Canada's Comments on draft safety standard:
DS484 - Safety Requirements: Site Evaluation for Nuclear Installations

COMMENTS BY REVIEWER Reviewer: D. Miller Country/Organization: Canada / Canadian Nuclear Safety Commission Date: May 8, 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.3	The criteria described above are to be applied ~~for~~: i. to identify the natural and human induced events external to the installation that are important to safety; ii. to assess 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.	Fix the grammar See proposed changes	O.K.			
2	1.3	Change from: Defining the extent of information on a site to be used in the site evaluation process; To Defining the ~~extent of~~ information ~~on a site~~ to be used in the site evaluation process;	Editorial to make the statement clearer	O.K.			
3	2.4a	One element is related to adequate site selection and incorporation of good design and engineering features that take site characterization information into account, thereby providing safety margins, diversity and redundancy.	The sentence as written contains two different ideas. Adequate site selection is quite different from "incorporation of good design and engineering features providing safety margins, diversity and			x	Your proposed text looks very good but the text it is a citation form SF1.

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			redundancy. Therefore, added highlighted text to clarify the importance of having high quality site characterization data as inputs into the design of SSCs, so that defence-in-depth of the facility provides a high level of safety.				
4	2.4b	Change the text to: To address principle 9, the site evaluation process of a nuclear installation shall identify the reasonably foreseeable external hazards, including those of very low probability. In addition, in order to assess the feasibility of emergency planning measures in the region, the site evaluation process shall identify the site characteristics ~~of the site~~ that can affect the interactions between the nuclear installation, the environment and the population.	Text needs editing – see suggested edit.	O.K.			
5	4.1, 4.2	It would be useful to make reference to the Vienna declaration here, that emergency measures need to be limited in times and area.	Proposed additional sub-requirement			x	Not appropriate in site safety requirements (site evaluation provides just input for

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							demonstration of the site safety objectives).
6	4.7	Change The level of detail needed in an evaluation to meet the requirements established in this publication will be commensurate with the risk associated with the facilities and its site and vary according to the type of installation located at the site. To 4.7. The level of detail needed in an evaluation to meet the requirements established in this publication should be commensurate with the risk associated with the facilities and its site and vary according to the type of installation located at the site.	See proposed edit, changing "will" to "should"		In the Requirements publication "Should" is not appropriate. I changed will to "shall"		
7	4.8	Change To screen out an installation from performing a formal site evaluation process, a formal screening process shall be applied for determining the need for the scope and depth of the site evaluation process necessary to support the installation's safety case, which conservatively considers the potential radiological consequences of a release. Provided no unacceptable radiological consequences would be likely for	The overall intent of clause 4.8 is not clear. It seems to be addressing two or three different concepts. The proposed changes might be addressing the intent of clause 4.8.		We cannot use "Should" The paragraph was changed considering suggestions of another reviewer also.		

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		workers or for the public or for the environment, and provided that no other specific requirements are imposed by the regulatory body for such an installation, the installation shall be screened out from following a formal site evaluation process. to To screen out an installation from performing a formal site evaluation process, supported by clear screening criteria, should be in place. The scope and depth of the site evaluation process necessary to support the installation's safety case shall be determined. A site should be screened out from following a formal site evaluation process if unacceptable radiological consequences would be likely for workers or for the public or for the environment.					
8	4.9	Change: "the following shall be considered as applicable:" to "the following shall be addressed:"	"Shall consider" is not very useful and its use needs to be avoided. One could say "yes, I considered the item, but chose not to do anything regarding the list of items in clause 4.9"		O.K. The paragraph was changed considering suggestions of another reviewer also.		

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		OR "the following should be addressed" Pick "shall" or "should"	Make the statement more definitive				
9	4.10	Change: "the following aspects shall be considered as applicable:" to "the following aspects shall be addressed:" OR "the following aspects should be addressed" Pick "shall" or "should"	Make the statement more definitive "Shall consider" is not very useful and its use needs to be avoided	O.K.			
10	4.12	Re-phrase The design of the installation shall compensate for any unacceptable potential effects of the nuclear installation on the region, or otherwise the site shall be deemed unsuitable. As The design of the installation shall compensate for any potentially unacceptable effects of the nuclear	Editing for clarity		O.K. The paragraph was deleted (redundant with 4.11) considering suggestions of another reviewer also.		

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		installation on the region, or otherwise the site shall be deemed unsuitable.					
11	4.15	Regarding: For nuclear power plants, the total nuclear capacity to be installed at the site shall be determined as precisely as possible at the first stages of the siting process. Change to: For nuclear power plants, the total nuclear capacity to be installed at the site shall be determined ~~as precisely as possible~~ at the first stages of the siting process.	The nuclear capacity does not have to be determined precisely. It should be possible to use a bounding approach in site evaluation, in order to provide a limit on the nuclear capacity and inventory on the site. The bounding values should be appropriately conservative. It is agreed that if the nuclear capacity and inventory or its impact have been increased, the impact on the site, and suitability of the site will have to be re-evaluated.	O.K.			
12	4.16	Change: "the following shall also be considered as applicable:" to "the following shall also be addressed:" OR "the following should also be addressed" Pick "shall" or "should"	Make the statement more definitive "Shall consider" is not very useful and its use needs to be avoided	O.K.			

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13	Requirement 5, and clauses 4/.17 through 4.20	Refer to section 6 in *Site Evaluation for New Nuclear Power Plants* (RD-346) http://nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/rd346/ and section 18 in Draft REGDOC-1.1.1, *Licence to Prepare Site and Site Evaluation for New Reactor Facilities* http://nuclearsafety.gc.ca/eng/acts-and-regulations/consultation/comment/regdoc1-1-1.cfm for further requirements and guidance on baseline characteristics	Requirement 5 on and clauses 4.17 through 4.20 provide very basic statements on site characteristics. The document should provide more requirements and guidance on site characterization. It is important to have knowledge of the baseline characteristics so that the predictions of the impacts from normal operation can be confirmed. It is also to important to have baseline information to assess the impact of an accident or malfunction should one occur.			x	These are general requirements for site evaluation. The document has different structure as compare with RD346 but cover all needed site evaluation aspects. Base line is covered requirement 28 and para 7.3. The IAEA Safety Requirements do not provide guidance.
14	4.23	Change: Screened out events on the basis of enveloping by other events shall ensure that all effects (e.g., load cases) are bounded. To With respect to screening out events, it shall be ensured that all effects (e.g., loaded cases) resulting from these events are bounded. Events may be screened out through enveloping within	Proposed edits to clarify text. The key requirement is that all effects, including those related to screened out events, are represented by bounding effects.	O.K.			

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		a set of events.					
15	4.28	Change: Hazard assessments shall consider the possibility that external events …. to Hazard assessments shall address the possibility that external events ….	Make the statement more definitive "Shall consider" is not very useful and its use needs to be avoided. Combinations of events, and simultaneous events shall be addressed, just not considered.	O.K.			
16	Requirement 19	Typo in: "The potential for the occurrence of rear meteorological hazards such as lightning, tornados and cyclones, including information on their severity and frequency shall be evaluated for the site." Change "rear" to "rare"	typo	O.K.			
17	5.33	Add text such as: Slope instability shall take into account meteorological conditions and events, such as flooding.	Slope instability should take into account the impact of meteorological events	O.K.			
18	5.42	Change Other natural external hazards like wild-fires, drought, hail, sub-surface freezing of subcooled water (frazil), blockage or diversion of a river shall be considered. If the potential of	Editing for clarity. The factors listed in this clause need to be addressed, just not considered. Then, if these hazards may be challenging, address them	O.K.			

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		challenging the safety of nuclear installation is confirmed, the hazard shall be assessed and design bases for these events shall be derived. To The design basis for other natural external hazards like wild-fires, drought, hail, sub-surface freezing of subcooled water (frazil), blockage or diversion of a river shall be derived if these events have the potential to challenge the safety of nuclear installation.	in the design basis.				
19	5.43	Change The human induced events to be considered shall include, but shall not be necessarily limited to, the hazards due to collisions from land, sea or air transport, fire, explosions from stationary sources or land or sea transport or pipelines, release of hazardous gases to the site and electromagnetic interference Ref. [9]. To Human induced events to be addressed include, but shall not be limited to, the hazards due to collisions from land, sea or air transport, fire, explosions from stationary sources or land or sea	Editing to provide clarity		O.K. but modified considering suggestions of other reviewer.		

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		transport or pipelines, release of hazardous gases to the site and electromagnetic interference Ref. [9].					
20	5.45	Change The relevant information shall be obtained and evaluated on the stationary and mobile sources of hazard up to a conservatively established distance within which the source can have the possibility of adversely affecting the safety of the nuclear installation including as forecasted over the lifetime of the installation. To The relevant information on stationary and mobile sources of hazards shall be obtained and evaluated. The evaluation shall be performed up to a conservatively established distance for which the source may have a possibility of adversely affecting the safety of the nuclear installation. The evaluation is to be performed over the forecasted lifetime of the installation.	Edited for clarity		Deleted – following suggestions of other reviewers.		
21	5.48	Change “shall be considered” in the clause to “shall be addressed”	The activities listed do have to be addressed, just not considered.	O.K.			
22	5.51	Change “considered” to “addressed” in the clause The potential effects of electromagnetic	EMI has to be addressed, just not considered.	O.K.			

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		interference shall also be evaluated and considered in the design and/or safety assessment. To The potential effects of electromagnetic interference shall also be evaluated and addressed in the design and/or safety assessment.					

