the **people and** environment.	The word radiological release instead of only release may be added which may affect the people and environment.	o.k			
6.	4.34/ Page 12	As appropriate for the ultimate heat sink under consideration, the following data shall be evaluated: a) Ice, frazil ice; fire, **sedimentation, debris;**	Clogging of water intake and ultimate heat sink due to sedimentation and debris may pose a threat and it need to be considered.		Modified to accommodate other MS comments also. Sedimentation is covered by water depth and debris was added.		
7.	4.35/ Page 12	**All** potential **external** natural and human induced events that can cause a **loss of ultimate heat sink or/and** loss of function of systems required for the long term heat removal shall be identified and evaluated.	At siting stage, the availability and reliability of ultimate heat sink is ensured and all the potential external natural and human induced events / hazards for loss of UHS shall be considered.		Ultimate heat sink is included in long term heat removal.		

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Comment No.	Para / Page	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	**General comment**	1.3. The objective of this publication is to establish appropriate requirements and criteria for: … (c) Analysing the characteristics of the population and the area surrounding the site aimed to determine if there would be significant difficulties for emergency response actions effectively.	It seems, that this objective is quite purely covered in the DS484. The information relating emergency response planning, what should be assessed and evaluated for this purpose is not concentrated in one chapter, but rather barely touched through many chapters. There is only one requirement (Requirement 13) which is related with emergency response actions planning but all the detailed requirements (4.39-4.42) is for site infrastructure, on-site and co-located installations and their interactions evaluation. Meanwhile, there is no clear requirement for analysing the characteristic of population. It is proposed to supplement this chapter with explanations what characteristics of populations should be analysed and how ensure, that this characteristics of population do not hinder the establishment of effective emergency response actions plan.			x	Requirements for Emergency Planning are given by GS_R part 7. DS484 deals only to feasibility of implementation of the Emergency Actions that could be influenced by site and near region factors.
2.	**General comment**	The same format and text alignment should be used in all paragraphs which has sublevels (listings of one category items).	There are many paragraphs in document which has sublevels (listings) a, b, c, etc. but numbering and text alignment in this sublevels (listings) is chaotic. Sometimes is used (a), (b), (c), etc.,	o.k.			

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Comment No.	Para / Page	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			sometimes a), b), c) etc. The text itself sometimes is moved to the right in sublevels, sometimes is not. It is recommended to review the sublevels (listings) numbering and text alignment in the following paragraphs: 1.3, 1.9, 2.2, 2.4, 4.7, 4.8, 4.34, 4.45, 7.4				
3.	**General comment**	The same unified term *"natural and human induced hazards"* should be used in the entire document where applicable.	1. Different terms are used in the document without clear order: - *"human induced events"* (see paragraphs 1.3, 1.8, 4.8, 4.21, 4.35, 5.33 and Requirements 3, 6, 20, 24), - *"human induced hazards"* (see paragraphs 1.12, 3.5, 4.28, 4.30, 4.31, 4.32, 4.43, 4.45, 7.4 and Requirements 7, 8, 9, 11, 14, 28, 29) as well as - *"human induced situations and activities"* (see 4.16) or even - *"human induced phenomena"* (see 4.27, 5.25,) Human activity on the site or near the site might have certain risk what one or other event will occur which might influence nuclear installation safety. But this doesn't mean, that such event a priory must happen during installation lifetime. The risk of event is called hazard.		.	x	It will incorrect to use only one terminology since the meaning (phenomena, hazard, event) is different. A phenomena may or may not generate a hazard. Hazards means potential or likelihood to cause an event. The event it is caused by a hazard. Is related to impact produced by the hazard (e.g. vibratory ground motion, surface deformation, pressure wave, heat, toxic gas, etc.). One single hazard may generate multiple

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Comment No.	Para / Page	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			Hazards aroused from human activity (or natural phenomena) exists always with one or other probability. **In the site analysis the potential hazards to the nuclear installation should be evaluated, not the events.** As of that, it is recommended to review entire document text and where applicable the single term *"human induced hazards"* should be used. There might be few exceptions when hazards of induced events are considered (for example Requirement 20) 2. At some paragraphs, instead of *"human induced hazards"* the *"man-made hazards"* term is used (see for example Requirement 2). *"Man-made hazard"* term should be replaced by *"human induced hazard"* term.				events. So this should be read in the context of each paragraph.
4.	Para 1.2 / page 1	„This Safety Requirements publication establishes requirements and provides criteria for ~~ensuring safety in~~ site evaluation ~~for~~ in order to ensure safety of nuclear installations. The related Safety Guides [?] on site evaluation after publication will provide detailed recommendations on how to meet the requirements established in this Safety Requirements publication."	1. Safety Requirements should provide criteria for site evaluation in order to ensure safety of planed or existing nuclear installation (see objectives provided in paragraph 1.3), but not for ensuring "safety in site evaluation" process. 2. The proper reference to relevant Safety Guide should be added or if there is no relevant SG yet, it is proposed to	O.K.	Paragraph was modified as following: "1.2. This Safety Requirements publication establishes requirements and provides criteria for ensuring safety in for site evaluation in		

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			corrected text that SG will provide recommendations.		order to ensure the site safety objectives for nuclear installations defined by Requirement number 2. The related Safety Guides on site evaluation provide recommendations on how to meet the requirements established in this Safety Requirements publication."		
5.	Para 1.3 / page 1	1.3. The objective of this publication is to establish appropriate requirements and criteria for: … (c) Analysing the characteristics of the population and the area surrounding the site aimed to determine if there would be significant difficulties for providing effective emergency response actions ~~effectively~~. The site evaluation criteria ~~described above~~ [?] are to be applied:	Editorial remark. 1. Hardly understandable part: *"if there would be significant difficulties for emergency response actions effectively"*. Seems like something is missing, like "providing" or "implementing" 2. There are no criteria described above. Above are described only purposes and tasks for which the evaluation and analysis criteria should be established. It is proposed to correct the sentence.	o.k.	The paragraph was modified to accommodate changes suggested by other MSs: c) Analyzing the characteristics of the population and the area surrounding the site aimed to determine if would be significant difficulties for implementation of the emergency response actions effectively The criteria described		

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					above are to be applied: i. to identify the external natural and human induced events that could challenge the safety of the nuclear installation ii. to assess the site–installation interactions in operational states and accident conditions, over the projected lifetime of the installation, including those interactions that require guaranteed proper implementation of emergency response plans.		
6.	Para 1.9 / page 2	1.9. The site selection process, also called 'siting processes', is divided into two stages: a) Site survey when potential sites are identified on the basis of existing data b) Site Selection aim ~~to arrive at~~ is to choose the 'preferred candidate	1 The slang term "to arrive at" should not be used in such level document as Safety Requirements. 2. To keep the structural consistency with item a) and to follow the listing of "siting processes" stages, item b) should be joined with the next paragraph 1.9 sentences (there is some repeating) and be written as: *"Site Selection when*	o.k.	Paragraph was also changed to accommodate other MS comments: 1.9. The site selection process, also called 'siting processes', is divided into two		

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		site(s)'. In this second stage the candidate sites are assessed by screening and ranking. The aim of the second stage is to identify suitable sites and to select list of candidate site(s). In this second stage the candidate sites are assessed by screening and ranking ~~to arrive at~~ in order to choose the 'preferred candidate sites'.	*suitable sites and list of preferred candidate sites are identified on the basis of screening and ranking".* Otherwise, similar aims should be provided for "Site survey".		stages : a) Site survey when potential sites are identified on the basis of existing data b) Site Selection aim to arrive at the 'preferred candidate site(s)'. In this second stage the candidate sites are assessed by screening and ranking. The aim of the second stage is to identify suitable sites and to select list of candidate site(s). Site suitability shall be confirmed during the site evaluation process. The site evaluation process starts with the second stage of the siting process, following the site survey and shall continue throughout the entire lifetime of the site. Detailed site evaluation (for the selected site) provides		

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					input to preliminary and final Safety Analysis Report. During the operation stage of the nuclear installation, site evaluation continues with confirmatory and monitoring activities of the design basis parameters as well as any full and comprehensive re-evaluation process as required by the periodic safety reviews. Some suggested modification were not implemented in order to keep consistency with SSG-35.		
7.	Para 1.9 / page 3	"The site evaluation process starts with the second stage of the siting process, following the site survey and shall continue throughout the entire lifetime of the site [?]".	1. It is not clear what is "the lifetime of the site". It seems, that the "lifetime of the installation" (see 1.10) or "project lifetime" (see 4.1) should be considered here. Site continuous evaluation is needed to show that safety objectives related with protection from radioactive release are	o.k.	"…entire lifetime of the nuclear installation."		

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			met (see. Section 7). No installation, no hazard for public and environmental, no need to continue site evaluation. Otherwise, the definition and explanation what is "the lifetime of the site" should be provided.				
8.	Para 2.4 / page 4	"This Safety Requirements publication establishes requirements that apply for implementation of safety principles 8 and 9 [1]… In this regard: (a) Principle 8 states that: "The primary means of preventing and mitigating the consequences of accidents is 'defence in depth'… To address Principle 8 […] (b) Principle 9 states that: […] To address Principle 9, the site evaluation process of a nuclear installation shall identify..."	To keep the structural consistency with item (a) the Principle 9 statement should be also provided in item (b). Both items (a) and (b) should clearly explain what actions (evaluation, implementation, etc.) is needed to address Principle 8 and Principle 9.	o.k.			
9.	Para 3.3 / page 5	"The site evaluation process shall include proper ~~quality assurance~~ management system arrangements covering those activities… The ~~quality assurance~~ management system arrangements shall be consistent with regulatory requirements…"	It should be noted, that according to new revised IAEA safety standards term "quality assurance" is no longer applicable to use. Instead new term "management system" shall be used in all IAEA safety standards and guidance. The term "quality assurance" should be	o.k.	"3.3. The site evaluation process shall include, as part of management system, proper quality assurance arrangements covering those activities…"		

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			replaced by term "management system" in the entire document.		Quality Assurance is integral part of Management System and is relevant for site specific activities.		
10.	Para 4.6 / page 6	"The scope and depth of the site evaluation process necessary to support the installation's safety cases [?] shall be determined…"	The meaning of "safety cases" is not clear. This term is used in the UK, but is not applicable in most other countries. It should be added a note with the definition of "safety case" meaning, or term "safety case" should be replaced with unified and recognizable for all term such as "safety assessment", or "safety report".	O.K.	Safety Cases was replaced with "safety demonstration" Paragraph was also changed to accommodate other MS's comments.		
11.	Para 4.34 / page 12, Para 5.22 / page 18 Para 6.4 / page 22	"… f) Available and sustainable water flow (for a river), minimum and maximum water level and the period of time for which safety related sources of cooling water are at a minimum level, with account taken of the potential for failure of water control structures [?]."	It is not clear what should be understood as *"water control structures"*. What are this structures as well as control of what - water quality, water temperature, water level or water flow? Proper clarification and explanation regarding meaning of *"water control structures"* should be provided in the document. See also paragraph 5.22 *("the upstream water control structures"*) and 6.4 *("the major structures for water control"*)		It is an usual term also used in SSG-18 and WMO publication related to flood analysis. Could include dams and/or other manmade structures that may control the flow. Paragraph was also changed to accommodate other MS comments		.
12.	Para 4.39 /	"The requirements for site evaluation	Hardly understandable sentence. Seems		e.g. roads, bridges		

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	page 13	apply also to the infrastructure in [?] and other characteristics of the external region where emergency response actions may be warranted."	what something is missing in the line *"to the infrastructure in"*. In where? The missing words should be added or sentence clarified.		related to evacuation routes.		
13.	Para 4.45 / page 14	"The data collection process shall address the following as a minimum: … (f) Conditions for access to the site and circulation at the site [?]"	The requirement (f) is not clear. It is not clear what is considered to be entering to the site (humans, cargo, water?) and what must circulate at the site (humans does not circulate). Proper clarification and explanation access of whom and circulation of what should be provided in the document.	o.k.	Circulation was replaced with "site infrastructure" Access roads are used for evacuation, roads on site (to provide movement of the existing staff and workers) area need in the context of implementation of the emergency actions.		
14.	Para 5.1 / page 15	"Geological ~~F~~fault capability shall be identified and evaluated…"	It is not clear which "fault" is considered here. From the explanatory note 4 we can **only guess** that by "fault" should be understood "geological fault" or "geological fracture". Proper clarification should be provided and one of the terms "geological fault" or "geological fracture" should be used instead of term "fault". Same applies to paragraphs 5.2 and 5.3.			x	The context of 5.1 is under the part: "Seismic Hazards" (subsection heading) in the publication's Section 5: "Evaluation of External Events," and "Fault displacement hazard evaluation" – the requirement 15 to which para 5.1 belongs. In addition, the footnote #5

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							provides definition of fault capability. It is obvious that the word faults here means faults in geology. Safety of the site was replaced with "safety of the installation" The solution is to demonstrate safety of the installations in such situation. How to do this is explained in guidelines not in the requirements. If site suitability cannot be demonstrated, the license of nuclear installations at that site will be suspended – however statements about Nuclear Installation Safety outside the scope of this requirements.
15.	Para 5.3 / page 15	"If a capable fault is identified in the vicinity of the site of an existing nuclear installation [?!], the site shall be deemed unsuitable if the safety of the site [safety of the site or safety of	This is quite complicated requirement. First of all it is not clear what does it means *"safety of the site"* in this particular case. For existing facilities /			x	See above.