DS484 Site Evaluation for Nuclear Installations

COMMENTS BY REVIEWER Reviewer: Dr. Dana Havlín Nováková Country/Organization: Czech Republic/SÚJB			Page. 1 of 3 Date: 2. 5. 2017	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Page 2/ 1.8 Page 8/ Req. 5	1.8. The "site area" is the geographical area that contains an authorized facility, authorized activity or source, and within which the management of the authorized facility or authorized activity or first responders may directly initiate emergency response, as defined in GSR Part 7 Ref. [12]. This is typically the area within the security perimeter fence or other designated property marker. The term "site" is …..?	The document **Preparedness and Response for a Nuclear or Radiological Emergency General Safety Requirements No. GSR Part 7, 2015** defines: "site area" (not only "site") as a "*geographical area that contains an authorized facility, authorized activity or source, and within which the management of the authorized facility or authorized activity or first responders may directly initiate emergency response actions*". In IAEA SSG-9: "*site area includes the entire area covered by the nuclear power plant, which is typically one square kilometre".* The meanings of terms, such as „site", „site area", „region" etc. in DS484 are not quite obvious. These terms are also not aligned with other IAEA documents, such as SSG-9, where the ranges of evaluated areas for each characteristic (e. g. seismic hazard assessment, surface faulting etc.) are	O.K.			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			follows: regional (*region – 300 km*), near regional (*typically not less than 25 km in radius*), site vicinity (*typically not less than 5 km in radius*) and site area (*1 km^2*). Clarify throughout the document where the names "site, region, site area" is generally meant as a place for a siting a nuclear installation or mean exact terms defined in SSG-9 (1 km^2, 5 km, 25 km or more). For example on page 8: "The site and regional area shall be investigated with regard to the characteristics that can impact nuclear safety. 4.19. The size of the region to be investigated, also called geographic area of interest…" *(region is radius 300 km, IAEA SSG-9)*				

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2	Page 6/ 4.4.	4.4. The scope of the investigation for the site of a nuclear installation covers the entire process of the site evaluation. The requirements established in this publication do not apply to the site survey stage, for which a different series of criteria may be used (IAEA SSG-35).	Add a link to the document related to these other criteria.				
3	Page 7/ 4.9 i)	i) The characteristics of the site that are relevant to the consequences of the dispersion of radioactive material to the atmosphere and the hydrosphere (e.g. geographical, morphological features and local climate features, proximity of watercourses and groundwater aquifers ~~size, demography of the region~~ see Req. 25, page 20).	There are not clear examples: "the size of what" is meant as an example of consequences of the dispersion of radioactive material to the atmosphere and the hydrosphere? The main characteristics of the site that affect the dispersion of radionuclides in the air are geographic location, morphological characteristics and local climatic conditions; in water - proximity to watercourses and active groundwater circulation (and the existence aquifers of groundwater), which is correctly stated in Req. 25 on page 20).			x	4.9 I talks about characteristics of the site relevant for the radiological consequences not about those affecting the dispersion (dispersion model).
4	Page 10/ Req. 9	4.33.Occurrences of extreme external natural and human induced hazards and their credible combinations, which, are able to challenge the safety of multiunit or collocated sites and to generate	Experience has shown that the construction of new units at existing nuclear installation site is considered as "a completion or an extension of nuclear			x	The suggested additions are not clear. This talk about hazards induced due to human activities –

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		disruptions of infrastructure affecting communications, transportation and utilities, shall be considered. In particular the potential impact on the safety of the existing nuclear installation by the construction of another nuclear facility should be assessed, such as technical seismicity, changes in base conditions etc.	installation". But it is a new building in another time and nuclear installation of other generation has a completely different design and parameters like depth of foundation etc.				construction of another NPP has no impact on seismicity for the existing one.
5	Page 17, 18/ Req. 21-23	Assessing of the impact of aggressive groundwater on the design and construction of nuclear facilities, including a proposal for protective measures.	Not found in document			x	It is addressed by Requirement 22 – Para 5.35. More details are in Safety Guide for Geotechnical investigations needed for foundations design.
6	Page 21/ Req. 20	6.14. The investigation shall cover land and water bodies that are used by the population or serves as habitat for organisms in the food chain. Resources of surface and ground waters will also assess, including supply of drinking water, at least within 20 km of the nuclear facility (or depends of local conditions).	The direct usage of water and water management system is not included in any requirements.		6.14. The investigation shall cover land and resources of surface and ground waters that are used by the population or that serve as habitat for organisms in the food chain.		IAEA generally is not using specific values in safety requirements e.g. 20 km (in other countries could be 30 km).

DS484
SITE EVALUATION FOR NUCLEAR INSTALLATIONS

COMMENTS BY REVIEWER Reviewer: T. Homma Page.1.. of..1.. Country/Organization: JAPAN/Nuclear Regulation Authority Date:12.05.2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	2.4.b	Change from “emergency action” to “emergency response actions”	To conform to the other wording in this document.	O.K.			
2	4.10.(c) Req.13: 4.41. 4.44.	Change from “external zone” to “region”	It is better to use “region” rather than it because “external zone” isn’t defined in GSR Part7.	O.K.			

TITLE: DS484 Site Evaluation for Nuclear Installations (6 April 2017)

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	General		The concept of "site safety objective", not established in NS-R-3, should be discussed			x	Site Safety Objectives are defined in Requirement 2.
2.	General	Remove all references to Safety Guides SSG 9, SSG 18, SSG 21	A Safety Requirement publication should not refer to Safety Guides as it is a top down approach	O.K.			
3.	General	Avoid repetitions in the requirements specific to a hazard by setting the expectation once in a section covering all hazards	Adequacy of modelling, taking into account historical data or uncertainties … is repeated in many requirements. Requirements should be simplified to avoid unnecessary repetitions.	O.K.			
4.	General	Revisit the draft to ensure the level of detail in requirements is appropriate, i.e. states the expectations but not the detailed means to implement or details matter to consider.	Several requirements are too detailed and would better fit in a Safety Guides (some actually do !)	O.K.			
5.	General	Revisit the draft to ensure the requirements are aimed at hazard identification and characterization, including with the definition of parameters relevant for the design of a nuclear installation, but not the design itself	The scope of the document is ambiguous. It seems to address both assessment of the hazards (independent from the facility to be built at the site) and the safety of the installation (which account for both the hazards and the design/operation of the installation)	O.K.			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
6.	1.3 (b)	(b) Evaluating a site to ensure that the site related hazardous phenomena and characteristics are adequately taken into account, so that the site related hazards are properly assessed and that the corresponding design bases are <u>appropriately</u> defined ~~according to the established performance criteria~~;	Term "performance criteria" is not clear in the context	O.K.			
7.	1.3	(c) Analysing the characteristics of the population and the area surrounding the site with the aim to determine if there ~~are insurmountable~~ <u>would be significant</u> difficulties for ~~planning to implement~~ emergency response actions ~~effectively~~.	Excessive. The objective should be more ambitious than just identification of "insurmountable difficulties"	O.K.			
8.	1.3	<u>(d) Analysing the characteristics of the population and the environment surrounding the site with the aim to develop the environmental impact assessment.</u>	Effluent discharges should also be considered. See 4.10			x	Development of the EIA is not in the scope of SSR-1.
9.	1.6	Nuclear vessels propelled by nuclear reactors (e.g. submarines, ice breakers, etc.), and equipment for military use are excluded from the scope of this Safety Requirements document. <u>This publication does not specifically address underground installations.</u>	This information was in the previous version and allows at clarifying the scope.	O.K.			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
10.	1.7	This Safety Requirements document covers site evaluation for both new and existing nuclear installations. Requirements for hazard evaluation are applicable to both categories. ~~For the purpose of this Safety Requirements document, existing nuclear installations are those installations that are either (a) at the operational stage (including long term operation and extended temporary shutdown periods) or (b) at a pre-operational stage for which the construction of structures, manufacturing, installation and/or assembly of components and systems, and commissioning activities are significantly advanced or fully completed Ref. [2].~~	The two mention types of existing installations seem confusing: both types are clearly covered by sentences above, and the reader will not understand why they should be defined. The requirements set expectations for both initial and periodic site evaluation…	O.K.			
11.	1.8	The site is the geographical area that contains an authorized facility, authorized activity or source, and within which the management <u>or staff</u> of the authorized facility or authorized activity ~~or first responders~~ may directly initiate emergency response, as defined in GSR Part 7 Ref. [12].				x	The definition is according to the one form GS-R-part 7.
12.	1.9	The external human induced events considered in this Safety Requirements document are of accidental origin. Considerations relating to the physical protection of the installation against wilful actions by third parties are outside its scope <u>although they may bear significant safety implications for site evaluation</u>.	Clarification.	O.K.			
13.	3.3	Delete 3.3	Redundant with suggested modified 3.4 (see next comment)	O.K.			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
14.	3.4	Site evaluation process shall include proper quality assurance arrangements covering those activities that can influence nuclear safety or the derivation of parameters for the design basis for the site. The quality assurance arrangements shall <u>be consistent with regulatory requirements and shall</u> ~~can~~ be graded in accordance with the importance to safety of the individual siting and site evaluation activity under consideration.	To accommodate deletion of 3.3	O.K.			
15.	3.5	Delete 3.5	Obvious. Covered by GSR Part 2 and associated guidance.			x	The general GSR Part 2 requirement is re-iterated for site evaluation activities. This is an important issue for embarking countries.
16.	3.7	Delete 3.7	Redundant with 3.6 for the need to have record. As for retention time, covered by GSR part 2 and associated guidance.	O.K.			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
17.	Rqt 2	Requirement 2: Site safety objectives in site evaluation for nuclear installations The main safety objective in site evaluation for nuclear installations in terms of nuclear safety shall be to provide adequate input to characterize the natural and man-made hazards that may challenge the safety of the nuclear installation ~~for demonstration of protection of the public and the environment from radiological consequences of radioactive releases due to accidents~~ or influence the exposure of the public and the environment in normal operation, anticipated operational occurrences or accident conditions. ~~Radioactive releases due to normal operation (i.e. discharges) shall also be considered.~~	The safety of the installation relies primarily on barriers and safety systems. They should be designed and constructed with due regard to site hazards.			X	Site evaluation provides input to the design process where mainly the DiD is developed. If the input for design protection against external hazards is not adequate that the DiD will be inadequate. Moreover site parameters influence/affect the implementation of the emergency actions. So the safety objective is to provide input for demonstration of protection of the public and the environment.

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18.	4.1	Delete 4.1.	Unclear. Furthermore, definition of "detailed acceptance criteria" is not the current practice in the domain for several MS. The lifetime of the installation is already mentioned in § 2.3. "additional matters as appropriate" is also too vague			x	Acceptance criteria provide the technical basis for demonstration of meeting the applicable requirements. Acceptance criteria are provided by applicable design standards and guides.
19.	4.2	Delete 4.2	Not relevant			x	This paragraph said that allowable radiological dose limits shall be defined at the national level. It is relevant for Embarking countries.
20.	4.3	Delete 4.3	Superfluous. The main message is graded approach and is addressed later on (see 4.5).		Modified considering suggestions of other reviewer/SSC member.		
21.	4.6	Merge 4.5 and 4.6	Same topic	O.K.			

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22.	4.7	Transform 4.7 in a footnote to 4.5	Not a requirement. Explanation only		Modified considering suggestions of other reviewer/SSC member.		
23.	4.12	Delete 4.12	Redundant with 4.11	o.k.			
24.	Rqt 5	Requirement 5: Site and regional characteristics The site and regional area shall be investigated with regard to the characteristics that can impact nuclear safety or exposure of the public and the environment.	Both impact from the environment to the plant and from the plant to the environment should be considered. See 4.18		O.K. Modified considering suggestions of other reviewer/SSC member.		

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25.	Rqt 6	Requirement 6: ~~Screening~~ Identification of the site specific hazards Potential hazards resulting from external natural phenomena and human induced events and activities which can ~~realistically~~ occur in the region of the site shall be identified. Phenomena and events not screened out shall ~~through a screening process~~, evaluated and selected for design basis or re-evaluation purposes according to their significance to the safety of the installation.	Screening is not the goal of this requirement. "Realistically" to be deleted for consistency with 4.22. Screening purpose is to avoid unnecessary evaluation.		O.K. Potential hazards resulting from external 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 design basis or re-evaluation purposes according to their significance to the safety of the installation.		
26.	After 4.21	Add a new requirement: "4.## The methods used to derive hazards characteristics relevant for site evaluation and design of the facility shall be appropriate. A thorough uncertainty analysis of the method and input data shall be performed as part of the evaluation."	Add a requirement on method to perform the evaluation. Also captures current 5.8 but makes its application broader			x	Should not be under Requirement 6. The proposed new requirement is covered by Req. 7.

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
27.	After 4.25	Add a new requirement after 4.25: "4.## The assessment of the impact of the hazard/event on the nuclear installation shall be conducted with appropriate method, using appropriately supporting numerical models as needed. It shall consider adequately the uncertainties."	Incorporates text from 5.13 But makes its application more general.			x	Assessment of the impact of the hazards/events is covered by safety assessment requirements GS-R-4.
28.	Rqt 11	Requirement 11: ~~Special considerations for the~~ Site evaluation for nuclear installations requiring an ultimate heat sink For nuclear installations for which an ultimate heat since is required for safety, The evaluation of site specific external and human induced hazards shall consider hazards that can impact availability and reliability of the ultimate heat sink.	Clarification		O.K. 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.		
29.	Rqt 12	Requirement 12: Potential effects of the nuclear installation on population and environment In site evaluation, to determine the potential radiological impact of the nuclear installation on the region for operational states and accident conditions ~~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.	Superfluous	O.K.			

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
30.	4.44	Delete 4.44	Radiological risk includes consideration both of frequency and consequences… It therefore encompasses the facility engineered safety features…			x	This requirement is mainly related to population density. It is an important criterion for site evaluation.
31.	4.49	Delete 4.49	Duplicate 3.6			x	3.6 refers (under Management System Requirement) to the records to be kept – not to the adequacy of the details of the collected information.
32.	4.50	Delete 4.50	Redundant with previous requirement 4.19			x	I suggest keeping it since talks about relation between the level of details of the investigations correlated with the distance to the site (regional, near region, site vicinity and site area).
33.	4.53	Delete 4.53	Redundant with requirement 10.	O.K.			

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
34.	5.1-5.4	5.1.Fault capability shall be identified and evaluated. The evaluation shall consider the fault characteristics in the site vicinity. The methods to be used and the investigations to be made shall be sufficiently detailed to support safety related decisions. 5.2.The fault displacement hazard 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. 5.3 For the new sites, an alternative site shall be considered when reliable evidence shows the existence of a capable fault and its effects cannot be compensated by design/engineering protective measures. 5.4 In case of a capable fault is identified in the site vicinity of an existing nuclear installation, the site shall be deemed unsuitable if the site safety cannot be demonstrated.)	Comments: - "fault displacement hazard" should be more clearly defined - clearer distinction should be made between the ground motion induced by the fault and surface faulting - § 5.3 and 5.4 propose the same approach for new and existing installations: the site is unsuitable except if safety is demonstrated. The gradation in the requirements is necessary.				Capable faults are those that may produce surface rupture/displacements including permanent ground deformation. Fault capability is explained in the footnote. For new sites there is the option to change the site area away from the capable fault. For existing sites and operating nuclear installations – safety of operation shall be demonstrated. Fault displacement hazard assessment provides input for demonstration of safety of operation. Same requirements are in old version.

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
35.	5.7	Delete 5.7	Redundant with 4.51			x	This requirement has specific relevance for seismic hazard.
36.	5.8	Delete 8.8	Can be deleted if comment to ad a requirement after 4.21 is implemented			x	The new requirement after 4.21 was not accepted since Requirement 6 deals with identification of the hazards.
37.	5.15	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 available documentation for an appropriate period of time Ref. [7].	Storm surges are not meteorological parameters. To stress the need to explore realistic combinations.	O.K.			
38.	5.16	Delete 5.16	Already addressed in previous requirements. Furthermore, the purpose of the model development is not clear, e.g. what mean "to evaluate the quantity of the data", the model should be use to derive extreme value…		Modified as suggested by other reviewer/SSC member.		The requirement is needed since the methods used should be reviewed if it is appropriate or not.
39.	Rqt 19	Requirement 19: Rare meteorological hazards evaluation The potential for the occurrence of ~~rear~~ rare meteorological hazards such as lightning, tornados and cyclones, including information on their severity and frequency shall be evaluated for the site.	Typo	o.k.			

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
40.	5.17	Delete 5.17	No additional expectation compared to Requirement 19 and previous requirements		Modified as suggested by other reviewer.		
41.	5.18 to 5.20	Combine 5.18 to 5.20 in one requirement ~~Tornadoes~~ 5.18.The potential for the occurrence, frequency and severity of tornadoes <u>or cyclones</u> and associated missiles shall be evaluated in the region of interest, together with the hazard posed by these phenomena. ~~5.19.The hazards associated with tornadoes shall be derived and expressed in terms of parameters such as rotational wind speed, translational wind speed, radius of maximum rotational wind speed, pressure differentials and rate of change of pressure.~~ ~~Cyclones~~ ~~5.20. The potential for the occurrence, frequency and severity of cyclones and associated missiles shall be evaluated in the region of interest, together with the hazard posed by these phenomena, on the basis of the available data and the appropriate physical models.~~	Combine 5.17 to 5.20 in one requirement and simplify to avoid redundancy with previous requirements Too many details on parameters for tornadoes (this level of detail is not given for other hazards)	O.K.			
42.	5.21-5.32		The structure of the requirement on flooding could be upgraded based on the structure of SSG 18 which cover also tsunami and failure of water control structures…			x	It covers all type of floods addressed by SSG-18 I suggest to keep the structure as is.

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
43.	5.21	The potential for flooding in the region due to one or more natural causes, (including in combination due to a common cause or due to relatively high frequency of occurrence,) ~~such as runoff resulting from precipitation or snow melt, high tide, storm surge, seiche and wind waves, as well as climate change~~, which can affect the safety of the nuclear installation shall be evaluated ~~Ref. [7]~~.	Incorporation of idea developed in 5.23 No need for examples as already available in Safety Guide. A Safety Requirement should not reference a Safety Guide	O.K.			
44.	5.23	Delete 5.23	Can be incorporated in 5.21	O.K.			
45.	5.24	Delete 5.24	Already covered in previous requirements			x	It has specific relevance for flood. I suggest to keep it.
46.	5.27	Delete 5.27	Too detailed and already covered by previous requirements			x	It has specific relevance for Tsunami. I suggest to keep it.
47.	5.28	~~On the basis of the available prehistorical and historical data for the region and comparison with similar regions that have been well studied with regard to these phenomena, the frequency of occurrence, magnitude and height of regional tsunamis or seiches shall be estimated and shall be used in determining the~~ hazards associated with tsunamis or seiches, shall take into ~~with~~ account ~~taken of~~ any amplification due to the coastal configuration at the site, such as nearshore bathymetry and coastal topography.	Already covered by previous requirements.	O.K.			
48.	5.29	Delete 5.29	Already covered by previous requirements	O.K.			

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
49.	5.30 5.31	5.30. The upstream water control structures shall be analysed ~~for screening purposes~~ to determine potential hazard to the nuclear installation resulting from the failure of one or more of the upstream structures, including in combination with flooding from other causes, and characterize such hazard. ~~Water control structures can be screened out from further analysis if it can be demonstrated that the nuclear installation can safely withstand the effects of the massive failure of the upstream structures.~~ ~~5.31.If a preliminary examination of the nuclear installation indicates that it cannot be 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; otherwise such upstream structures shall be upgraded to withstand the hazards associated with the nuclear installation~~.	Simplification The proposed approach is difficult to understand and seems inappropriate.	O.K.	Modified as suggested by other reviver.		
50.	5.36	Delete 5.36	Too detailed	O.K.			
51.	5.38	Delete 5.38	Already covered by previous requirements			x	It has specific relevance for soil liquefaction.
52.	Rqt 22	Requirement 22: Geotechnical characteristics of subsurface materials The geotechnical characteristics of the subsurface materials shall be investigated and a soil/rock profile for the site shall be determined.	To be consistent with 5.39	O.K.			
53.	5.39	Delete 5.39	Redundant with Rqt 22 as modified.	O.K.			

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
54.	Rqt 23	Requirement 23: Evaluation of other natural hazards In addition to natural hazard ~~requirements~~ listed above, other natural phenomena that are specific to the region and have the potential to affect the safety of the nuclear installations shall be investigated.	Clarification	O.K.			
55.	5.42	Other natural external hazards relevant to the site, ~~like~~ such as wild-fires, drought, hail, sub-surface freezing of subcooled water (frazil)~~, blockage or diversion of a river~~ shall be identified ~~considered. If the potential of challenging the safety of nuclear installation is confirmed, the hazard shall be~~ and assessed ~~and~~ so that design bases for these events ~~shall~~ can be derived.	Clarification and simplification Blockage or diversion of river is addressed by flooding or drought…	O.K.			
56.	5.43	The human induced events to be considered shall include, but shall not be necessarily limited to: - the hazards due to ~~collisions from~~ nearby land, sea or air transport (collision, explosion…), - fire, explosions, missile generation, release of hazardous gases from stationary sources such as nearby industries ~~or land or sea transport~~ or pipelines, ~~release of hazardous gases~~ to the site and - electromagnetic interference ~~Ref. [9].~~	Using a bullet list would be better Fire and explosion from transport are already dealt with in the first bullet Missiles have been added to account for 5.50. A Safety Requirement should not reference a Safety Guide	O.K.			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
57.	5.44	~~Industrial activities and events in the region around the installation shall be investigated, including resource extraction activities, manufacturing, waste disposal, land reclamation and~~ Human activities which may influence the type or severity of natural hazards, such as resource extraction or other significant re-contouring of land or water, shall be considered.	Simplification, generalization of idea and avoidance of redundancy with 5.44	O.K.			
58.	5.45	Delete 5.45	Already covered by previous requirement (4.19)	O.K.			
59.	5.47	Delete 5.47	Topic related to the design of the facility, not the site evaluation	O.K.			
60.	5.48	Delete 5.48	Redundant with 5.43			x	It has specific relevance for chemical hazards and is adding “foreseeable”.
61.	5.49	Delete 5.49	Too detailed for a requirement			x	The requirement basically says that hazards should be expressed function of parameters that can be used in the design or safety assessment.
62.	5.50	Delete 5.50	Redundant with 5.43			x	It has specific relevance for multi-units or co-located sites and covers impact of radiological releases.

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
63.	5.51	Delete 5.51	Redundant with 5.43	O.K.			
64.	6.3	Delete 6.3	Redundant with Rqt 25	O.K.			
65.	6.4	Delete 6.4	Combine 6.4 and 6.6				
66.	6.5	A description of the groundwater and surface hydrological characteristics of the region (including interaction ~~with~~ between surface water and groundwater) shall be developed, including descriptions of the main characteristics of 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.	Simplification and widening the scope of information required. Enable to have one section on surface water and another on ground water	O.K.			