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		the installation?] cannot be demonstrated."	installations the safety of nuclear installation / facility should be considered. Second, it does not provide any solution or recommendation what should be done with existing nuclear installation if the safety of the site cannot be demonstrated and site shall be deemed unsuitable. Because the nuclear installation is already at the "unsuitable" site and cannot be simply removed just by site unsuitability declaration (shut down, closure and decommissioning of facility might take tenths of years) at least must be written: *"If a capable fault is identified in the vicinity of the site of an existing nuclear installation, the safety of the site and nuclear installation shall be demonstrated or necessary applicable compensatory measures for nuclear installation safety strengthening shall be applied".* It should be noted, that similar installation safety strengthening was proposed in case of site seismic unsuitability (see Requirement 16 which talks about *"seismic safety upgrading of the structures, systems and components*				

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			of the nuclear installation ").				
16.	Para 5.15 / page 17	"The ~~potential for~~ [?] probability of the occurrence, frequency and ~~severity~~ intensity of tornadoes, cyclones ~~and~~ as well as severity of potential impacts from associated with these nature phenomena flying debris and other missiles shall be evaluated in the region of interest, together with the hazard posed by these phenomena…"	The sentence is hardly understandable. 1. Usually the term "intensity of tornadoes" is used. 2. It is not clear which "associated missiles" is considered here. It should be clarified, that these missiles are associated with mentioned nature phenomena as well as that they include first of all flying debris.			x	Potential for occurrence means: it is possible or not. Frequency and severity is appropriate – is consistent with Req. 7 paragraph 4.22. Tornados and Cyclones are characterized by high velocity wind resulting in airborne missiles and flying debris (see SSG-18). Phenomena (which are meteorological phenomena) may pose hazards.
17.	Para 5.17 / page 18	"Appropriate meteorological, hydrological and hydraulic [?] models shall be developed to derive the flooding hazard for the site."	It is not clear what does it mean and what is considered by "hydraulic models" in this particular case. Hydraulic effects are usually related with liquid flow in a confined space under pressure (tubes and pipes) and barely could be related with site flooding hazards caused by natural phenomena (paragraphs 5.16–5.18 are for natural phenomena), especially if		There is no mistype. Hydraulic technical science deal with flow of fluids in a large variety of conditions (not only in tubes and pipes) Hydraulic models are commonly used in flood analysis to		

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Comment No.	Para / Page	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			site under evaluation is "green field". If there was no mistype, then proper clarification should be provided regarding "hydraulic model" for which on-site or off-site structures this model should be applied.		model the rivers flood For more information you may read IAEA SSG-18 also.		
18.	Para 5.23 / page 18-19	"If a preliminary examination of the nuclear installation indicates that it is not able to withstand safely the effects of the failure of one or more of the upstream structures, then the hazards associated with the nuclear installation shall be assessed including such effects; <u>otherwise the site shall be deemed unsuitable</u>."	**This paragraph requires deep revision and clarification.** 1. First of all, it is not clear, if this requirement is for new planned nuclear installations or for already existing at the site. The requirement for periodical re-evaluation of the site during installation lifetime (see paragraph 7.4), implies, that such assessment of the effects of the failure of one or more of the upstream structures should be applicable also for the existing nuclear installations. In that case arise the question, what should be done with existing nuclear facility / installation <u>if site shall be deemed unsuitable</u>. See also similar comment 15 for the paragraph 5.3 regarding necessary actions if site shall be deemed unsuitable. 2. It is not clear what is exactly required				1. Apply to both new or existing. 2. Failure of upstream water control structure have potential of severe flood on site and therefore the safety of the nuclear installation shall be evaluated. Preliminary evaluation preclude decision of a detailed evaluation (time consuming) 3. This paragraph requires that flooding hazards due to a dam failure associated with the nuclear installation have to

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			by this requirement and what is the goal of a) preliminary examination of the nuclear installation, b) following assessment of hazards associated with the nuclear installation. The requirement only talks about the necessity of more detailed assessment if preliminary examination shows, that installation is not capable to withstand flooding effects, but no words provided about the goal of following detailed assessment. It should be more precisely clarified, if the goal is: - to assess potential hazard to population and environmental arising from nuclear installation damage by flooding effects, or - to assess the flooding hazards in order to *"to provide the input needed for the design or upgrading of the structures, systems and components of the nuclear installation"*. 3. Finally, <u>it is not clear when the site shall be deemed as unsuitable</u>. From what is written (and how is written) it looks like we have two options in case *"If a preliminary examination of the nuclear installation indicates that it is not able to withstand*				be assessed. The text is written as such. 4. The site is unsuitable if the flood generated by the failure of upstream water control structure cannot be compensated by design or site protective measure and safety of the nuclear installation cannot be demonstrated. Also please read the general requirement related to site suitability.

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			safely the effects of the failure of one or more of the upstream structures": a) to perform detailed assessment of hazards associated with the nuclear installation including effects of the failure of upstream structures. b) do not perform any detailed assessment of hazards, <u>but to declare site unsuitability</u>. But it remains unclear what should be done with the site (and installation) if performance of detailed assessment (item a)) will show that hazards associated with the nuclear installation is not acceptable.				
19.	Para 5.25. / page 19 Geotechnical hazards Requirement 21: Geotechnical hazard evaluation	5.25. The site and its vicinity shall be evaluated to determine the potential for slope instability (such as landslides, rock fall and snow avalanches) caused by natural or human induced phenomena that can affect the safety of the nuclear installation. In the evaluation of slope stability, the configuration of the site during and after site preparation activities shall be address. Also it shall take into account meteorological conditions and events, such as flooding or heavy rainfalls.	In our opinion also heavy rainfalls can cause slope instability, in certain local geological structure/conditions as described in the Safety Guide No. NS-G-3.6 "Geotechnical Aspects of Site Evaluation and Foundations for Nuclear Power Plants" (para 5.3): The external effects of earthquakes and of heavy rainfalls should be considered in the safety evaluation for assessing the potential hazards of natural slopes. Surficial instability typically occurs on steep slopes during periods of prolonged or intense rain or due to excessive irrigation or waterline breaks. Debris, soil creep and mudflows are examples			x	Requirement is covering all suggested aspects. There is no need for changes. - … caused by natural or human induced phenomena - … take into account meteorological conditions (rainfall is included in meteorological

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			of surficial instability.				conditions)
20.	Para 4.7 / page 7	"The site shall be deemed unsuitable for the location of the nuclear installations if the site evaluation for the three aspects cited above indicate that site is unacceptable and the safety deficiencies cannot be compensated for by means of a proper balance of site protection measures, design features of the installation, and administrative procedures, either upon initial analysis or after subsequent reviews.	**Related to previous comments for paragraphs 5.3 and 5.23** It is clear, that site shall be deemed unsuitable if initial analysis for planed nuclear installation will indicate such unacceptability. But it is unclear what to do with the site and existing nuclear installation, if subsequent reviews of the site evaluation, performed as required by Requirement 29 will indicate, that site become unacceptable and safety deficiencies cannot be compensated. Proper clarification should be provided regarding that case.	o.k.	This part was deleted to accommodate comments from other MSs.: "…either upon initial analysis or after subsequent reviews."		
21.	Para 4.29 / page 11	"The availability of adequate engineering solutions for implementing site protection measures shall be evaluated and if such engineering solutions are not available, the site shall be deemed unsuitable."	**Same as above comments for paragraphs 5.3, 5.23 and 4.7** It is unclear what to do with the site and existing nuclear installation, if subsequent reviews of the site evaluation, performed as required by Requirements 8 and 29 will indicate the lack of adequate engineering solutions for implementing site protection measures. Proper clarification should be provided regarding that case.			x	Requirement says that if there is a need for site protective measures (and read also 4.28) and if there are no engineering solution for site protective measure the nuclear installation is not safe on that site and the site is not suitable. Or in other words site safety objectives cannot be

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			General remark: It seems that in this Safety Requirements documentation the declarations of site unsuitability were written and spread freely without deeper analysis of potential consequences of such requirement for existing nuclear facilities / installations. Even if as the worst case closure and decommissioning of nuclear facility would be required, it should not be forgotten, that nuclear material, and hazards associated with presence of nuclear materials might remain on the site for tenth years.				fulfilled or there is a unacceptable risk related to the nuclear installation at that site. It is not in the scope of Site Evaluation Requirements to say how to resolve such situation but if such situations exist you cannot ignore such major safety issues because you do not see solutions.
22.	Para 5.35/ page 20	The probability for aircraft crashes with aircraft characteristics that can affect the aircraft crash hazard shall be assessed. Should be taken into account, to the extent practicable, the potential changes in future of aircraft characteristics and air traffic.	This requirement is unclear. Crashes of what kind aircrafts (military, general aviation, large civil aircrafts?) shall be considered?		Such details cannot be specified in the IAEA safety requirements document. Such details should be described in lower level documents (e.g. guidelines)		
23.	Para 6.3,6.5	6.3. "A programme of measurement and investigations… the assessment of	It is not clear what is this *"affected*		This is an usual self-		

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Comment No.	Para / Page	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	/page 21-22	radionuclide movement in the affected hydrological units [?].” 6.5 “A programme of measurement shall be carried out to gather data relevant for the assessment of radionuclide movement in the affected hydrological units [?].”	*hydrological units”*. Proper definition and/or clarification of the used term *“affected hydrological units”* should be added to the document.		evident terminology: Hydrological unit a distinct watershed or river basin. Also may include aquifers. Watershed=An area of land whose total surface drainage flows to a single point in a stream. Affected hydrological units – are those that potentially can be contaminated by radioactive releases.		
24.	Para 6.6 / page 22	“A programme of hydrogeological investigations shall be carried out… to assess radionuclide movement in hydrogeological units [?].”	Same as above, only this time proper definition and/or clarification of the used term *“hydrogeological units”* should be added to the document		Same as above.		
25.	Para 7.1 / page 23	“This monitoring shall be commenced no later than the start of construction on nuclear installation and shall be continued up until nuclear installation decommissioning. The natural and human induced hazards [?] monitoring plan shall be developed as part of the objectives and scope of the site evaluation.”	1. The clarification should be provided “construction” and “decommissioning” of what. 2. It should be clarified which monitoring plan (monitoring of what?) is considered here.			x	Is redundant –since Nuclear installation is included in the description of the Requirement 28.