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
67.	6.6	~~6.4.A programme 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 radionuclide movement in the affected hydrological units.~~ 6.6. A programme of measurement shall be carried out to gather data relevant for the assessment of radionuclide movement in the affected hydrological units A programme of investigation and measurements of the surface hydrology 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 reconcentration 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.	Combination of 6.4 and 6.6 Combination with ground water requirements	O.K.			
68.	6.7	Delete 6.7	Redundant with Rqt 25	O.K.			
69.	6.8 6.9 6.10	Delete 6.8 to 6.10	Requirements on surface water and ground water can be grouped together.	O.K.			
70.	Rqt 26	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 an evaluation of the potential impact of radioactive releases, either due to normal operation or under accident, on the population shall be performed.	Knowing the population distribution is to allow calculation of doses and planning for emergencies.	O.K.			

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
71.	6.11	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. ~~The radius within which information is needed shall be chosen on the basis of potential consequences, with account taken of special situations.~~ Special attention shall be paid ~~to the population living in the immediate vicinity of the installation, densely populated areas and population centres in the region,~~ sensitive populations, and institutions such as schools, hospitals and prisons <u>when considering the ability to implement protective measures</u>.	Simplification Already addressed in 4.19	O.K.			
72.	6.12	Delete 6.12	Too detailed			x	The requirement is relevant for embarking countries.
73.	6.13	Delete 6.13	Too detailed			x	The requirement is relevant for embarking countries.
74.	6.14	The investigation shall cover land and water bodies that ~~are~~ <u>may be</u> used by the population or <u>could</u> serve~~s~~ as habitat for organisms in the food chain.	Text from the previous version was more appropriate (larger scope)	O.K.			
75.	7.2	Delete 7.2	Redundant with Rqt 28 and 6.11	O.K.			
76.	7.4	Delete 7.4	The purpose of such baseline data is unclear.	O.K.			

COMMENTS BY REVIEWER Country/Organization: FRANCE / ASN -IRSN Date: May 2017 Pages				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
77.	7.7 7.8	7.7. The implications of such a reassessment of site specific hazards or of data relevant for the radiological impact assessment for the safe operation of the nuclear installation shall be evaluated ~~periodically including the comparison with the original design basis and the need to establish new re-evaluation basis.~~ ~~7.8.Site conditions and characteristics that are relevant to the radiological impact on the environment produced by the installation operation shall be also periodically reassessed as part of periodic safety reviews of the nuclear installation, in a systematic and comprehensive manner and using new data and information as well as the operating experience and the respective results of the monitoring programme implemented until the reassessment date.~~	To avoid duplication with Redundant with Rqt 29 and 7.6	O.K.			
/							

DRAFT GUIDE DS484 "Site Evaluation for Nuclear Installations" – STEP 7

ENISS Comments

COMMENTS BY REVIEWER Reviewer: ENISS Country/Organization: ENISS			Page: 2 Date: 16/05/2017	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	§ 1.10	Please insert Figure 1 of SSG-35, which gives a clear description of the different stages of siting process and site evaluation process	§ 1.10 is confusing. It refers to several "stages" of the siting process and the site evaluation process, whereas these processes are not presented in the document.			x	The reference is made to SSG-35 and stages are explained.
2	4.25	Adequate account shall be taken of uncertainties for each hazard in the design basis hazard level overall evaluation of the site and its associated safety demonstration.	Some hazards inherently have high uncertainties and there are a range of different hazard methodologies that can be applied which may be equally valid and may indicate varying degrees of uncertainty. It would be unreasonable to expect a site evaluation to be bounding of all uncertainties from all assessments performed for a particular hazard at a particular site. The word "adequate" has therefore been included to make it clear that a judgment has to be applied as to how much uncertainty to account for. This makes the text consistent with other statements concerning	O.K.			

COMMENTS BY REVIEWER Reviewer: ENISS Country/Organization: ENISS			Page: 2 Date: 16/05/2017	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			uncertainty made elsewhere in the document.				
3	§ 4.32	"If either as a result of the evaluation performed according to Requirement 7 ~~para 4.23~~ during the early site evaluation stage or later […]"	Editorial	O.K.			
4	§ 4.32	"Also the site protection measures shall be classified ~~categorized,~~ designed, built, maintained and operated as important to safety ~~related~~ structures, systems and components."	SSC are safety classified, not categorized (see SSG-30). "Important to safety" is the correct terminology (see IAEA glossary)	O.K.			
5	Requirement 19	The potential for the occurrence of rare ~~rear~~ meteorological hazards […]	Typo	O.K.			

DS484 Site Evaluation for Nuclear Installations, Specific Safety Requirements, STEP_7_5_2017, Draft 6th_April 2017

COMMENTS BY REVIEWER Reviewer: M-L. Järvinen, Page.... of.... Country/Organization: STUK Date: 16th May 2017				RESOLUTION			
Comment No.	Paragraf			Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.1	… Fundamental Safety Principles (Ref. [1]) …	Missing brackets. The same absence elsewhere in many requirements. In some requirements … **see** Ref. [x]. The references should be given in a consistent way.	O.K.			
2.	1.3	… design <u>envelope of the installation</u> …	Clarity		…site specific design parameters		
3.	1.3	… The <u>requirements and</u> criteria described above are to be applied **to**: i. <u>Identification of</u> the natural … ii. <u>The</u> site (?) and … … accident**s** ~~conditions~~ …	Clarity. To enhance expression for the objective of the publication. The objective of the publication should be expressed rigorous way		Resolved by modifications suggested by other reviewer / SSC member		
4.	1.5 -1.6	Clarify if the requirements should be applied to floating nuclear power plants which are not necessarily propelled by nuclear reactors.					Para. 1.5 states clearly that Nuclear Installations are defined in Safety Glossary.
5.	1.10	Please clarify The description of the site selection and site evaluation processes should be clarified. The overlapping of the processes should be explained. The site selection process seems to end with the selection of several preferred candidate sites. At which stage do site field investigations begin? Where is the selection of the actual site in the	Carity				Details are given in SSG-35 – Ref [4] which says that limited site evaluation starts in Stage 2 (reason is to level the amount of information across the sites for proper ranking). And detailed site

COMMENTS BY REVIEWER Reviewer: M-L. Järvinen, Page.... of.... Country/Organization: STUK Date: 16th May 2017				RESOLUTION			
Comment No.	Paragraf			Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		processes?					evaluation is done in subsequent stages for the selected site.
6.	1.11	non-radioactive aspects should be non-radiological aspects	Clarity	O.K.			
7.	1.11	An environmental impact assessment shall use ~~of~~ the collected site evaluation database, to the extent available, in order to avoid inconsistencies in the analysis and reporting.	In some countries EIA is done at an early stage of the siting process when the site evaluation database is limited and preliminary information has to be used.	O.K.			
8.	2.4.	This Safety Requirements publication establishes requirements that apply for implementation of the safety principles 8 and 9 as most relevant to be considered in site evaluation for nuclear installations (see Ref [1]). In this regard: a. The principle 8 says that the primary means of preventing and mitigating the consequences of accidents is 'defence in depth'. Defence in depth is implemented primarily through the combination of a number of consecutive and independent levels of protection that would have to fail before harmful effects could be caused to people or to the environment. One element is related to adequate site selection and incorporation of ~~good~~ design and engineering features providing safety margins, diversity and redundancy. …	delete: good, Clarity, the adjective is not needed.			x	It is a citation from Safety Fundamental Principal 8 Principle Paragraph 3.32.

COMMENTS BY REVIEWER Reviewer: M-L. Järvinen, Page.... of.... Country/Organization: STUK Date: 16th May 2017				RESOLUTION			
Comment No.	Paragraf			Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
9.	Requirement. 1	**Requirement 1: Application of the management system for site evaluation** **Site evaluation shall be conducted <u>in a comprehensive, systematic, planned and documented manner</u> <u>and included in the</u> management system.**	O.K.				
10.	Requirement 2	**Requirement 2: Site safety objectives in site evaluation for nuclear installations** **The main safety objective in site evaluation for nuclear installations in terms of nuclear safety shall be to provide ~~adequate~~ input for demonstration of protection of the public and the environment from radiological consequences of radioactive releases due to accidents. Radioactive releases due to normal operation (i.e. discharges) shall also be considered.**	Clarity … Delete adequate, it raises the question what is adequate?			x	Adequate input is the one which fully complies with the Site Evaluation Safety Requirements. Other type of input is not adequate.
11.	Requirement 3	**Requirement 3: Scope of the site evaluation for nuclear installations** **The scope shall consider site related factors and site–installation interaction factors relating to operational states and accidents<u>s</u> ~~conditions~~, including those that could warrant emergency response actions and external natural and human induced events that are important to safety.**	Delete conditions, accidents The assessment of accident more severe than the design envelope should be included as stated at the later part of the sentence.			x	"Accident conditions" is more general; it includes also severe accidents (…**including those that could warrant emergency response actions…).**

COMMENTS BY REVIEWER Reviewer: M-L. Järvinen, Page.... of.... Country/Organization: STUK Date: 16th May 2017				RESOLUTION			
Comment No.	Paragraf			Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
12.	4.35.	Taking due account of the uncertainties in the projections of climatic variability and change, appropriate safety margins shall be included in the related design ~~basis~~ envelope of the nuclear installation.	Observe! terminology The design envelope covers all the conditions DBA and DEC.	O.K.			
13.	Requirement 12	**Potential effects of the nuclear installation on population and environment** **In site evaluation, to determine the potential radiological impact of the nuclear installation on the region for operational states and accidents ~~conditions~~ 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.**	Replace accident conditions with accidents **and accidents ~~conditions~~**			x	"Accident conditions" is more general; it includes also severe accidents (…**including those that could warrant emergency response actions…).**
14.	4.47	.. c) Characteristics of the proposed engineering and administrative protective site features and mitigation measures; d) Characteristics of potential impact of the installations on population and environment as a result of both normal operations as well as accidents ~~conditions~~; ~~..~~	Replace accident conditions with accidents			x	"Accident conditions" is more general; it includes also severe accidents (…**including those that could warrant emergency response actions…).**
15.	3.5	Please clarify	Clarity		3.5. For each activity of the site		The basic idea is to ensure compliance

COMMENTS BY REVIEWER Reviewer: M-L. Järvinen, Page.... of.... Country/Organization: STUK Date: 16th May 2017				RESOLUTION			
Comment No.	Paragraf			Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		For each activity of the site evaluation process, including inspection, testing, verification and validation, the acceptance criteria and the responsibilities for carrying out these activities shall be specified and performed by designated individuals or groups other than those who originally performed the work.	The basic idea of the paragraph is not clear. There are several different topic included in the paragraph 3.5 such as verification and validation process, acceptance criteria and independent assessment.		evaluation process, including inspection, testing, verification and/or validation, the acceptance criteria and the responsibilities for carrying out these activities shall be specified.		with GS-R-Part 2 Para 4.31. Management System requires that verification (validation if needed e.g. use in-house computer codes), acceptance criteria and responsibilities shall be clear defined.
16.	4.1	Please clarify … shall contain detailed acceptance criteria … Acceptance criteria of what? When should they be defined?	Clarity				Acceptance criteria provide the technical basis for demonstration that the applicable requirements are met.
17.	4.4	Please clarify … investigation for the site … This is very unclear sentence.	Clarity				Site evaluation includes intensive "site investigations". This terminology is commonly used related to field work and studies concerning: geological, geophysical geotechnical, hydro-geological, etc. investigations.
18.	4.3 – 4.9	Please clarify.	Clarity				The application of the graded approach may