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Comment No.	Para/Line	Proposed new text	Reason	Accepted	Accepted but modified as follows	Rejected	Reason for modification/ rejection
1	2.4 (a)/4	Principle 8 ““Accident Prevention” states: …”	It is expedient to give a short title to the principle from the SF 1 [1]	o.k.			
2	2.4 (b)/1	Principle 9 ““Emergency Preparedness and Response”. To meet Principle 9…”	It is expedient to give a short title to the principle from the SF 1 [1]	o.k.			
3	4.9.	To add as follows: At the first stage of the activities justification of a possibility to achieve the target safety goals is unreal, as a rule, therefore in the course of siting for reduction of risks and unjustified costs in future, the availability of natural and human induced processes, phenomena and factors, which prevent siting or are unfavorable for the location of the nuclear installation, shall be considered. To the criteria that exclude the possibility of the nuclear installation location shall belong: areas, where location of nuclear installations is forbidden by the Law of the country; areas, which encompass enterprises that are not subject to evacuation; sites, where unpredictable in their intensity and duration processes, phenomena and factors (active and potentially active volcanoes, active and potentially active seismic faults; sulphated, salt and suffusion karst; excess of site seismicity and tsunami parameters, adopted in the nuclear installation design; occurrence during earthquakes of soil residual deformations unpredictable in their amplitude and direction) can occur. To the criteria unfavorable for the nuclear installation location shall belong natural and human induced processes, phenomena and factors, which occurrence affects safety and requires development of organizational and technical measures to achieve the target safety goals. If it is impossible to achieve the	At the first stage of siting activities the possibility to achieve the target safety goals cannot be justified. The latter is possible only upon development of the design, including the development of organizational and technical safety measures and justification of a possibility to achieve the target safety goals based on the results of the Probabilistic Safety Analysis. In this respect, at the first stage of siting activities the priority shall be given to the sites, which lack factors preventing or unfavorable for the nuclear installation location. Example: at siting and in the designs of the Kashiwazaki NPP and Fukushima NPP (Japan) the achievement of the target safety goals was not justified. The adopted in the design non-conservative estimations of the level of geodynamic activity and seismic hazard, as well as tsunami hazard, led to NPP accidents. According to the Russian practice, it is not allowed to locate NPPs at sites, where the external natural and human induced impacts exceed the impacts,			x	It is too detailed for the requirement document. Paragraph 4.9 is talking about site suitability that needs to be demonstrated/confirmed (after site is selected) based on detailed site evaluation. Paragraph 4.9 is similar as in NS-R-3 Rev 1.

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		target safety goals, the criteria unfavorable for the nuclear installation location shall be assigned to the criteria, which exclude the site suitability, and the site shall be rejected.	adopted in the design.				
4	4.10	4.10. «Site suitability during the next stages of the activities shall be assessed on the basis of relevant updated data and methodologies and consistent with planned operations at the site. Conservative criteria can be developed in relation to site specific scenarios; in such a case, their consistency with the generic criteria for site suitability shall be demonstrated»	It is necessary to take into account the vital difference of the site assessment at the first stage of the siting activities from the next assessments of the site, performed on the basis of the relevant updated data and methodologies and consistent with planned operations at the site, as well as conservative criteria, adopted in the design of the nuclear installation.			x	The requirement is not for initial stages. Observing the requirements in different stages to arrive to a licensable site is described in SSG-35.
5	4.43 (Whole abstract)	«Data regarding external natural and human induced hazards, with the account of possible interrelated and interdependent natural and human induced hazards, with the potential to give rise to adverse effects on the safety of the nuclear installation over the lifetime of the installation shall be collected. Data shall be confirmed to be spatially and temporally pertinent to the site, not to be outdated, take account of the predicted climatic changes, with preference given to site-specific data.	To consider the information related to possible interrelated and interdependent natural and human induced hazards.			x	4.43 is related to data collection. Combination of hazards is addressed in Requirement 7, Paragraph 4.26.
6	Page 15, after the line SEISMIC HAZARDS	Seismic hazard is an occurrence of tectonic subductions (outcropping of the earthquake focus and creep), earthquake ground motions and secondary ground motions caused by earthquake ground motions during an earthquake (cracks, sinkholes, subsidence or uplift, slope instability, collapse and other phenomena).	A relevant definition is to be added after the words “SEISMIC HAZARDS”.			x	We do not need a definition for Seismic Hazard. Following this logic we should define all external hazards.
7	Requirement 15,	Faults within a certain size range and geodynamic activity, which are at a certain distance from the	Without the account of the order (size) of faults (geodynamic zones,			x	Foot note 5 describe

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	page 15	installation and are critical to site safety, shall be evaluated to identify the capability of the fault and potential challenge to the site safety in terms of ground motion and/or fault displacement hazard.	i.e. the potential zones for possible earthquake focuses) and characteristics of their geodynamic activity, it is impossible to justify the safe location of the site in the tectonic block that is intact to active "live" faults and to justify non-excess of seismic impacts, adopted in the design, by the seismic load parameters within the site.				conditions for a capable fault.
8	5.1.	The order (size) of fault displacements (seismogenic structures of various magnitudes) and their geodynamic activity [4] shall be identified and evaluated in the region, locality, vicinity, and on the site. When evaluating the hazard of shear displacements there shall be considered the parameters (length, displacements, geodynamic activity) of fault displacements in vicinity of the site and their relation to the active (live) faults of the region and vicinity. The methods to be used and the investigations to be made shall be sufficiently detailed to support safety related decisions.	The capability of fault displacements shall be identified by their size, geodynamic activity and relation to the larger "live" structures of the region, locality, and vicinity of the nuclear installation location. Characteristics of fault displacements and geodynamic activity shall be identified during engineering survey and investigations of the region, locality, vicinity and site. Details of investigations shall be enlarged while approaching the nuclear installation.			x	Too many details for requirements. Fault capability is addressed by Safety Guide SSG-9.
9	5.2.	The fault displacement hazard shall be evaluated to provide the input (maximum potential and recurrence of earth motions and differentiated slips), needed for the design or upgrading of the structures, systems and components of the nuclear installation, as well as the safety analyses performed during the lifetime of the installation.	It is required to concretize the term "input". Without the data on the maximum potential and earthquake recurrence it is impossible to justify the achievement of the target safety goals.			x	In some MSs is sufficient to show that the frequency of exceedance of a displacement threshold is acceptable low. Therefore we want to keep requirements general. Details should be in lower

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							level documents.
10	5.3	(a) It shows evidence of past (neotectonic, quartenary) movements or current movements (significant surface deformations and/or dislocations) of a recurring nature within such a period that it is reasonable to infer that further movements at or near the surface could occur. In highly active areas, where both earthquake data and geological data consistently and/or exclusively reveal short earthquake recurrence intervals, periods of the order of tens of thousands of years may be appropriate for the assessment of capable faults. In less active areas, it is likely that much longer periods will be required (up to 1 ÷ 2 million years and more).	For assessment of the potential seismic hazard and geodynamic activity it is required to know the geological age of tectonic movements.			x	Too much details for requirements. Details should be in lower level documents.
11	5.3.	(в) The maximum potential earthquake associated with the current ("live") fault, i.e. a seismogenic structure, is sufficiently large and at such a depth that it is reasonable to infer that, in the geodynamic setting of the site, movement at or near the surface could occur.	The criterion "rationality" does not meet the requirements to achievement of the target safety goals.			x	Too many details for requirements. Details should be in lower level documents
12	Requirement 16 a: (include sub requirement on page 16)	To conduct deterministic safety analysis for ground motion there shall be established at least three levels of seismic loads: operating base earthquake (level SL1), safe shutdown earthquake (level SL-2) and beyond design-basis earthquake, corresponding to the probabilities 10^{-3}, 10^{-4}, 10^{-5} on the interval of one year, respectively. To conduct probabilistic safety analysis the ground motions shall be assigned by the curve of the site seismic hazard, calculated up to the probability of the order 10^{-8} on the interval of one year.	In regard to nuclear plants and nuclear installations of Categories I and II as per nuclear and radiation safety, the additional requirement shall be included, concerning assessment of the level of seismic loads for conduct of the deterministic safety analysis and seismic hazard curves for conduct of the probabilistic safety analysis.			x	Too many details for requirements. Details should be in lower level documents.
13	Requirement 16 b: (include sub requirem	In the course of assessment of the ground motion hazard along with the long-term seismic hazard, account shall be taken of the possible changes in geodynamic, seismotectonic and seismologic conditions of the region, locality and vicinity and of	A requirement to predict changes in seismic loads shall be included in addition with the account of the possible changes in geodynamic, seismotectonic and seismologic			x	Too many details for requirements. Details should be in lower

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	ent on page 16)	the geotechnical conditions of the site during construction, operation and decommissioning of the nuclear power installation.	conditions of the region, locality and vicinity and in geotechnical conditions of the site during construction, operation and decommissioning of the nuclear power installation.				level documents.
14	5.4.	Hazards due to earthquake induced ground motion shall be assessed for the site with account taken of the seismic sources characteristics of the regional, vicinity and local geodynamic, seismotectonic and seismic conditions of the region, locality and vicinity, seismic waves propagation characteristics on the way from the seismogenic structure to the site and site specific conditions using proper methods. In addition, hazards due to earthquake induced ground motion shall be assessed for the site with the account of the possible changes in geodynamic, seismotectonic and seismologic conditions of the region and geotechnical conditions of the site during construction, operation and decommissioning of the nuclear power installation. In case ground motion was identified for the site of the nuclear installation in operation, and it exceeds the value of the ground motion specified in the design basis, the facility is considered as unsuitable, if its safety cannot be justified.	Not only regional seismotectonic conditions shall be considered, but also additional data on the vicinity and local geodynamic, seismotectonic and seismic conditions for the nuclear installation location shall be obtained. Account shall be taken of seismic waves propagation characteristics on the way from the seismogenic structure to the site. The possible changes in these conditions during construction, operation and decommissioning shall be assessed. Site suitability/unsuitability criteria shall be incorporated with the account of correlation of seismic loads adopted in the design basis and seismic loads specified for the site during re-assessment.			x	Too many details for requirements. Details should be in lower level documents.
15	5.6	The effect of ground motion shall be considered in combination with other seismically induced hazards.	Clarification shall be given with regard to the “ground motion”, what characteristics of the “ground motion” shall be specified and considered in combination with other seismically induced hazards.	O.K.	Modified as following: “5.6. The effect of the vibratory ground motion shall be considered in combination		

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					with other seismically induced hazards if any." Earthquake can induce other external hazards such as: land slides, liquefaction, upstream dam breaks, etc.		
16	Page 17 line 3.	HYDROMETEOROLOGICAL HAZARDS	Hydrological phenomena are also mentioned in this Section.	O.K.			
17	Geotechnical hazards. Requirement 21, page 19, para 8	Geotechnical hazards including such hazardous geological phenomena as slope instability, collapse, subsidence or uplift, and soil liquefaction, as well as changeability of soil properties above the relevant standards, shall be investigated.	Changeability of soil properties above the relevant standards is often the cause of unallowable or critical lopsidedness of a nuclear installation.		Was modified and includes also comments of other Member States.		
18	Para 5.26	The paragraph is to be finished by the following words "… including soil and ground water characteristics."	Evaluation of slope stability is impossible without knowledge of soil characteristics and their changes during the site flooding and underflooding.	O.K.	Was modified and includes also comments of other Member States. (numbering changes also now is 5.27)		
19	Para 5.27	The paragraph is to be finished by the following words: In cases, when it is identified that soil collapse	This is s factor that makes the site unacceptable.			x	This aspect is generally

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		and subsidence are caused by the processes (for example, karst-suffosion ones), which affect the nuclear installation safety and cannot be eliminated or mitigated by protective measures, the candidate site shall be rejected.					covered by Requirement 4. There is no need to repeat for each hazard.
20	Geotechnical hazards. Requirement 21 5.27	The paragraph is to be finished by the following words: The methods of investigation shall be used to assess the uplift pressure and the value of the independent uplift of clay soils, which underlay the facility foundation. Clay soils shall be sampled from the bore holes, bored without the flushing solution to the depth of the installation effect.	Uplifted soils, characterized by very high values of uplift pressure, but subjected to domestic loads, which do not exceed the installation loads after its construction, will be compacted in addition due to water loss. The uplift pressure and the value of the independent uplift of clay soils are very changeable variables of physical properties of the clay soils. Therefore, the installation settlement due to water loss by the uplifted soil can be lop-sided and considerable.			x	Too many details for requirements. Details should be in lower level documents.
21	5.30	The stability of the foundation material and potential excessive and lop-sided settlement under dynamic and static loading shall be assessed.	Insufficient stability of soils causes not only excessive settlements of the structure, but also unallowable lopsidedness.			x	Original formulation covers all suggested aspects. Should not be restricted to differential settlements.
22	5.31	The paragraph is to be finished by the following words: Assessment shall also be given to their current and predicted aggressiveness due to their effect on the underground parts of structures and components of the nuclear installation.	The current and predicted aggressiveness of ground water is the design-basis.			x	Too many details for requirements. Details should be in lower level documents.
23	7.1/1	"This monitoring shall be performed at all stages of the constructed facility lifetime and shall…"	This is the wording that is applied in the relevant regulatory documents of the Russian Federation, for example,			x	The original text captures construction

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			in NP-064-05. The suggested wording "…no later than the start of construction…" is not correct.				stages, operating life until decommissioning.
24	7.4/4	"…and with the required frequency (typically not less than once per five – ten years), and …"	For certain situations a ten-year period may be rare.			x	Original text "no less than" captures the intention of the comment.

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
1.		Section is not included dedicated to the development of design documentation for nuclear installation within a specific selected site.	This publication does not provide a description of interaction between the processes of site assessment for nuclear installation and the development of design documentation for nuclear installation.			**x**	DS484 scope includes only site evaluation. Does not cover design.
2.	1.4	This publication is intended for use by regulatory bodies responsible for establishing regulatory requirements, and for operating organizations directly responsible for conducting site evaluation of nuclear installations.	Operating organization can be absent as such and thus not available for performing evaluation of site suitability for the location of a new nuclear installation.			x	This paragraph is general – is not talking about site suitability. Operating organization supposed to apply for the license (site permit, construction license, etc.) therefore should take ownership of the site evaluation.
3.	1.5./line 1	This Safety Requirements publication addresses nuclear installations, namely: research reactor (including subcritical and critical assemblies), nuclear power plant.	It is advisable to clarify the range of nuclear facilities covered in this Safety Requirements			x	The nuclear facilities covered by Nuclear Installations is defined in IAEA Safety

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							Glossary.
4.	1.7/line 2	… that contains an authorized facility, authorized activity …	It is advisable to exclude “sources” that can be of natural origin; this Safety Requirements shall not be applicable to such sources			x	This is consistent with the definition provided by GS-R part 7.
5.	1.9	1.9 The site selection process, also called ‘siting processes’, is divided into two stages: The purpose of site selection is to define the "preferred potential site(s)" (and): a) Site survey when potential sites are identified on the basis of existing data b) Assessment of potential sites through comparison and ranking.	In the text under review the second stage was not specified. There was no logic in the presentation of the stages.			x	Site Selection stage is described in details in SSG-35. Please refer the footnote #3. Site evaluation is a process (not a stage) that starts in stage 2 – site selection (limited site evaluation) and continue after the site is selected. In the later part of this paragraph, this requirements document states *“The*

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							site evaluation process starts with the second stage of the siting process, following the site survey and shall continue throughout the entire lifetime of the nuclear installation".
6.	2.4 (a) /1	Principle 8 "Prevention of accidents" states that: …	It is advisable to add a short name for the principle from SF 1 [1]	o.k.			
7.	2.4b	The text should say " ....all reasonably foreseeable external hazards and those of very low probability...."	It's strange to combine events of very low probability with foreseeable (very likely) ones.	o.k.			
8.	2.4 (b) /1	To address Principle 9 "Emergency preparedness and response" …	It is advisable to add a short name for the principle from SF 1 [1]	o.k.			
9.	2.10., 2.11.	2.10 The possible non-radiological impact of the installation, due to chemical or thermal releases, and the potential for explosion and the dispersion of chemical products shall be taken into account in the site evaluation process. 2.11 The potential for interactions between radioactive and non-radioactive effluents, such as interactions due to the combination of heat or chemicals with radioactive material in liquid effluents,	Based on what documents paragraphs from the previous document (NS-R-3) important for site evaluation have been removed?	o.k.	The paragraphs have been included under Req. 7.		

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
		shall be considered.					
10.	3.3	The site evaluation process shall include proper quality assurance arrangements covering those activities that can influence nuclear safety.	Deviations from the design basis of the site are not acceptable.			x	There is nothing in para. 3.3 talking about deviations from the design basis.
11.	4	It is necessary to include the basic classification of external events of natural and man-made origin or give relevant references to standards containing such classification. Also, for each type of event, it is necessary to set the limits for parameters of an event and assign a degree of danger to the consequences of events.	This will allow us to classify the impacts according to the degree of danger taking into account the limits of the parameters			x	This level of details should be at lower documents level not in the requirements.
12.	4.2/line 1	Site safety objectives shall be defined with reference to consequences	editorial revision	**o.k.**	Re-formulated to include comments from other MSs.: " Demonstration of compliance with the safety requirements presented in this document provides the basis for demonstration		

COMMENTS BY REVIEWER **Reviewer**: Country / organization: Russia / State Corporation Rosatom				RESOLUTION			
Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
					of achieving the site safety objectives which address all stages of the project lifetime (siting, design, construction, commissioning, operation and decommissioning) as well as emergency preparedness and additional matters as appropriate".		
13.	4.2 req. 3	No factors related to the site are discussed, all factors are related to nuclear facility type			See above.		
14.	4.2./line 5	radiological consequences for individuals, public and the environment.	editorial revision	O.K.			
15.	4.3./line 1	The scope of site evaluation for nuclear facilities includes the use of a graded approach	editorial revision			x	Graded approach is not the scope. Is a principle used to simplify hazards evaluation process in the manner

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							commensurate with the facility risk.
16.	4.4	The graded approach is aimed to scale down the application of safety requirements for analysis, evaluation, and documentation considering the potential hazards associated with operating nuclear facilities.	It seems that the graded approach is applicable to nuclear power plants as well. By the way, para. 4.7, where the use of graded approach is discussed, contains a list of parameters to consider nuclear installations other than nuclear power plants			x	Consistent with other IAEA Safety Standards related to site evaluation graded approach is used for nuclear installations other than NPPs.
17.	4.4	The reference to nuclear power plants should be removed.	The idea is to make the safety requirements associated with installations proportionate to the risks which they present - not "...scale down..."			x	Consistent with other IAEA Safety Standards related to site evaluation graded approach is used for nuclear installations other than NPPs.
18.	4.5		Isn't this last sentence a restatement (slightly rephrased) of 4.4?			x	Basically It says that concerning site

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							evaluation for NPPs no graded approach can be used.
19.	4.7 c)	Change to "The thermal power, in case of research reactors."	Bad wording	o.k.			
20.	4.7 g)		This is ok, but where is the reference to that part of the document which gives guidance on how to identify the scope and depth of the site evaluation process necessary to support the installation's safety cases? (if that is really what the authors meant)		Site and off site consequences can be conservatively estimated based on inventory and other facility characteristics.		
21.	4.8 b)	.	"Characteristics of the site and environment" is too general for the guidance to be useful. Although this might have come directly from NS-R-3, this is an opportunity to add clarity to the guidance. If characteristics of the site and environment are what was intended, then give some examples such as high rainfall to increase wet deposition or the high frequency of wind from a particular direction.		This deals with dispersion characteristics, topography and other characteristics that may influence the dispersion and diffusion of radionuclides. Also needs to be general enough.		
22.	4.8 c)		What is meant by "other characteristics of the external region" is not clear -		Other characteristics		

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
			examples should be provided. Issues that can affect feasibility of emergency planning include the road infrastructure, the presence of natural boundaries like lakes or hills which prevent the construction of roads and which might restrict evacuation, or the presence of woodland which could		of the external region relevant for feasibility of implementation of the emergency actions could be: infrastructure, access/evacuation routes, etc.		
23.	4.9	In the context of paragraph 4.9, reference is made to paragraph 4.8 (a,b,c) with regard to the unsuitability of the site for nuclear installations.	This document must establish specific criteria and factors, which, if fulfilled (present), shall mean that the site is not suitable for nuclear installations, as well as criteria to classify the site as unfavorable for NPP, which in turn determines the need in certain compensatory measures and engineering solutions when developing design documentation.		Is similar to NS-R-3 and must be general enough. Basically it said that there are no practical solutions to protect the safety functions and the public the site is not good.		
24.	4.10	Conservative criteria **shall** be developed in relation to site specific scenarios and their consistency with the generic criteria for site suitability shall be demonstrated.	Postulated scenarios for the development of emergency situations should be considered from the point of view of the conservative approach.	O.K.			
25.	4.10	Also, in the context of paragraph 4.10, reference is made to the compliance with general site suitability criteria. We consider this formulation unacceptable.	This document should establish direct and specific site suitability criteria rather than general ones.			x	These are done in Safety Guides. Requirements

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
							document has to be general.
26.	4.10		Which data need to be updated and why would that be? Could it mean "current" data? Which methodologies are being referred to?	O.K.			
27.	4.11		Is the potential release the only consideration? What about normal operational releases?		Potential release should be read – in all operating modes (normal operation and accidental conditions)		
28.	4.13		Isn't it more along the lines of "in the course of assessing site suitability, the effect of site-related parameters on those of the safety envelope shall be assessed?		Yes. For new NPPs ultimately the design parameters of the safety related systems shall envelop the relevant site specific parameters. For existing NPPs decision should be made based on available safety margins.		
29.	4.19	4.19. Site evaluation process shall include events of natural origin with frequency of	The current version of the draft safety standards does not exclude consideration		The paragraph was modified to		

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		recurrence 10^{-4} and higher and events of man-made origin with frequency of recurrence 10^{-6} and higher.	of events with a minimum probability, which can affect the unjustified increase in the cost of the design, construction and operation of nuclear facility, including when assessing the risks for insurance of civil liability to third parties for causing nuclear damage.		include comments from other MS also.		
30.	4.19, 4.22	4.19. Events of high severity but low probability that could contribute to the overall risk shall be included in the site evaluation process. Events of low severity but high probability that could contribute to the overall risk shall also be included in the site evaluation process. 4.22. Information on frequency and severity derived from the characterization of the hazards resulting from external events shall be used in establishing the site specific design parameters for the nuclear installation. Adequate account shall be taken of uncertainties in the design basis hazard level.	For some events, these two points are mutually exclusive: for an event of high severity but low probability statistical data are almost always not available, so taking uncertainties into account is not possible.		The paragraph was modified to include comments from other MS also.	x	I do not see what mutual exclusive is. Limited data means large uncertainties that need to be properly considered. Not considering uncertainties in hazards evaluation may lead to conservative results. Even for limited available data there are models that include uncertainties.