COMMENTS BY REVIEWER Reviewer: M-L. Järvinen, Page.... of.... Country/Organization: STUK Date: 16th May 2017				RESOLUTION			
Comment No.	Paragraf			Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		These requirements deal with use of the graded approach. Are they really needed here or should they be elsewhere (in their own requirement)?					control the scope and details of the site studies and investigations.
19.	4.13	… and be consistent …	Clarity				Suitability conditions are not the same in case of a site hosting low power research reactor or in case of NPP site.
20.	4.23	For events ~~Ss~~screened out ~~events~~ on the basis of enveloping by other events it shall be ensured ~~shall ensure~~ that all effects (e.g., load cases) are bounded.	Clarity		Modified by suggestions of other reviver (SSC member).		
21.	4.27	Probabilistic hazard curves may be used in different applications~~, in terms of accuracy level, probability range, and reference variables, when used, shall be developed with reference to the specific application~~ (e.g. design, margin evaluation, probabilistic safety assessment, hazard monitoring, emergency planning, etc.). The uncertainties of the hazard curves shall be considered.	Usually hazard curves are determined for the site in general, not for specific applications. However, the quality requirements may vary depending on the stage of the siting or site-evaluation process.		4.26. Probabilistic hazard curves, shall be developed with reference to the specific application (e.g. design, margin evaluation, probabilistic safety assessment, hazard monitoring, emergency planning).		
22.	Requirement 8	Please define site protection measure	Clarity What are site protection measures? Definition? Clarify!				E.g. flood protection dams, sea walls, engineered slopes, etc.
23.	4.30	Too long sentence	Clarity		The need for protection of the site against the		

COMMENTS BY REVIEWER Reviewer: M-L. Järvinen, Page.... of.... Country/Organization: STUK Date: 16th May 2017				RESOLUTION			
Comment No.	Paragraf			Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					effects of specific phenomena of external natural and human induced hazards (e.g. flooding, explosions, etc.), shall be evaluated considering adequate safety margins.		
24.	4.36	Please add: Ice, frazil ice, oil and chemical spills When atmosphere is the ultimate heat sink, also snow and high wind, including snowstorms, should be considered.	Ice, frazil ice, oil and chemical spills should be added. When atmosphere is the ultimate heat sink, also snow and high wind, including snowstorms, should be considered.	O.K.			
25.	4.37	The requirement should be rewritten and the meaning clarified.	If the probabilities and consequences of the events cannot be reduced to acceptable levels, establishing the hazards does not help. The site should be rejected or changes should be made in the design. Perhaps the requirement aims at a stepwise process: when the events cannot be screened out, more detailed hazard studies should be carried out and the results should		4.37. Potential natural and human induced events that can cause a loss of function of systems required for the long term heat removal shall be identified and evaluated.		

COMMENTS BY REVIEWER Reviewer: M-L. Järvinen, Page.... of.... Country/Organization: STUK Date: 16th May 2017				RESOLUTION			
Comment No.	Paragraf			Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			be considered in the design.				
26.	4.47	What are engineering and administrative protective site features and mitigation measures? Definition? Clarify	Clarity				Engineering solution could be an earth structure to reflect potential blast wave produced by a transportation accident from a nearby railway. Administrative solution is to limit by admin measures the quantity of explosive material transported on that railway. Or create a no fly zone by diverting the air traffic by administrative measures.
27.	4.47	.. f) Conditions for access to the site and ~~circulation~~ internal traffic at the site in any environmental and installation conditions; …	Clarity What is circulation? Clarify		(f) Conditions for access to the site and circulation at the site		
28.	4.47	What are periodic site re-evaluation conditions? Clarify	Clarity				PSR include site re-evaluation. There are many examples: a) In case of a Seism event

COMMENTS BY REVIEWER Reviewer: M-L. Järvinen, Page.... of.... Country/Organization: STUK Date: 16th May 2017				RESOLUTION			
Comment No.	Paragraf			Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							exceeding the current design basis, b) Human activities that may add new hazards, etc.
29.	5.4.	In case of a capable fault is identified in the site vicinity of an existing nuclear installation, the site shall be ~~deemed~~ stated unsuitable if the site safety cannot be demonstrated.	Too light requirement, Should the site be deemed unsuitable?!			x	Same wording was used in previous version (NS-R-3 Rev 1). Shall be deemed unsuitable – is not light. If the site is deemed unsuitable safety of operation at that site cannot be demonstrated anymore.
30.	5.12	For the new sites, an alternative site shall be ~~considered~~ selected when reliable evidence shows the existence of a capable volcano that has the potential to affect the safety of the nuclear installation that cannot be compensated through design and site protection measures.	Too light requirement Should the site be deemed unsuitable?!			x	Same wording was used in previous version (NS-R-3 Rev 1). Shall be deemed unsuitable – is not light. If the site is deemed unsuitable – safety of operation at that site cannot be demonstrated anymore.
31.	5.16	Please clarify Unclear requirement. E.g. How you can evaluate the length of the historical period with a meteorological model	Unclear requirement		Modified as suggested by other reviver.		The meteorological model/methods should be appropriate considering the length and quality of the recorded data.
32.	Requiremen	Please add the context to the	O.K. for 5.17		Modified as		Tornado and cyclones

COMMENTS BY REVIEWER Reviewer: M-L. Järvinen, Page.... of.... Country/Organization: STUK Date: 16th May 2017				RESOLUTION			
Comment No.	Paragraf			Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	ts 19, 5.17 – 5.20	installation. No requirements with respect to the design of the installation (compare 5.3)			suggested by other reviver.		may impact any nuclear installation.
33.	6.2, 6.6	Please clarify the requirement The site evaluation report? Submittal of it? To whom and when?	Unclear requirement	O.K.	Submission of the site evaluation report was deleted.		

Japan NUSSC Comments on DS484 "Site Evaluation for Nuclear Installations"

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Page of 12 Country/Organization: Japan/NRA Date: 18 May 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	General	Delete all of referred safety guides, SSG-35, SSG-9, SSG-21, SSG-18, NS-G-3.6, NS-G-3.1 and NS-G-3.2.	Safety guide documents should not be referred from safety requirements.	O.K.			
2.	1.3./L10	**The criteria described above are to be applied for:** **i. to identify the natural and human induced events external to the installation that ~~are important to safety~~ could affect the region.;**	Clarification.		i. to identify the natural and human induced events external to the installation that could challenge the safety of the nuclear installation;		
3.	1.10.	Add a footnote to explain composition of the siting processes' instead of describing 'Ref.[3] as follows; The ~~site selection~~ process of 'siting'~~, also called 'siting processes,~~ is divided into two stages (*1) ~~Ref. [3]~~. Footnote (*1) There are two processes relating to the safety considerations for the site of a nuclear installation, e.g. the siting process and the site evaluation process. These two processes are further split into five stages: - Site survey stage; - Site selection stage;	There is some contradiction in terms between this draft and Ref. [3]. This contradiction should be made clear in this upper class document.		The reference was moved to the footnote Also modified by suggestions of other reviewer.		

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Page of 12 Country/Organization: Japan/NRA Date: 18 May 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		- Site characterization stage; - Pre-operational stage; - Operational stage. The siting process covers site survey stage and site selection stage. The site evaluation process covers the last stage of site selection stage and subsequent three stages. This publication covers 'site evaluation process.'					
4.	1.10. /L7	Delete 'site assessment' as follows; The site characterization stage ~~named also 'site assessment'~~ has the objective to confirm the acceptability of the finally selected site ……	To avoid confusion with 'site evaluation', as the term 'site assessment' does not appear in the subsequent text at all.	O.K.	Done! by removing that sentence. Also modified by suggestions of other reviewer.		
5.	Sec.2	Clarify the reason why 'defence in depth' referred from SF-1 is introduced here. There are no descriptions of 'defence in depth' in the other chapters.	Clarification. The most of the description in section 2 are refrained from SF-1 and provide no additional message.				It is citation form Safety Fundamentals Principle 8 where site is mentioned. The site safety objective is related to this principle – by providing adequate input

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							(site specific parameters) for design and safety demonstration.
6.	3.2.	The management system shall ensure the quality and the control of the ~~effectiveness of the execution of the site investigations and assessments, and~~ effective engineering activities performed in the ~~different~~ each stage~~s~~ of the site evaluation for the nuclear installation.	In accordance with para 3.1, management system is established at the earliest time of site evaluation stage and is not established at site investigation (survey) stage.	o.k.			
7.	3.5.	For each activity of the site evaluation process, including inspection, testing, verification and validation, the acceptance criteria and the responsibilities for carrying out these activities shall be specified and activities on verification and validation shall be performed by designated individuals or groups other than those who originally performed the work.	Only the activities on verification and validation would be performed by persons other than those who originally performed the siting evaluation.		Modified as suggested by other reviewer/SSC member.		
8.	**Req. 2**	**Requirement 2: Site ~~safety~~ objectives in site evaluation for nuclear installations** **The main ~~safety~~ objective in site evaluation for nuclear installations in terms of nuclear safety shall be to provide adequate input for demonstration of protection of the public and the environment from radiological consequences of radioactive releases due to accidents. Radioactive releases due to normal operation (i.e. discharges) shall also be considered.**	Clarification.		The main safety objective in site evaluation for nuclear installations shall be to provide adequate input for demonstration of protection of		

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Page of 12 Country/Organization: Japan/NRA Date: 18 May 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					the public and the environment from the radiological consequences of radioactive releases due to accidents. Radioactive releases due to normal operation (i.e. discharges) shall also be considered.		
9.	4.2.	The objectives shall be expressed in terms associated with radiological consequences for individuals, ~~population~~ public and the environment.	The wording "Protection of individuals, public and the environment from radiological consequence" is commonly used in SSs.	O.K.			
10.	**Req. 3**	**Requirement 3: Site evaluation scope** **The scope shall consider site related factors and site–installation interaction factors relating to operational states and accident conditions, including those that could warrant emergency response actions and external natural and human induced events external to the installation that**	Clarification. The same comment #2.		The scope shall consider site related factors and site–installation interaction factors relating to operational states and		

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Page of 12 Country/Organization: Japan/NRA Date: 18 May 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		could affect the region.			accident conditions, 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.		
11.	4.3. & 4.5.	Delete para 4.3	Duplication with para 4.5	O.K.			
12.	4.8.	To screen out an installation from performing a formal site evaluation process, a ~~formal~~ screening ~~process~~ criteria shall be applied for determining the need for the scope and depth of the site evaluation process necessary to support the installation's safety case, which conservatively considers the potential radiological consequences of a release. Provided no unacceptable radiological consequences would be likely for workers or for the public or for the environment, and provided that no other specific	Clarification。 Screening criteria are quite important.		Modified as suggested by other reviewer. "The scope and depth of the site evaluation process necessary to support the installation's		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		requirements are imposed by the regulatory body for such an installation, the installation ~~shall~~ could be screened out from following a formal site evaluation process.	Clarification.		safety case shall be determined. 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"		
13.	4.9.	**For nuclear installations other than nuclear power plants where a graded approach is applied to site safety evaluation, the following shall be considered as applicable:** **a) The amount, type and status of the radioactive inventory at the site (e.g. whether solid or fluid, processed or stored);** ~~**b) The intrinsic hazard associated with the physical processes (e.g. nuclear chain reactions) and chemical processes (e.g. for fuel processing purposes) that take place at the installation.**~~	Clarification. The elements to be applied a graded approach should be just focued on essential points. These are just cut & pasted from SSG-18 para. 10.5., and this should be necessary to state here only important aspects.		Simplified but not as suggested since needs to characterize all range of nuclear installations. 4.8. For nuclear installations other than nuclear power plants where a		

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Page of 12 Country/Organization: Japan/NRA Date: 18 May 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		c) The thermal power of the nuclear installation; ~~**d) The configuration of the installation for activities of different kinds;**~~ ~~**e) The distribution and/or location of radioactive sources in the installation (e.g. for research reactors, most of the radioactive inventory will be in the reactor core and the fuel storage pool, whereas for fuel processing and storage facilities the radioactivity inventory is distributed throughout the installation);**~~ ~~**f) The changing nature of the configuration and layout for installations designed for experiments (such activities have an associated intrinsic unpredictability);**~~ ~~**g) The need for active systems and/or operator actions for the prevention of accidents and for mitigation of the consequences of accidents; characteristics of engineered safety features for the prevention of accidents and for mitigation of the consequences of accidents (e.g. the containment and containment systems);**~~ ~~**h) The characteristics of the processes or of the engineering features that can generate a cliff edge effect in the event of an accident;**~~ ~~**i) The characteristics of the site that are relevant to the consequences of the dispersion of radioactive material to the atmosphere and the hydrosphere (e.g. size, demography of the region);**~~			graded approach is applied to site safety evaluation, the following shall be considered as applicable: (a) The amount, type and status of the radioactive inventory at the site (e.g. whether solid or fluid, processed or stored); (b) The intrinsic hazard associated with the physical processes that take place at the installation; (c) The thermal power of the nuclear installation; (d) The distribution		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		~~j) The potential for on-site and off-site contamination.~~			and/or location of radioactive sources in the installation; (e) The changing nature of the configuration and layout for installations designed for experiments (f) The need for active systems and/or operator actions for the prevention of accidents and for mitigation of the consequences of accidents; (g) The potential for on-site and off-site consequences.		

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
14.	4.19./L7	For some specific external natural phenomena, as tsunamis and volcanic manifestations, ~~near and far~~ the regions ~~shall be considered~~ for the potential hazards that can affect the safety of the nuclear installation shall be identified and considered.	The sentence without "far region" make sense, as the wording "for the potential …" indicate present the extent of target regions.		For some specific external natural phenomena, such as tsunamis and volcanic manifestations, near and adequate regions shall be identified and considered for the potential hazards that can affect the safety of the nuclear installation.		
15.	4.20.	The region shall be studied to evaluate the present and foreseeable future characteristics that can have an impact on nuclear safety ~~including emergency preparedness and response~~. This includes distribution of the population in the region, the present and future use of land and water, 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.	To avoid duplication. There is the wording with more explicit meaning in second sentence	O.K.			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
16.	**Req. 6**	**Potential hazards resulting from external natural phenomena and human induced events and activities which can realistically occur in the region of the site shall be identified through a screening process, and shall be evaluated and selected for design basis or re-evaluation purposes according to their significance to the safety of the installation.**	Clarification (editorial).		o.k. Clarification included in a modification suggested by other SSC member.		
17.	**Req. 8**	**The need for site protection measures shall be evaluated if ~~either~~ the projected design of the nuclear installation is not able to cope with and safely withstand either the impact of external natural and human induced hazards defined as design basis during the early site evaluation stage, or the impact resulted from the re-evaluation of the external natural and human induced hazards during the operating life.**	Clarification (editorial).	o.k.			
18.	**Req. 12**	**Requirement 12: Potential effects of the nuclear installation on ~~population~~ the public and the environment**	To keep consistency with the description of requirement 14 of this paragraph, which says ". **…… and the impact of the installation on the public and the environment shall be collected**".	o.k.			
19.	4.38.	The potential effects of the nuclear installation on ~~population~~ the public and the environment shall be evaluated considering collocated installations (e.g. 'multiple installation site'), ...	Ditto.	o.k.			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
20.	4.40.	The direct and indirect pathways by which radioactive material released from the nuclear installation ~~can~~ could potentially affect ~~people~~ the public and the environment shall be identified and evaluated; in such an evaluation, specific regional and site characteristics and population distribution in the region shall be taken into account, with special attention paid to the function of the biosphere in the accumulation and transport of radionuclides.	This sentence show the possibility, then suggested to use "could". The same comment on #18	o.k.			
21.	4.41.	For the new sites, t~~T~~he requirements for site evaluation apply also to the infrastructure in and other characteristics of the external zone where emergency response actions may be warranted. ~~The external zone for a proposed site shall be established with account taken of the potential hazards and associated consequences of an emergency involving the installation taking into account emergency planning zones expected to be established in line with Ref. [12].~~	Since this para mentions "Before the construction of the installation", it must be able to apply to only new sites. The context of this para here, EPZ is quite confusing. The feasibility of planning to implement emergency plan for the external zone is good enough at this stage.		O.K. Should not be restricted to new sites only.		
22.	4.43. (a)	The data collection process shall address the following as a minimum: a) External natural and human induced hazards information: sources, propagation, potential effects on installation and workers, ~~population~~ the public and the environment;	The same comment on #18.	o.k.			

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
23.	4.44./L1	In the site evaluation, it shall be demonstrated that the radiological risk to the ~~population~~ individual, the public associated with accident conditions,	It is the individuals and the public who will be protected from radiological consequences.	o.k.			
24.	4.46. & 4.47. a), d)	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 ~~population~~ the public and the environment.	The same comment on #18.	o.k.			
25.	**Req. 18** and **Req. 19**	**Requirement 18: Extreme meteorological hazards evaluation** **The extreme meteorological hazards and their credible combinations that have the potential to affect the safety of the nuclear installation shall be evaluated.** **Requirement 19: Rare meteorological hazards evaluation** **The potential for the occurrence of rear meteorological hazards such as lightning, tornados and cyclones, including information on their severity and frequency shall be evaluated for the site.**	Clarification for the difference between "**extreme meteorological hazards**" and "**rare meteorological hazards**". Clarification what "**their**" stands for.				As defined in SSG=18 Extreme meteorological hazards corresponds to hazard severity for a return period of 100y – this means high likelihood to happen during the life time. Are used for design of process systems mainly. Rare meteorological hazards are those with T=10,000

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							that can challenge the safety functions – are used to design safety related SSCs.
26.	**Req. 18** and **Req. 20**	**Requirement 18: Extreme meteorological hazards evaluation** **The extreme meteorological hazards and their credible combinations that have the potential to affect the safety of the nuclear installation shall be evaluated.** **Requirement 20: Flooding hazards evaluation** **The hazard due to flooding for the nuclear installation shall be evaluated considering natural causes and/or human induced events including their possible combinations.**	Clarification for the difference between "**credible combination**" and "**possible combination**" should be clarified. Similar wordings are used. Difference among these words should be defined.		O.K. I changed to possible combination.		
27.	5.21.	**The potential for flooding in the region due to one or more natural causes (including in combination) such as runoff resulting from precipitation or snow melt, high tide, storm surge, seiche and wind waves~~, as well as climate change,~~ which can affect the safety of the nuclear installation shall be evaluated Ref. [7].**	"Climate change" in the future cannot be predicted based on current technology.		O.K. Also changed by other SSC member.		

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Page of 12 Country/Organization: Japan/NRA Date: 18 May 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
28.	5.30.	*Floods and waves caused by failure of water control structures* The upstream water control structures shall be analysed for screening purposes to determine potential hazard to the nuclear installation resulting from the failure of one or more of the upstream structures such as dams, including in combination with flooding from other causes. Water control structures can be screened out from further analysis if it can be demonstrated that the nuclear installation can safely withstand the effects of the massive failure of the upstream structures.	To specify the examples of human induced events. Flooding occurring in the region due to "dams failure" should be taken into account.		O.K. Also changed by other SSC member.		
29.	5.42.	OTHER NATURAL HAZARDS Other natural external hazards like wild-fires, drought, hail, sub-surface freezing of subcooled water (frazil), blockage or diversion of a river and biological hazards such as jelly fish, small animal, barnacle, etc. shall be considered. If the potential of challenging the safety of nuclear installation is confirmed, the hazard shall be assessed and design bases for these events shall be derived.	Biological hazards such as jelly fish, small animal, barnacle, etc. could be significant for heat transfer to UHS.	O.K.			
30.	5.50./L1	*Other human induced events* ~~The region shall be investigated for installations~~ Investigation shall be performed for installations in the region (including collocated units of ….)	Clarification.	O.K.			
31.	6.2.	Delete whole of para 6.2.	To much detail for requirement document.				

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Page of 12 Country/Organization: Japan/NRA Date: 18 May 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
32.	6.11./L7	Special attention shall be paid to the population living in the immediate vicinity of the installation, densely populated areas and population centres in the region, sensitive populations, and institutions such as schools, hospitals and prisons.	Clarification. Does the word "sensitive population" mean vulnerable population?		Sensitive was changed to vulnerable. Also changed by other SSC member.		
33.	7.4.	Baselines for each of the external natural and human induced hazards and site conditions that are defined in the monitoring plan shall be established on basis of the results of the monitoring performed ~~in each phase of the installation lifecycle (~~before construction~~, commissioning and operation), before the initiation of the next phase~~.	Clarification. Not nesseary to obtain baseline before each phase of lifecycle of the installation.		Also changed by other SSC member. Paragraph deleted.		
34.	7.6. & 7.8.	**Reassessment of external hazards and site conditions** Simplify the description on (a) – (g) and delete whole of para 7.8, as follows; As part of safety reviews such as periodic safety reviews or safety assessments under alternative arrangements (Ref. [11]), external natural and human induced hazards shall be reassessed throughout the lifetime of the nuclear installation, at regular intervals ~~and~~ or as frequently as necessary (typically no less than once in ten years) ~~and in the event of any of the following:~~ with an account taken of update of the regulatory requirements, obsolescence of design basis, new insight resulted from research and experience in similar installations, and comparison with baseline data.	Descriptions of (a) – (g) are too much detail for Requirement document.. The contents of para 7.8 is included in revised new para 7.6. by adding "comparison with baseline data", which is addded by comment on para 7.4. and 7.5.	O.K.			