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
31.	4.20	Wording "low probability", "low severity", etc.	We consider these statements unacceptable for this document. This document should contain specific requirements regarding probability, and criteria (as already mentioned above), on the basis of which the degree (severity) of the event's danger is assigned.	**o.k.**	The paragraph was modified to include comments from other MS also.		Requirements must be general. Specific criteria are provided by the guidelines documents.
32.	4.20		Better terminology needed. IEs are identified, screened, and IEs which are bounding are selected for analysis in order to converge on a manageable set of events to be taken forward. There is plenty of text available in IAEA docs which convey this much better than the text which is presented.	**o.k.**	Paragraph modified based on comments from other MS also. In the context of this paragraph Events means External Events (not Initiating Events).		
33.	4.21	Proposed sites for a nuclear installation shall be evaluated with regard to the frequency, postulated degree of impact and severity of potential consequences of external natural and human induced events, which could affect the safety of the installation,[3] and the potential combinations of such events.	To determine the severity of potential consequences one shall have information not only about the frequency of events, but also on their degree of impact (intensity). Only the events, which are probable for the territory under consideration shall be taken into account.			x	This paragraph basically says that the results of hazard characterization shall include both frequency and severity of the hazard parameters (applicable for

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
							non-screened out hazards).
34.	Requirement 11	Special considerations for the ultimate heat sink for nuclear installations requiring an ultimate heat sink. The evaluation of site specific external and human induced hazards shall consider hazards that can impact the availability and reliability of the ultimate heat sink for nuclear installations requiring an ultimate heat sink. 4.34. As appropriate for the ultimate heat sink under consideration, the following data shall be evaluated: a) Ice, frazil ice; fire b) oil and chemical spills; c) Air temperature, humidity; d) Water temperatures; e) Water quality characteristics including turbidity, suspended solids, and chemical and biochemical changes (natural or human induced); f) Available and sustainable water flow (for a river), minimum and maximum water level and the period of time for which safety related sources of cooling water are at a minimum level, with account taken of the potential for failure of water control structures. 4.35. Potential natural and human induced events that can cause a loss of function of	The need for such a detailed analysis of the issue when assessing a site for any type of nuclear installation is not fully understood. Probably, this item is inherited from the previous document IAEA Safety Series 50-C-S "Safety in Nuclear Power Plant Siting" (Rev. 1)			x	It is not for any type of nuclear installations. Only for the ones requiring ultimate heat sink. Basically it says that site specific hazards that may challenge the long term heat removal shall be evaluated.

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		systems required for the long term heat removal shall be identified and evaluated.					
35.	4.34	Remove "fire" from a), move it to b). Add a statement on biota to e)	Oil and chemical spills may be the primary hazard with fire a secondary hazard so maybe consider fire here? It seems unclear as to whether this includes biota such as jellyfish blooms for instance.	**o.k.**	The paragraph was also modified by comments from other MSs.		
36.	4.38		The effect of releases due to normal operation shall be evaluated. In addition, the effect of releases accumulated during N-1 years of operation (release to the environment) for a plant with a lifetime of N years shall be evaluated.			x	This paragraph is saying what specific regional characteristics and population distribution information shall be takin into account in site evaluation (such information is needed regardless of releases in normal operation or accident conditions).

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
37.	4.40		An assessment shall be made of the feasibility of development and **effective** implementation of an emergency plan for taking **other** emergency response actions effectively as required in GSR Part 7 [3] Bad wording	o.k.	Also modified by other MS.		
38.	4.45		It may be necessary to correct the table: a) This is already included and does not help in providing guidance (this is also stated in para 4.43 above). It is advisable to delete the "External natural and human induced hazards information". b) Maybe to be more specific in requirements or give a reference to other parts of the document where this information is described? For instance, boreholes data for the site. Not sure about what regional environmental conditions are more relevant if seismic is not mentioned. Better to be specific. c-g) Maybe to be more specific in requirements or give a reference to other parts of the document where this information is described? For instance, boreholes data for the site. Not sure about what regional environmental conditions are more relevant if seismic is not mentioned. Better to be specific.				This requirement emphasizes the need for collecting data at the extend that is practically possible and identify just type of data to be collected. Details are provided in Safety Guides.
39.	4.49		Methods and instrumentation for monitoring and recording data is chosen			x	Paragraph 4.49 is not related

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			with reliability and accuracy in mind. Methods and equipment are determined by the scope of an engineering survey.				to hazards monitoring. This information is needed for hazard assessment – if can be obtained.
40.	5	Section 5 shall be amended as follows "… for the type of installation as well as the specific site under consideration. The impact of external events is analyzed on the basis of databases, containing information on groups of possible hazards. A justification for why…"	Risk assessment should be carried out on the basis of statistical data – databases.			x	Out of scope of the Site Evaluation. Risk/Safety Assessment is covered by GS-R-Part 4.
41.	5.11/3	Extreme meteorological and hydrological hazards evaluation	This section addresses hydrological hazards among all.	o.k.			
42.	5.12/1-3	"5.11 Meteorological hazards such as wind, precipitation, snow and ice, air and soil temperature, humidity, water temperature and ice phenomena, storm surges and sand / dust storms, fogs, thunderstorms, snowstorms, as well as …"	It is advisable to add soil temperature, ice phenomena, fogs, thunderstorms and snowstorms to the list.			x	These are the hazards addressed by the IAEA Safety Standards. Snow, ice and humidity are already mentioned in this paragraph.
43.	5.13	5.13. Add "…corresponding characteristics in the region or its climatic	Meteorological data should take into account the climate characteristics rather	**o.k.**	Also modified by other MS.		

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
		zone".	than the territorial division (of the region) where there may be several climatic zones with their own parameters				
44.	*Tornadoes and cyclones* Subtitle between para 5.13 and para 5.14 (in Russian translation) 5.14 and 5.15 (in English version)	"Tornadoes and powerful tropical cyclones (hurricanes and typhoons)"	Cyclones are atmospheric disturbances having low air pressure. Typically extratropical cyclones have a diameter in the range from thousands of km at the beginning of development and up to several thousand km in the case of the so-called central cyclone. Tropical cyclones originating in tropical latitudes have smaller sizes, large pressure gradients and storm wind speeds, which are very rare in extratropical cyclones. Powerful tropical cyclones with wind speeds more than 32 m/s are called hurricanes in the Atlantic Ocean, typhoons in the Pacific Ocean basin and willy- willy in the Indian Ocean basin.		Cyclones are already included.		
45.	5.14 (in Russian translation) 5.15 (in English version)	The potential for the occurrence, frequency and parameters of tornadoes, powerful tropical cyclones (hurricanes and typhoons) and their other characteristics, including maximum wind speeds and pressure differentials between the periphery and the center of tornado funnel or typhoon (hurricane) eye, the type of destruction of carried objects and the description of their falling should be evaluated for the region, along with the	A detailed description of the characteristics of tornadoes is outside the scope of this standard.		I agree. But para 5.15 does not provide a detailed description of the hazard parameter. It just lists the parameters.		

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
		risks created by these phenomena.					
46.	5 req.15		The term "capability of the fault" needs clarification.		It is explained in Footnote 4.		
47.	5.15 (in Russian translation) 5.16 (in English version)	The potential for flooding in the region due to one or more natural causes such as snow and mountain glaciers melting, storm surge, wind generating waves, extreme precipitation (including in combination due to a common cause or due to relatively high frequency of occurrence), which can affect the safety of the nuclear installation shall be evaluated.	The main factors of flood formation on the rivers during the spring-summer high water are missed (for example, on the rivers of the European part of Russia and Siberia) and floods on flooding regime rivers, for example, Primorsky Krai, rivers of the Black Sea coast of the Caucasus, including also all rivers prone to hydrological effects of typhoons and hurricanes.			x	Para 5.16 talks about flood in general. Is not providing hazard parameters for a specific type of flood.
48.	5.20	Add "… lead to physical effects on the site or on the efficiency of water intake equipment of cooling systems."	It is not taken into account that although these factors may not affect the site itself, they may affect safe operation of NPP.			x	All tsunami hazards are covered in details in the guidelines (SSG-18).
49.	5.24	Add "… (e.g., caused by landslides or ice), change in land use, as well as caused by the failure of protective hydraulic structures located outside the nuclear power plant site.	Technogenic reason is not taken into account.			x	It is covered by Para. 5.18 and 5.22.
50.	5.31	The design basis for other natural external hazards caused by both climate change and short-term natural causes like wild-fires, drought, hail, subsurface freezing of subcooled water (frazil), diversion of a river and biological hazards (e.g. jelly fish, small animal, barnacle, etc.) shall be	The effect of possible gradual climate change on the NPP site is not taken into account.			x	It is covered by Requirement 10 Change of Hazards and site characteristics

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
		identified and assessed so that design basis for these events can be derived.					with time.
51.	5.35	Add the following to para 5.35 "…characteristics that can affect the aircraft crash hazard. The assessment should be based on the data of national aviation regulators on the characteristics of perspective air traffic and airborne vehicles."	For the purposes of analysis, developers need specific data for the country where NPP is to be built rather than global data.			x	5.35 covers all potential situations based on the relevance. National data are not excluded. Details are in Safety Guides.
52.	6	Requirement 25: Dispersion of radioactive material Dispersion of radioactive material in air and water released from the nuclear installation under normal operating and accident conditions shall be assessed. Potential radiation doses from releases of radioactive material should take into account external exposure from the cloud and contamination of soil with precipitated radionuclides, internal exposure due to inhalation of radionuclides contained in atmospheric air and ingestion of radionuclides contained in foodstuff.	It is necessary to take into account all possible ways of the public expose to radioactive material.			x	I do not see any restriction in the original formulation of the Requirement 25. Site evaluation provides input data (e.g. dispersion) for dose assessment. Dose Assessment is addressed by other Safety Standard

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
							(DS427)
53.	6	Requirement 26: Population distribution and public exposure The distribution of the population within the region over the lifetime of the installation shall be determined and evaluation of the potential impact of radioactive releases, either due to normal operation or under accident conditions, on the population shall be performed.	It is necessary to take into account all possible ways of public exposure: both the release of radioactive material into the environment and the discharge of radioactive material into water bodies		I agree but Site evaluation just provides input to Dose Assessment. Dose Assessment is ad-dressed by other Safety Standard (DS437)		
54.	Requirement 26	Amend Requirement 26 as follows: "… either due to normal operation or under accident conditions, taking into account the specifics of national regulatory requirements"	Requirement 26 must be implemented taking into account the requirements in the country where NPP is to be built.		IAEA Safety Standards are just recommended to MSs and are regarded as International Safety Standards. National regulations are assumed to be followed first.		
55.	6 req 26		There appears to be no place where the recreational practices of individuals are addressed so that these can be featured into exposure models to determine consequences of normal operational exposure.		This is a level of details that is covered by Safety Guides and lower level documents.		

COMMENTS BY REVIEWER **Reviewer**: Country / organization: Russia / State Corporation Rosatom				RESOLUTION			
Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
56.	6.10		Something should be said about unauthorized settlements where dwellings do not have necessary air-tightness and shielding factor as required in civil engineering.		This is a level of details that is covered by Safety Guides and lower level documents.		
57.	6.11		Shouldn't it be said that there must be an investigation of the agricultural practices rather than land use - land use may be defined as agricultural with no further description of whether livestock or agronomy. The guidance should try to be specific.		This is a level of details that is covered by Safety Guides and lower level documents.		
58.	7.1/1	"This monitoring shall be carried out at all stages of the facility life cycle and shall…"	This is the wording used in the relevant documents in Russia, for example, in NP-064-05 "Accounting of external natural and man-induced impacts on nuclear. facilities". The wording "… no later than the start of construction …" is not specific enough.		This formulation is equivalent since covers entire life cycle (starting with beginning of construction and ending with decommissioning)		
59.	7.4/4	"… as frequently as necessary (typically no less than once in five to ten years) and in the event of any of the following:	In certain situations frequency "once in ten years" may be insufficient.			x	We cannot recommend 5 years with no reason. Ten years can be justified by revision of codes and

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Comment No.	Para / Line No.	Proposed new text	Reason, justification	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
							standards. More frequent than every 10 years is covered by conditions listed (a) to (h). Original text "no less than" captures the intention of the comment.
60.	Full text	---	We draw your attention to the low quality of the Russian translation of the draft document.	Noted.			

COMMENTS BY REVIEWER Country/Organization: The Nuclear Regulatory Authority of the Slovak Republic (ÚJD SR Date: 8 November 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	7	7. Monitoring and periodic review of the site	The scope ofthe Specific Safety Guide No. SSG-25: Periodic Safety Review for Nuclear Power Plants is: "This Safety Guide deals with PSR for an operating nuclear power plant. PSR is a comprehensive safety review of all important aspects of safety, carried out at regular intervals, typically every ten years. In addition, a PSR may be used in support of the decision making process for license renewal or long term operation, or for restart of a nuclear power plant following a prolonged shutdown." Therefore, we propose the term "re-evaluation and the term "reassessment" to be replaced by the term "review" here and further in other places in the text within the section 7. Monitoring and periodic review of the site, as indicated below.	O.K.			
2	Req. 29 7.4	Requirement 29: Review of external hazards and site conditions All external natural and human induced hazards and site conditions that are covered in this Safety Requirements publication shall be reviewed by the operating organization as part of safety reviews ...	The same reasoning as for the Comment No. 1.	o.k.			

3	7./ Req. 29 7.4	As part of safety reviews such as periodic safety reviews or safety assessments under alternative arrangements, external natural and human induced hazards shall be reviewed and reassessed if necessary based on updated infonnation throughout the lifetime of the nuclear installation, at regular intervals and as frequently as necessary (typically no less, than once in ten years) and in the event of any of the following: ...	The same reasoning as for the Comment No. 1.	o.k.			
4	7./ Req. 29 7.5.	The implications of such a review of site specific hazards or of data relevant for the radiological impact assessment for the safe operation of the nuclear installation shall be evaluated. The outcome of such an evaluation may result into a reassessment of the site specific hazards or of data if necessary.	The same reasoning as for the Comment No. 1.	o.k.			
5	1.3. ii.	to assess the site	a typographical error in the original text: "to assess he site"	o.k.			

COMMENTS BY REVIEWER Country/Organization: Office of Atoms for Peace Date: 16 Oct. 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	3.5	The data collected and results of public hearing during site evaluation process shall be kept and the results of studies and investigations from site evaluation process shall be documented in sufficient detail to permit an independent review. The assessment of the site related external hazards shall be independently reviewed.	Public should participate to decide about nuclear installations project especially nearby purpose site.			x	Public hearing is not included in site evaluation. It is part of regulatory requirements – specific to each MS. Transparency and openness are not included in the scope of DS484.
2	5.22	The upstream water control structures shall be analyzed to determine potential hazard to the nuclear installation resulting from failure of one or more of upstream structures such as dams, including combination with flooding from other causes. The water management plan for local area is included to consider.	In some areas, there are unstable of annual rainfall then the cause by failure of water management such as irrigation or flush way for drainage may about safety of nuclear installation impact.			x	In the context of this paragraph any type of water control structure (included or not in the water management plan for the local area) that have potential to affect the site is covered.
3	7.4(d)	New information, experience and lessons from the occurrence of actual external events affecting the safety of nuclear installations or hazardous facilities.	It is possible to detect the new information in all lifetime of nuclear installation such as active faults.	o.k.			
4	5.33	Human induced events to be addressed include both military and civilian activities but shall not be limited to, the hazards due to: nearby land, sea or air transport (collision, explosion) ; fire, explosions, missile generation, releases of hazardous gases from stationary sources such as nearby industries or explosive weapon storage to the site and Electromagnetic interference.	The military exercise area which used to happen nearby the site vicinity should be considered.			x	5.33 is general enough to include hazards generated by military activities. The level of details is usually used in safety guide documents, not in safety requirements documents (see NS-G-3.1)

COMMENTS BY REVIEWER Reviewer: US Nuclear Regulatory Commission Page 1 of 15 Country/Organization: United States of America Date: 12/6/2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	Table of Content	Format for page number of "SCOPE"	Page number should be to the far right	O.K.			
2.	1.3(c) i	add "during the expected life of the installation"	It's applicable	O.K.			
3.	1.3.ii	Revise to read: "to assess the site and site–installation interactions …"	Editorial	O.K.			
4.	1.9 (b)	Change "aim" to "aims"	Editorial	O.K.			
5.	1.9	Paragraph 1.8, following (b), revise to read: "… and to select a list of candidate site(s)."	Editorial	O.K.			
6.	New 3.6	Add the following paragraph after paragraph 3.5: 3.6 Site background conditions must be established regarding quality of soil, surface water, and groundwater' pre-existing radiological and hazardous characteristics. Background characterization data must be well documented and its records kept until termination of authorization.	Completeness: Establishing existing background radiological and chemical hazards conditions is essential for management and site evaluation at the different lifecycle phases of the nuclear installation. This is important in order to compare background conditions with monitoring data collected during construction, operation, after		I suggest adding this new paragraph under Requirement 5 Site and Regional characteristics not under Requirement 1 Management System.	x	Covered by para 7.3 under Requirement 28.

COMMENTS BY REVIEWER Reviewer: US Nuclear Regulatory Commission Page 1 of 15 Country/Organization: United States of America Date: 12/6/2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			shutdown, and after decommissioning.				
7.	Requirement 3, Line 2	Replace “installation” with “facility”	Editorial: “installation” in this context was confusing.	x	Replaced with nuclear installation. DS484 scope includes Nuclear Installations (a subgroup of nuclear facilities – See IAEA Safety Glossary definitions)		
8.	4.6	Last sentence on 4.6, “A site can be screened out from following a formal site evaluation process if **no unacceptable radiological consequences** would be likely for workers **or** for the public **or** for the environment. The phrase **"no unacceptable radiological consequences"** is confusing. In addition, the sentence uses to many **or’s** to be easily understood. Please revise sentence to eliminate	Clarity	x	Prevised sentence: The sentence was deleted – as suggested by other MS (screening make more sense to the hazards).		

COMMENTS BY REVIEWER Reviewer: US Nuclear Regulatory Commission Page 1 of 15 Country/Organization: United States of America Date: 12/6/2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		confusion.					
9.	4.7	Add new (f) and revise numbering: (f) Potential external hazards at the site; (i) Potential for on-site and off-site consequences.	A new (f) has been added and original (f) and (g) have been renumbered as (g) and (i), respectively. Consequences [as in (i)] will be due to an event, which has created a hazard at the site. Facility design and operational description address the operational hazards. Discussion on potential external hazard(s) is currently missing.			x	External hazards shall be evaluated as stated in the requirements. Application of graded approach may downgrade the severity of hazards considered for design.
10.	4.8(b)	Revise to read: “The characteristics of the site and its environment that do not meet and nuclear installation design criteria, and can influence the transfer to persons and to the environment of radioactive material that has been released;”	For a site that does not meet all nuclear installation design criteria (e.g. wetland usage and other environment related regulations), and the site characteristics do not meet the selected design of a nuclear facility for the lifetime of the planned installation (e.g. geologic hazards, such as karst formation, zones of high geologic stress and structural			x	Design shall envelope site characteristics not the other way around.

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			deformation, soft and organic weak soils, etc.), then this site is not suitable for a nuclear installation.				
11.	4.9, Line 2	Revise to read: "…site evaluation for any of the three aspects …"	The revision avoids an interpretation that the text could be taken to mean all three aspects are needed for the site to be unacceptable.	O.K.			
12.	4.10	Revise beginning of sentence to read: "Site suitability shall be assessed on the basis of current and relevant data and methodologies …"	A justification has not been provided to justify why data has to be updated to be acceptable, if they are current and appropriate.	O.K.			
13.	4.16	Revise to read: "The size of the region to be investigated, also called the geographic area of interest, shall be defined for each of the external natural phenomenon and human induced events and associated activities. Adequate regions shall be identified and considered for the potential hazards that can affect the safety of the nuclear installation for all external natural phenomena. The correlation between the event magnitude and distance from the	To improve clarity.	O.K.			

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		source to the site shall be given priority in identifying the size of the region to be investigated. …"					
14.	4.17/2-6	Revise to read: This includes potential changes in the magnitude or frequency of the natural hazard, distribution of the population in the region, the present and future use of land and water, the development of existing installations and human activities or the construction of facilities that can impact on the safety of the installation and the feasibility of planning to implement emergency response actions effectively.	Potential changes in the hazard need to be included here.	O.K.			
15.	New paragraphs 4.18, 4.19, and 4.20	After Para 4.17, add the following paragraphs: 4.18 Site's location must be identified for important previous historical and archeological activities. Substantive effort must be made to avoid installation construction adjacent to such activities. 4.19 Wet land areas must be conserved when decisions are made regarding site selection. Wetlands have a distinct ecosystem	These paragraphs are need to make the document complete.			x	Too detailed for requirement document. These aspects are addressed in Safety Guides (e.g. SSG-35)

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		that must not be disturbed because of its important environmental role for water purification, flood control, shoreline stability, carbon sink, and keeping biological diversity of the ecosystem. 4.20 Site must be selected outside of areas known to have significant commercial mineral or oil resources.					
16.	4.20	Revise to read: "With respect to screening out events, it shall be ensured that all effects resulting from these events are bounded. Events may be screened out through enveloping within a set of events."	The interpretation of the clause "(e.g., loaded cases)" is unclear.	O.K.	Also modified to accommodate other comments from MSs.		
17.	4.22/3-4	Revise to read: Adequate account shall be taken of both aleatory and epistemic uncertainties in the design basis hazard level.	Both types of uncertainties need to be identified, characterized and propagated. Leaving it vague would allow for one or the other type to be ignored or not adequately addressed	O.K.			
18.	4.25	Delete 4.25 in its entirety or revise.	Hazard curves for a particular hazard is site-specific, and are not application-specific.		4.25. Probabilistic hazard curves shall be developed with reference to the		

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			If the concept of performance requirement for a structure, system, or component to be constructed at the site has been implicitly included here, then the text needs to be revised to express that clearly.		specific conditions.		
19.	Requirement 10,	Revise to read: “External hazards and site characteristics shall be assessed for their potential to change with time and the impact of these changes shall be evaluated.” Delete the remainder of the requirement, making sure idea is caught in subsequent text.	Requirement is too complex; the details should be in the following text.	O.K.			
20.	4.34	Revise and renumber to make “fire” its own line item. a) Ice and frazil ice b) Fire c) Oil and chemical spills d) Air temperature, humidity; e) … … f) … … g) … …	Fire is an important item by its own merit.	O.K.			
21.	4.45(f)	Revise to read:	It is not clear what the	O.K.	Modified:		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		"Conditions for access to the site including traffic;"	phrase "circulation at the site" means.		(f) Conditions for access to the site and site infrastructure		
22.	4.30/1-5	Revise to read: If either as a result of the evaluation performed according to Requirement 7 during the early site evaluation stage or later, during the operating lifetime as a result of periodic safety site re-evaluation, site protection measures are required to be implemented, ~~conservative assumptions shall be taken in order to account for~~ design of the protection measures shall take into account the uncertainties in the evaluation of extreme values of external natural and human induced hazards.	As written, it seems to imply that only a deterministic approach can be used.	O.K.			
23.	4.31/1-4	Revise to read: Occurrences of external natural and human induced hazards and their credible combinations, which are able to challenge the safety of multi-unit or co-located sites ~~and to generate disruptions of infrastructure affecting communications, transportation and~~	The need to consider disruptions of infrastructure affecting communications, transportation and utilities is generic and not specific to multi-unit or co-located sites.	O.K.			

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		~~utilities,~~ shall be considered.					
24.	4.34	Delete this paragraph.	This is too detailed for a requirements document. Paragraph 4.35 succinctly give the requirement.			x	I agree but is supported by other MSs in their comments. It just list the hazards that may affect the UHS.
25.	5.1	Revise the first sentience to read: "Capable faults[4] shall be identified and evaluated."	Revise to make sentence consistent with the requirement statement and Footnote 4.	O.K.			
26.	Requirement 15	Revise to read: "Faults within a certain size range and within a certain distance from the installation critical to site safety shall be evaluated to identify whether these faults are to be considered as capable faults and potential challenge to the site safety in terms of ground motion and/or fault displacement hazard."	Revised to make the requirement statement clearer and consistent with Footnote 4.	O.K.	Also was modified to include comments from other MSs.		
27.	5.2	Add to Para 5.2 after first sentence. For a new nuclear power plant, evaluation of fault displacement hazard shall include detailed geologic mapping of excavations for safety-related engineered structures to enable evaluation of fault	The geologic mapping documents the existence (or absence) of faults and, in combination with information on age of faulting, makes it possible to evaluate capability of any faults	O.K.			