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Page of 12 Country/Organization: Japan/NRA Date: 18 May 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		~~(a) Update of the regulatory requirements, that take into account the 'state of knowledge' and the actual as-is condition of the installation;~~ ~~.....~~ ~~(g) A programme of long term operation, or life extension programme, of which such an evaluation is a part.~~					
35.	7.7.	The implications of such a reassessment of site specific hazards for the safe operation of the nuclear installation shall be evaluated periodically including the comparison with the original design basis and the need to establish new ~~re-evaluation~~ design basis.	Re-assessment basis should be established before reassessment would be performed. Implication from reassessment should be used to establish new design basis.		Simplified by other SSC member.		
36.	7.8.	Delete para 7.8.	Duplication. The contents of para 7.8 is included in revised new para 7.6 in Comment # 34.	O.K.			

TITLE

COMMENTS BY REVIEWER Reviewer: Peter Ford/Tanya MacLeod Page.... of.... Country/Organization: ONR Date: 11 May 11, 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	General	n/a	The English requires refinement	O.K.			
2	General	n/a	Clarity is required in terms of the points being made – sometimes the meaning is unclear.	O.K.			
3	General	n/a	There is a large amount of overlap between sections, repetition, leading to lack of clear focus between heading and what is actually discussed. E.g. Emergency arrangements, cliff edge effects.	O.K.			
4	General	n/a	Terminology needs to be reviewed - risk and hazard not well defined (not defined at all) and used interchangeably.			x	The risk was used properly. Was not used as synonym for the hazard.
5	General	n/a	Weather phenomena identified rather than weather parameters like wind speed or temperature. This is ok, but need to close the loop. Also several phenomena missed e.g. Dust storms.				Covered by Req 18. Weather phenomena should be assessed and weather parameters shall be developed. Results of hazards assessment should be usable for design and safety assessment.

COMMENTS BY REVIEWER Reviewer: Peter Ford/Tanya MacLeod Page.... of.... Country/Organization: ONR Date: 11 May 11, 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							Dust storm is mentioned in SSG-18 (Safety Guide).
6	General	n/a	Solar weather/RFI not included			x	Is implicitly covered my Meteorological Hazards. RFI (Electromagnetic Interference) is covered by Human induced.
7	1.10	The stages that make up the siting process are as follows: 1. Site Survey – aimed at identifying potential sites on the basis of existing data. 2. Site Characterisation – aimed at selecting the site(s) and confirming the acceptability of the final selected site. Site evaluation (the topic addressed in this document) begins during the site characterization stage and continues throughout the lifetime of the site.	The way the stages are described in paragraph format is confusing. I suggest using a numbered list. I have suggested some text as an example of how this might be done to add clarity.	O.K.			
8	4.3 – 4.9	I suggest either addressing the scope of site evaluations in this section or changing the requirement to address screening. Also a description of the graded approach is required or a reference to where further information about this approach can be found.	The intent of this section is to describe Requirement 3: Scope of the site evaluation for nuclear installations. However the text does not address scope – instead it describes a screening		The graded approach is not by itself a requirement but influence the scope and depth of site evaluation.		

COMMENTS BY REVIEWER Reviewer: Peter Ford/Tanya MacLeod Page.... of.... Country/Organization: ONR Date: 11 May 11, 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			process for considering whether a graded approach is appropriate. However the graded approach is not described.		Modified for showing that the graded approach principles are used to define the scope and depth of the site evaluation process.		
9	4.9	4.9 c – perhaps refer to heat loads or thermal issues?	The list provided is described as being "for nuclear installations other than nuclear power plants" but point c) refers to the thermal power of the nuclear installation – this is contradictory (unless the list applies to research/test reactors? but this is unclear). Perhaps it is referring to the decay heat from storing nuclear materials rather than thermal power?		Modified to reflect that this is relevant for research reactors only. Thermal power is relevant for categorizing the research reactor facilities for the graded approach.		
10	4.10	Select and apply consistent terminology.	Requirement 4 refers to site suitability, but the scope section does not use this term in describing the stages that make up the siting process – is it the same as site acceptability which is used in the scope section?		Site suitability was included in Scope Section para 1.10. Basically says that the second stage (site selection) is to identify suitable sites and to select a list of candidate the		

COMMENTS BY REVIEWER Reviewer: Peter Ford/Tanya MacLeod Page.... of.... Country/Organization: ONR Date: 11 May 11, 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
					sites. In this second stage the candidate site(s) are assessed by screening and ranking to arrive at the 'preferred site'. Site suitability shall be confirmed during the site evaluation stage.		
11	4.17	Possibly combine requirements 4 and 5 or be clearer on the differences between them.	This paragraph is basically a rewording of paragraph 4.10(a) which already refers to regions.			x	Requirement 4 talks about site suitability should be as is. Requirement 5 talks about site and regional characteristics (including the size of the region) to be covered by site evaluation. The context of 4.10 (a) and 4.17 is different.
12	4.34 – 4.35	Potentially refer to the managed adaptive approach or adaptive management to improve clarity.	The meaning of this requirement is unclear. Is it about incorporating uncertainty into the current design basis or managing uncertainty to ensure that			x	4.34 require assessment over the live time of the NI natural and human induced hazards (that may change in time).

COMMENTS BY REVIEWER Reviewer: Peter Ford/Tanya MacLeod Page.... of.... Country/Organization: ONR Date: 11 May 11, 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			enhancements to protection measures can be made in future if this becomes necessary? Or is it just about emergency response actions?				4.35 talks about to consideration of uncertainties in projection of climatic parameters that may evolve in time.
13	5.3 and 5.12	"The site shall be deemed unsuitable."	Strictly speaking there isn't really a need to consider another site – just to screen out the site under consideration.	O.K.			
14	5.10 – 5.14	Volcanic ash should also be considered.	Page 8 talks about "near and far regions" – please provide further details on this in the context of volcanic hazard evaluation.			x	Ash fall is one of the Volcanic hazards and implicitly is covered by the requirement 17. Details are given in SSG-21.
15	5.17 – 5.20	Suggest removing different categories for "rare" versus "extreme" hazard.	Some hazards listed in the "rare" section are not rare in many countries, such as lightning and tornadoes.			x	This is typical terminology used (also in SSG-18 endorsed by WMO). Extreme means extreme values with T=100y – values mainly used for process design – less safety relevant. Rare means those hazards with T=10,000 that challenge directly the

COMMENTS BY REVIEWER Reviewer: Peter Ford/Tanya MacLeod Page.... of.... Country/Organization: ONR Date: 11 May 11, 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							safety functions.
16	sentence preceding 5.21	Suggest either listing all types of flooding or removing the words "precipitation and other causes."	I don't think it's helpful to single out floods due to precipitation, particularly as flooding from storm surge/waves is more credible on many sites. Also groundwater flooding has not been mentioned in this section.			x	Other cause could me snow melt. All types of floods are addressed to support Requirement 20. Ground water is a factor that could make the flood more severe - Is not the primary cause of the flood.
17	5.42	Suggest removing "blockage" from this section or provide a description of why it needs to be considered again in addition to the reasons provided in paragraph 5.32.	Blockage of rivers is already mentioned in para 5.32	O.K.			
18	7.6(a)	Clarification required.	Perhaps make it clear that there is a need to be proactive rather than wait for updates of regulatory requirements.			x	76 (a) Could be one of the reasons – not the only on. The operator could be pro-active considering other reasons mentioned in the rest of the list.

DS 484 Site Evaluation for Nuclear Installations

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:			Page 1 of 1				
Country/Organization: Switzerland/ENSI			Date:11.5.2017				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	5.1; footnote 1(a)	In highly active areas, where both earthquake data and geological data consistently and 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.	Rare but very strong earthquakes should not be excluded a priori when short recurrence intervals of weaker earth-quakes are known.		…and/or exclusively…		
2	5.16	Appropriate methods shall be applied considering the available amount of data (measured data and historical events descriptions), and known past changes in relevant characteristics of the region.	The evaluation of the quantity of the data, etc. is not a requirement of the hazard assessment.		O.K. (measured and historical data),		
3	5.22	An appropriate meteorological and hydrological model as well as a hydraulic model shall be developed to derive the flooding hazard for the site, including secondary effects such as debris, ice sediment, etc..	Hydraulic models are needed to determine the water level. This im-portant model should be mentioned.		O.K. An appropriate meteorological, hydrological and hydraulic models shall be…		
4	5.24	The flood hazard assessment shall be conducted using appropriately supporting numerical models, data concerning historical and instrumentally recorded flood events, and shall adequately consider the uncertainties.	Historical flood events should be considered (as it is mentioned for tsunamis or seiches).		O.K. The flood hazard assessment shall be conducted using appropriately supporting numerical models based on instrumental and historical data, and shall…		

DS484_Site_Evaluation_for_Nuclear_Installations_SafetyRequirements

COMMENTS BY REVIEWER Reviewer: Fahad Al Blooshi Page.... of.... Country/Organization: Federal Authority for Nuclear Regulation FANR Date:16 May 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Requirement 11: Special considerations for the ultimate heat sink, Requirement 20: Flooding hazards evaluation, Requirement 7: Evaluation of external natural and human induced hazards	As may **Red tide** create huge number of debris, should be considered during evaluation.	To be considered, it might impact screening house at the power plant.			x	Is too detailed for requirements. Debris due to various flooding phenomena are addressed in SSG-18 Para 2.13, 5.41, 5.81, 5.104, etc.

COMMENTS BY REVIEWER Reviewer: Fahad Al Blooshi Page.... of.... Country/Organization: Federal Authority for Nuclear Regulation FANR Date:16 May 2017				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2	Requirement 6: Screening of the site specific hazards	Military sites should be considered	Military sites such as range or other military activities should be avoided/ considered during evaluation			x	The requirements mention the type of human hazards not the type of human activity generating these hazards.
3	Requirement 13: Feasibility of planning to implement emergency response actions effectively	Change from “emergency planning zones” to “emergency planning zones and emergency planning distances” Further to Japan representative comments we can include PAZ, UPZ, EPD and ICPD with definition	The EPZ/EPD definition, Can be give the evaluators a wide range of aspects to consider, Reception center, agriculture, hospitals, ORO’s and etc..		Was edited based on suggestions from other SSC/NUSSC member.		