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		capability at the plant site.	that occur at the site.				
28.	5.4	Revise last sentence to read: "… and site specific conditions using appropriate methods."	Revised sentence to make the statement clearer.	O.K.			
29.	5.12/1-4	Revise to read: Meteorological hazards such as wind, precipitation, snow and ice, air and water temperature, humidity, storm surges and sand / dust storms as well as the plausible combinations, shall be evaluated for their extreme values based on the available record ~~available documentation for an appropriate period of time~~.	The entire available record should be used. "appropriate period of time" is unnecessarily vague.	O.K.			
30.	5.12/4-5	Revise to read: If necessary, efforts shall be made to extend the database (e.g. incorporating ~~paleo-meteorological data~~ paleoclimate information, numerical models or simulations).	"Paleo-meteorological" is a very obscure term. It is not often used and, in every known instance of its use, the meaning is indistinguishable from paleoclimate.	O.K.			
31.	5.16/1-2	Revise to read: The potential for flooding in the region due to one or more natural causes such as storm surge, wind generated ~~generating~~ waves,…	editorial	O.K.			
32.	5.17	Add to the existing text:	Where it is feasible, paleoflood studies may	O.K.			

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		"Where feasible, information from paleoflood studies should be used to inform riverine flood frequency and magnitude estimates."	provide very valuable information, sometimes extending the effective record by hundreds to thousands of years.				
33.	5.20/1-2	The hazards associated with tsunamis or seiches shall be derived from known historical records, available paleoflood information, as well as from physical and/or analytical modelling.	Numerous studies have shown the value of looking for geologic evidence for tsunamis that have occurred outside the realm of human observation.	O.K.			
34.	Title above Requirement 21	Revise title to read: GEOTECHNICAL AND GEOLOGIC HAZARDS	Geologic hazards can also affect the safety of nuclear installations and affect the determination of site suitability.	O.K.			
35.	Requirement 21	Revise to read: Geotechnical and geologic hazards including slope instability, collapse, subsidence or uplift, ~~and~~ soil liquefaction, and the effect of karst formation, zones of high geologic stress and structural deformation, soft and organic weak soils on foundation stability, shall be evaluated.	Geologic hazards can also affect the safety of nuclear installations and affect the determination of site suitability.	O.K.			
36.	Requirement 21 and 22	Recommend revising the sequence of Requirement 21 and 22	Current Requirement 22 deals with characteristics of subsurface materials, which are needed before	O.K.			

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			assessing the geotechnical hazards, such as slope instability, collapse, etc. (current Requirement 21).				
37.	5.27	Add to Para 5.27 after first sentence. The potential for collapse and subsidence related to dissolution that could produce non-tectonic surface deformation at the site shall be included in the geotechnical hazard evaluation.	Consideration of the potential for collapse and subsidence related to dissolution is important when subsurface materials might allow dissolution to occur.	O.K.	(after re-numbering is para 5.30)		
38.	5.25	Revise 5th line to read: "… shall be addressed. Also, it shall take into account extreme meteorological conditions and rare events, …"	It appears that part of the word was left out. In addition, "extreme" and "rare" added, as assessment of slope stability should consider extreme meteorological conditions and rare events. "Normal" site meteorological conditions should not pose a hazard.	O.K.			
39.	5.28	Revise 2nd line to read: "…consistent with the seismic hazard and geotechnical properties	Geotechnical properties of subsurface materials are also necessary to assess the potential	O.K.			

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		of the subsurface materials present at the site."	liquefaction hazard at the site.				
40.	5.29	Revise to read: "The evaluation of soil liquefaction shall include use of accepted methods for field and laboratory testing in combination with analytical methods to determine the potential for hazards."	Revised to make the statement clearer.	O.K.			
41.	Add new requirement prior to 5.30 and renumber paragraphs. New paragraph before current 5.30 under Requirement (new) 21 (current Requirement 22).	Add new 5.30; "Geologic features and geotechnical characteristics (both static and dynamic) of subsurface materials, including any backfill, at the site shall be established. Laboratory and field-based methods in conjunction with appropriate sampling technique(s) and sufficient repetition of each tests shall be used to characterize each parameter of the subsurface materials at the site."	The existing Requirement 22 addresses characteristics of subsurface materials at the site. However, there is no discussion on what would be needed to appropriately characterize them.	O.K.	After re-numbering is para 5.25		
42.	Requirement 22:	Modify the two lines before Para 5.30 to read. The geotechnical characteristics of	For geotechnical hazard evaluation, variation in subsurface materials at a site is a key factor that	O.K.			

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		subsurface materials shall be investigated, and a soil/rock profile for the site that considers the variability and uncertainty in subsurface materials shall be determined.	must be considered.				
43.	5.30	Modify 5.30 to read. The stability of foundation materials shall be assessed, to include consideration of potential excessive settlement under static and seismic loading, bearing capacity, and earth pressure.	Settlement, bearing capacity, and earth pressure are key factors that must be considered in the assessment of site stability.	O.K.			
44.	5.31/1	Revise to read: The groundwater regime and the ~~chemical~~ geochemical properties of the soil and groundwater shall be studied by appropriate methods and accounted for.	"Geochemical" is more appropriate term to use here.	O.K.			
45.	5.32	Revise to read: ~~The design basis for~~ Other natural external hazards like wild-fires, drought, hail, frazil ice formation ~~sub-surface freezing of subcooled water (frazil)~~, diversion of a river and biological hazards (e.g. jelly fish, small animal, barnacle, etc.) shall be identified and assessed so	1) As written design basis is used redundantly 2) The sentence fragment that includes frazil is very confusing. Frazil ice formation occurs in surface waters, so use of "sub-surface" is odd. Frazil ice forms in super-cooled water, not	O.K.			

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		that design basis for these events can be derived.	"subcooled"				
46.	Requirement 24:	Modify 5.34 to read. Human activities which may influence the type or severity of natural hazards, such as resource extraction (e.g., hydraulic fracturing) or other significant re-contouring of land or water such as reservoir-induced seismicity shall be considered.	Clarification.	O.K.			
47.	5.35	Revise 5.35 to read: 5.35 The potential for aircraft crashes on the site shall be assessed with account taken, to the extent practicable **based on type of facility and potential risk, as well** as ~~of~~ the potential changes in future air traffic and aircraft characteristics that can affect the aircraft crash hazard.	Clarity & Completeness: Assessment of aircraft crash and modification of installation design to avoid as such must be based on graded approach, and potential risk.			x	Graded approach is used to screen in or out the aircraft (Req 3 and Req 6).
48.	5.37	Revise to read: "Hazards associated with chemical explosions or other releases shall be expressed in terms of heat, overpressure and toxicity (if	The added text would address the need for considering conservative potential consequences of the hazards during site selection. In addition,	O.K.			

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		applicable), with account taken of the effect of *taking into account the distance and the worst combinations of atmospheric conditions at the site. Additionally, potential effects on onsite workers shall be evaluated.*"	effects of chemical explosions or releases on onsite workers need to be evaluated.				
49.	6/Section heading	Revise to read: 6. THE POTENTIAL EFFECTS OF THE NUCLEAR INSTALLATION ~~IN~~ ON THE REGION	editorial	O.K.			
50.	6.1, Line 5	Add the following sentence to end of current 6.1: "If possible long-term (many years) meteorological data from nearby locations should be obtained, evaluated for quality, and used."	While one year site observations are OK, it is necessary to have longer-term data as well. This text clarifies that multiple year data are needed and that it should be evaluated for quality.	O.K.			
51.	7.3	Revise to read: Before commissioning of the nuclear installation the ~~ambient~~ background radioactivity of the atmosphere, hydrosphere, lithosphere and biota in the region shall be assessed so as to be able to determine the effects of the operation of the nuclear installation.	editorial	O.K.			
52.	7.4,	Add new criteria:	New methods, especially probabilistic approaches	O.K.			

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		"(h) New methods to analyze hazards are developed that substantially improve estimates."	are being developed that could be applicable.				

DRAFT GUIDE DS484 "Site evaluation for Nuclear Installations" – Step 8

ENISS Members Comments

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.1	It is recognized that there are steady advances in technology and scientific knowledge, in nuclear safety and in what is considered adequate protection. Safety requirements ~~change~~ evolve with these advances and this publication reflects the present consensus among Member States.	'Evolve' brings a positive progress connotation	O.K.			
2.	1.3.(c)	Analysing the characteristics of the population and the area surrounding the site aimed to determine if there would be significant difficulties for implementing emergency response actions effectively.	Missing word		c) Analysing the characteristics of the population and the region surrounding the site so as to determine whether there would be significant difficulties in planning to implement the emergency response actions effectively.		
3.	1.3.(c)i	to identify the natural and human	Editorial	o.k.			

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		induced events external to the installation that could challenge the safety of the nuclear installation;					
4.	1.3.(c)ii	to assess ~~he~~ the site and site–installation interactions in operational states and accident conditions, over the projected lifetime of the installation, including those interactions that require guaranteed proper implementation of emergency response plans.	Editorial		To assess the interactions between the site and nuclear installation for operational states and accident conditions, over the projected lifetime, including those accidents that could necessitate proper implementation of emergency response plans.		
5.	1.4	This publication is intended for use by regulatory bodies responsible for establishing regulatory requirements, and for ~~operating~~ organizations directly responsible for conducting site evaluation of nuclear installations.	Added value for specifying 'operating' organizations? Could be deleted			x	Operating organization should have the ownership of site evaluation process.
6.	1.9	The site selection process, also called 'siting ~~processes~~ process', is divided into two stages[2]:	(If next comment not taken into account) Editorial		1.12. The siting process for a nuclear		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		a) Site survey when potential sites are identified on the basis of existing data; b) Site ~~Selection~~ selection ~~aim~~ aims to arrive at the 'preferred candidate site(s)'. ~~In this second stage the candidate sites are assessed by screening and ranking.~~	Redundant with next §		installation is divided into two stages :		
7.	1.9	The site selection process, also called 'siting ~~processes~~ process', is a multifaceted process that includes safety considerations and aims to select a suitable site. The process is divided into two stages2: a) Site survey ~~when potential sites are identified on the basis of existing data~~, when studies and investigations are performed at the regional level to identify potential sites, from which one or more candidate sites are chosen on the basis of screening criteria; b) Site ~~Selection~~ selection ~~aim to arrive at the 'preferred candidate site(s)'.~~, in which unsuitable sites are rejected and the remaining candidate sites are assessed by comparing and ranking them on the basis of safety and other considerations to arrive at the preferred candidate site(s).~~In this second stage the candidate sites are~~	Editorial To harmonize with IAEA SSG-35 (1.4 & 1.6 & 2.3 & Fig3) and to make clearer the underlying logic of potential sites > candidate sites > preferred candidate sites		1.12. The siting process for a nuclear installation is divided into two stages : a) Site survey, in which candidate sites are identified after the investigation of a large region and the rejection of unsuitable sites; b) Site selection, in which the candidate sites are assessed by screening, evaluation,		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		~~assessed by screening and ranking. The aim of the second stage is to identify suitable sites and to select list of candidate site(s). In this second stage the candidate sites are assessed by screening and ranking to arrive at the 'preferred candidate sites'.~~			comparison and ranking on the basis of safety and other considerations to select one or more 'preferred candidate sites'.		
8.	1.12	Section 2 of this publication describes the safety principles and ~~concepts~~ objectives applicable to site evaluation.	To better focus on the content of section 2; 'concepts'seems too vague for the purpose	O.K.			
9.	2.	SAFETY PRINCIPLES AND ~~CONCEPTS~~ OBJECTIVES	See 1.12	O.K.			
10.	3.1	The management system shall be ~~established~~ implemented at the earliest possible time to conduct site evaluation activities for the nuclear installation.	Implementation is the key	O.K.			
11.	Reqt.3	The scope shall consider site related factors and site–installation interaction factors relating to operational states and accidents, including those that could warrant emergency response actions and external natural and human induced events ~~external to the installation~~ that could affect the safety of the nuclear installation.	Redundant as it is the definition of external events, or sentence to be reworded to clarify your meaning		The scope of the site evaluation shall encompass both factors relating to the site and factors relating to the interaction between the site and the installation, for		

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					all operational states and accident conditions, including accidents that could warrant emergency response actions.		
12.	4.6	A site can be screened out from ~~following~~ a formal site evaluation process if no unacceptable radiological consequences would be likely for workers or for the public or for the environment.	To simplify the sentence		4.5. The level of detail needed in an evaluation to meet the requirements established in this publication shall be commensurate with the risk associated with the nuclear installation and its site and will differ depending on the type of nuclear installation.		
13.	4.7.(c)	The thermal power ~~of~~ in the case of research reactors;	Editorial		c) For research reactors, the thermal		

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					power;		
14.	4.8.(a)	The effects of external events ~~occurring in~~ affecting the region of a particular site (the external events can be of ~~a~~ natural origin or human induced);	To clearly not exclude events occuring outside the region but which coud still affect the region	O.K.			
15.	4.8.(b)	The characteristics of the site and its environment that can influence the transfer to persons and to the environment of radioactive material ~~that has been~~ being released;	Not only after the release but also during the release	O.K.			
16.	4.9	The site shall be deemed unsuitable for the location of the nuclear installations if the site evaluation for one or more of the three aspects cited above indicate that the site is unacceptable and the ~~safety~~ deficiencies cannot be compensated for by means of a proper balance of site protection measures, design features of the installation, and administrative procedures, either upon initial analysis or after subsequent reviews.	Site should be deemed unsuitable as soon as 1 of the 3 aspects is not satisfactorily met; it seems not useful to specify 'safety' deficiencies	O.K.			
17.	4.11	A decision regarding site suitability shall be based on the installation's characteristics, the amount and nature of potential releases and their impact on the population and the environment.	Impact on the population must also be taken into account as well		A decision regarding a site's suitability shall be based on the characteristics of the nuclear		

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					installation, the amount and nature of potential radiological releases and their impact on the people and environment.		
18.	4.12	~~If~~ When it is ~~determined or~~ anticipated that the installed nuclear capacity and inventory or its impact ~~have been~~ are to be increased to a level significantly greater than that previously determined to be acceptable, the site shall be re-evaluated considering the higher capacity or impact.	Re-evaluation has to be performed prior to the increase, not after		For nuclear power plants, the total nuclear capacity to be installed at the site shall be determined at the first stages of the siting process. If it is later determined or anticipated that the installed nuclear capacity and the inventory of nuclear material or its impact have been increased to a level significantly		

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					greater than that previously determined to be acceptable, the site shall be re-evaluated considering the higher capacity or impact.		
19.	4.17	This includes distribution of the population in the region, the present and future use of land and water, the development of existing installations and human activities or the construction of facilities that can impact ~~on~~ the safety of the installation ~~and~~ or the feasibility of planning to implement emergency response actions effectively.	Editorial	o.k.			
20.	Reqt.6	Potential hazards resulting from external natural phenomena and human induced events and activities which can ~~occur in~~ affect the region of the site shall be identified through a screening process.	See 4.8.a	o.k.			
21.	4.23	A thorough uncertainty analysis of the method and input data shall be performed as part of the evaluation.~~"~~	Editorial (" to delete)	O.K.			
22.	4.24	The decision for using probabilistic or deterministic methodologies in hazard				x	Without talking about design

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		evaluation shall be based on the nature of the hazard, availability of data and the applicable requirements for safety assessment. Special consideration shall be given to applicable probabilistic methodologies since external events hazard curves are needed as input for probabilistic safety assessment against external hazards. When the hazard curves enable to identify a cliff edge effect, adequate margins should be adopted.	Cliff edge effects should be considered not only during PSR (see 7.4 (f)) but also during initial site characterization. Low probability given to a magnitude 9 earthquake in the subduction zone in front of Japan; the height of the tsunami wave depends on to the earthquake magnitude.				aspects against external hazards we cannot talk about cliff edge effect only based on the hazard curves. I agree but this is beyond the scope of DS484 (this is addressed by Requirement 17 para 5.21 and 5.21A of SSR 2/1 Rev 1).
23.	4.45.(f)	Conditions for access to the site and circulation at the site;	Editorial		Information on conditions for access to the site and site. infrastructure.		
24.	5.7	Capable volcanos [6] shall be identified and evaluated.	Should be harmonised as volcanos or volcanoes in	O.K.			

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			the document				
25.	Reqt.19	The potential for the occurrence of rare[7] meteorological hazards such as lightning, tornados and cyclones, including information on their severity and frequency shall be evaluated for the site.	Should be harmonised as tornados or tornadoes in the document	O.K.			
26.	5.21	The hazards associated with tsunamis or seiches, with account taken of any amplification due to the coastal configuration at the site, such as nearshore bathymetry and coastal topography, shall be assessed.	Part of the sentence is missing		5.21. The hazards associated with tsunamis or seiches shall be derived from historical records, available paleo-flood information on prehistoric floods as well as from physical and/or analytical modelling. Such hazards include potential draw-down and run-up that can result in physical effects on the site.		
27.	5.25	In the evaluation of slope stability, the configuration of the site during and after site preparation activities shall	Editorial	O.K.			

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		be ~~address~~ addressed.					
28.	5.26	The potential for slope instability resulting from seismic loading that can affect the safety of the nuclear installation shall be evaluated by using parameters consistent with the seismic hazard at the site ~~including ground water characteristics~~.	It's not necessary to highlight "ground water characteristics" as it is one among several contributions already included in the analysis.			x	MS comment has priority.
29.	Reqt.25	Dispersion of radioactive material in air and water released from the nuclear installation under normal ~~operating~~ operation and accident conditions shall be assessed.	Editorial		The dispersion in air and water of radioactive material released from the nuclear installation in operational states and accident conditions shall be assessed.		
30.	6.1	The analysis of the atmospheric dispersion of radioactive material shall account for ~~be based on~~ a description of the regional orography, land cover and ~~the~~ meteorological features ~~description~~ of the region, including ~~descriptions of the regional orography and~~ parameters ~~of meteorological phenomena~~ such as wind speed and direction, air temperature ~~and quality~~, atmospheric pressure, precipitation, humidity,	Orography is not part of the meteorological description, but complementary and necessary, as well as the land cover; air quality is not requested for the atmospheric dispersion assessment; atmospheric pressure is one of the main parameter to be monitored; other parameters have to	O.K.			

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		atmospheric stability parameters, ~~and~~ prolonged inversions, and any other parameters required for the modelling purpose.	be measured according to the selected modelling programme				
31.	6.2	A programme for meteorological measurements shall be prepared and carried out at or near the site with the use of instrumentation capable of measuring and recording the main meteorological parameters at appropriate elevations and locations. Data from at least one representative full year shall be collected and used in the analyses, together with any other relevant data that can be available from other sources.	The meteorological data must be representative of the region; a representativeness assessment may be required	O.K.			
32.	~~6.3~~ 6.4	A survey programme shall be designed to gather relevant data and to characterize the hydrogeological and hydrological parameters at the site location and in the region ~~of measurement and investigations relevant for radiological impact on the environment shall be carried out and used in the analyses~~ to permit the assessment of the ~~radionuclide movement~~ dynamics of radionuclides in the potentially affected hydrogeological and hydrological units, and the subsequent assessment of the radiological impacts.	6.3 and 6.4 should be switched to first describe the water bodies (groundwater and surface water), and then their characterization through field investigations This section about waters could be better specified and structured, see proposals in 6.3 to 6.7		6.3. A survey programme shall be designed to gather relevant data to characterize the hydrogeological and hydrological parameters at the site location and in the region to permit the assessment of dynamics of		

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					radionuclides in the potentially affected hydrological units and the subsequent assessment of the radiological impact. This programme of measurement shall be carried out for at least one full year prior to hydrogeological investigations (see para. 6.7). The data shall be expressed in appropriate parameters for surface hydrology and groundwater		
33.	~~6.4~~ 6.3	A description of the groundwater and surface ~~hydrological~~ water characteristics in the region (including ~~interaction with~~ interactions between surface water and groundwater) shall be developed~~,~~	The right terminology should be used: hydrology or surface waters / hydrogeology or groundwater.		6.4. A program of surface water investigations in the region		

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		~~including~~. The description of the surface waters shall include ~~descriptions of~~ the main physical and chemical characteristics of the water bodies, both natural and artificial, the major structures for water control, the locations of water intake structures and information on water use in the region ~~so that relevant information is available for the radiological impact assessment~~. The ~~A~~ description of the groundwater ~~hydrology of the region~~ shall ~~be developed, including descriptions of~~ include the main characteristics of the water bearing formations~~, their interaction with surface water~~ and data on the ~~uses~~ use of groundwater in the region.	Moved to the end as it is applicable to surface waters and groundwater Should be moved from 6.7 Redundant with 1st §		(including the interactions between surface water and groundwater) shall be developed. The descriptions of the surface waters shall include the main physical and chemical characteristics of the water bodies, both natural and artificial, the major structures for water control, the locations of water intake structures and information on water use in the region.		
34.	6.5	~~A programme of measurement shall be carried out to gather data relevant for the assessment of radionuclide movement in the affected hydrological units. A~~ The investigation and measurements	Redundant with 6.3		6.5. A program of the hydrogeological investigations of the region shall		

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		programme ~~of investigation and measurements of the~~ for surface ~~hydrology~~ water and groundwater shall be carried out for at least one full year prior to submittal of the site evaluation report ~~and used in analyses to determine to the extent necessary the dilution and dispersion characteristics of water bodies, the re-concentration ability of sediments and biota, migration and retention characteristics of radionuclides and the determination of transfer mechanisms of radionuclides in the hydrosphere and along exposure pathways~~.	Should split in to paragraphs and renumbered as 6.6		be developed, including descriptions of the main characteristics of the water bearing formations and their interaction with surface water and data on the uses of groundwater in the region.		
35.	~~6.5~~ 6.6	The hydrological results shall be used ~~in analyses~~ to determine to the extent necessary the dilution and dispersion characteristics of the surface water bodies, the re-concentration ability of sediments and biota, the migration and retention characteristics of radionuclides and the determination of transfer mechanisms of radionuclides in the hydrosphere and along the exposure pathways.	Simplification (new paragraph, split from the previous one).		6.6. The programme of hydrogeological investigations shall include investigations of the migration and retention characteristics of radionuclides in groundwater and associated exposure pathways.		

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36.	~~6.6~~ 6.7	~~A programme of hydrogeological investigations shall be carried out prior to submission of the site evaluation report and~~ The hydrogeological results shall be used ~~in the analyses to assess radionuclide movement in hydrogeological units. This programme shall include investigations of~~ to determine the migration and retention characteristics of radionuclides in groundwater and ~~their~~ the exposure pathways.	Redundant with 6.5 Should be renumbered as 6.7		6.7. The hydrogeological and hydrological investigations shall determine to the extent necessary the dilution and dispersion characteristics of water bodies, the re-concentration ability of sediments and biota, migration and retention characteristics of radionuclides and the determination of transfer mechanisms of radionuclides in the hydrosphere and along exposure pathways.		
37.	~~6.7~~	~~A description of the groundwater hydrology of the region shall be developed, including descriptions of~~	Should be moved to 6.1			x	6.1 is under heading: Atmospheric

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		~~the main characteristics of the water-bearing formations, their interaction with surface water and data on the uses of groundwater in the region.~~					dispersion of radioactive material