Draft Safety Requirement "DS484 - Site Evaluation for Nuclear Installations", Step 7, 2017-04-06
Editorial Comments

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejecte d	Reason for modification/reje ction
3	1	Para 1.3 Line 10	The criteria described above are to be applied ~~for~~: i. to identify the natural and human induced events external to the installation that are important to safety; ii. to 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.	"for" doesn't fit together with the bullets beginning with "to".		O.K. but modified in a different way as suggested by other reviewer.		
3	2	Para 1.10 Line 7	[…] shall continue throughout the entire lifetime <u>of the</u> site.	Missing words.	o.k.			
3	3	Para 1.11 Line 5	An environmental impact assessment shall <u>make</u> use of the collected site evaluation database in order to avoid inconsistencies in the analysis and reporting.	Missing word.		Paragraph deleted		

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3	4	Para 1.13 Line 2	Section 3 discusses~~ed~~ the application of the management system for site evaluation.	Grammatical consistency with the previous sentence.	O.K.			
2	5	Para 3.3	As part of a management system for the nuclear installation, the quality assurance for site evaluation shall be conducted and managed to comply with the national regulatory requirements and international good practices.	A hint to international good practices should be included to cover those cases where no suitable national regulatory requirements are available.	O.K.			
1	6	Para 4.8 Line 7	[...] the installation ~~shall~~ may be screened out from following a formal site evaluation process.	"Shall" would imply that IAEA recommends not to perform a formal site evaluation for the mentioned facilities. As a site evaluation always helps to make any facility safer, it cannot be in the interest of the international community to recommend omitting a formal site evaluation. Therefore, the formulation should be changed in one that allows to omit a formal		O.K. – modified by other reviewer.		

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
				site evaluation.				
2	7	Para 4.9 Line 1	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 ~~considered as applicable~~:	As the list does not contain requirements, recommendations or assumptions, the term "applicable" does not fit. The bullet items seem to be general aspects to be taken into consideration.	O.K.			
3	8	Para 4.9 Bullet g)	g) The need for active systems and/or operator actions for the prevention of accidents and for mitigation of the consequences of accidents; h) The characteristics of engineered safety features for the prevention of accidents and for mitigation of the consequences of accidents (e.g. the containment and containment systems);	As the topics of the first and second sentence are slightly different, it might be a good idea to separate this bullet into two. The numbering of the following bullets needs to be modified accordingly.		Deleted – following the comments of another reviver.		
3	9	Para 4.11 Line 1	The site shall be deemed unsuitable for the location of ~~selected~~ the nuclear installations under consideration if [...]	"Selected" seems not to be the appropriate word in this context.	o.k.			

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2	10	4.22	Events of high severity but low probability that could contribute …	A reference to clarify how "low probability" is defined could be helpful	o.k.	I provided an example in the footnote.		
1	11	Para 4.23	Screened out events on the basis of enveloping by other events shall ensure that all effects (e.g., load cases) are bounded. <u>In determining the enveloping nature of the events foreseeable future developments shall be taken into account. Likewise their enveloping nature shall be verified as part of periodic safety reviews.</u>	The situation in the surroundings of the site may change with time. The changes might also affect the characteristics of impacts from certain events on the site which were the basis for assuming that they envelope impacts from other hazards.		Modified by other reviewer.		
2	12	Para 4.26 Line 2	[...] type of application of the hazard to the installation safety assessment.	The formulation is somewhat unclear. How can a hazard be "applied" to a safety assessment? A clarification / reformulation would be appreciated.	O.K.	Was re-formulated – Clarification: for example for Seismic-Probabilistic Safety Assessment is required to have as input the full seismic hazard curves since for other hazards (e.g. aircraft crash)		

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
						only the frequency and severity of the bounding hazard scenarios.		
3	13	after Para 4.29 Requirement 8	The need for site protection measures shall be evaluated if either the projected design of the nuclear installation is not able to cope with and safely withstand the impact of external natural and human induced hazards defined as design basis during the early site evaluation stage, or resulting~~ed~~ from the re-evaluation of the external natural and human induced hazards during the operating life.	From a grammatical point of view "[...] hazards defined as [...] or resulting from" sounds more reasonable.	O.K.			
2	14	Para 4.30	<reformulation of the whole paragraph needed>	Given the current formulation, the meaning of this paragraph is unclear. A thorough reformulation using shorter and more concise sentences is recommended.		O.K. The need for protection of the site against the effects of specific phenomena of external natural and human induced hazards (e.g. flooding, explosions,		

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
						etc.), shall be evaluated considering adequate safety margins.		
2	15	4.30	… stage to ensure safety and that the safety of structures, systems and components of the nuclear installation to withstand some external natural and human induced hazards can be highly sensitive to potential "cliff-edge" effects	What exactly does the term "cliff-edge" mean in this context?		Modified as suggested by other reviver.		
3	16	Para 4.32 Line 5	Also the site protection measures shall be categorized, designed, built, maintained and operated as ~~important to~~ safety related structures, systems and components.	Inappropriate mixing of terms. Either "safety related structures, systems and components" or "structures, systems and components important to safety" should be used.	o.k.			
2	17	4.33	… Occurrences of extreme external natural and human induced hazards …	Why the term "extreme" is used here in combination with "external natural"?	o.k.			
3	18	Para 4.36	As appropriate <u>for</u> the ultimate heat sink under consideration, the following	Missing word.	o.k.			

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejecte d	Reason for modification/reje ction
		Line1	data shall be evaluated:					
2	19	4.36		Enlarge if necessary in c) for clarification " e.g.: - algae (biologically) - floating debris (as a consequence of storm or/and flooding events)"			x	Too many details for requirements. Are covered by the Safety Guides.
2	20	4.36	Available and sustainable water flow ~~flow of water~~ (for a river), minimum and maximum water level and the period of time for which safety related sources of cooling …		o.k.			
3	21	4.45	… nuclear installation over the lifetime of the installation …		o.k.			
1	22	Para 4.37 Line 2	~~If the probabilities and consequences of such events cannot be reduced to acceptable levels, then t~~The hazards for the nuclear installation associated with such events shall be established.	Without establishing the resulting hazards for the installation, it cannot be verified that the consequences are acceptable. Therefore, an evaluation of the hazard (for the installation) resulting from the events		Modified as suggested by other reviewer.		

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejecte d	Reason for modification/reje ction
				under consideration is indispensable. (This doesn't mean that an assessment of the hazard from the installation being affected by those events to the environment needs always to be assessed.)				
3	23	Para 4.47 Bullet e)	Information required for establishment of emergency planning on-site and off-site in any environmental and installation~~s~~ condition~~s~~;	The plural ("installations conditions") does not fit well with "any". At least "installation" should be singular.	o.k.			
2	24	Para 4.49	The data collection, analysis and processing methods for the site investigations shall be sufficiently detailed to supporting safety decisions. ~~and~~ The documentation shall be sufficiently detailed to permit an independent review.	The reviewability of the assessment depends more on documentation than on the applied methods. Therefore splitting the sentence seems to be recommended.	o.k.			
2	25	5.6		Enlarge if necessary with some example (e.g. drilling activities, dam-structures (reservoirs), …)	o.k.			

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	26	Para 5.15	Meteorological hazards such as wind, precipitation, snow and ice, air and water temperature, humidity, storm surges and sand / dust storms shall be evaluated for their extreme values based on available documentation for an appropriate period of time Ref. [7]. <u>If necessary, efforts shall be made to extend the database (e.g. incorporating paleo-meteorological data, numerical models or simulations).</u>	The database available a priori may not be sufficient to estimate the intensity of extreme meteorological events that have to be considered in the design of the installation given their exceedance frequency. Therefore, additional research may be necessary to be able to evaluate the hazard appropriately.	o.k.			
1	27	Para 5.31 Line 4	[...] otherwise <u>the site shall be deemed unsuitable.</u> ~~such upstream structures shall be upgraded to withstand the hazards associated with the nuclear installation~~.	In general, neither the licensee nor the nuclear regulator can force an operator of a dam to upgrade it. Therefore, a site is not suitable for a nuclear installation if the hazard associated with the effects of a failure of the upstream structure is unacceptable.	o.k.			

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3	28	Para 5.45	The relevant information <u>on the stationary and mobile sources of hazard</u> shall be obtained and evaluated ~~on the stationary and mobile sources of hazard~~ up to a conservatively established distance within which the source can have the possibility of adversely affecting the safety of the nuclear installation including as forecasted over the lifetime of the installation.	Rearranging the sentence structure would make this requirement easier to read.		Modified as suggested by other reviewer.		
3	29	Req. 21	<Requirements 21 and 22 including the associated paragraphs 5.33-5.41 should directly follow Requirement 16 (Para. 5.5-5.9)>	Geotechnical hazards are closely linked to the tectonic setting (as can be seen, e.g., from Para. 5.34, 5.36, 5.37, 5.39 and 5.40). Therefore, they should be grouped with the other hazards linked to tectonics.			x	Tectonic setting is relevant for seismic hazard assessment. Geotechnical hazards are more linked to specific geotechnical site conditions e.g. potential for liquefaction, slope stability, subsidence, etc.)
2	30	Para 7.6 Bullet d)	New experience and lessons from the occurrence of actual external events affecting safety of nuclear installations	Also operating experience of non-nuclear facilities with external hazards		(d) New experience and lessons from the		

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)** (with comments of GRS) Pages: 8 Country/Organization: **Germany** Date: 2017-05-15				RESOLUTION			
Rele - vanz	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejecte d	Reason for modification/reje ction
			and comparable industrial facilities;	might be relevant to nuclear installations.		occurrence of actual external events affecting the safety of nuclear installations or hazardous facilities;		

NUSSC Comments on IAEA Draft Safety Requirements

" Site Evaluation for Nuclear Installations (DS484)"

COMMENTS BY REVIEWER **Reviewer**: Mikhail Lankin **Country/Organization:** Russian Federation **Date:** 20 May 2017				**RESOLUTION**			
Comment No.	**Page / Section / Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/ rejection**
1	p.1.6	Exclude para totally	Non-applicability of the Safety Standard to submarines and ice-breakers is absolutely clear because naval vessels have no sites. Non-applicability of the Safety Standard to military equipment derives from IAEA Statute.	o.k.			
2	p.4.1	Add word "siting" before word "design"	Siting is independent stage of nuclear facility lifetime (at least in Russian Federation).	o.k.			
3	p.4.33	Add new text at the end of sentence: "Influence of hazards originated from one installation of multi-installation site on other installations located at the same site shall be assessed".	Neighbor installations can be source of human induced external hazards for other same site installations.	o.k.			

TITLE DS-484

Site Evaluation for Nuclear Installations

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.	4.18/ Page 8	Characteristics of the natural environment in the region that can be affected by potential radiological impact of the installation in all operational states and accident conditions shall be investigated **and assessed** throughout lifetime.	After investigation assessment will contribute for decision making process.	o.k.			
2.	4.33/ Page 10	Occurrences of extreme external natural and human induced hazards and their credible combinations, which, are able to challenge the safety of multiunit or collocated sites and to generate disruptions of infrastructure affecting communications, transportation, and utilities **and emergency response**, shall be considered.	The emergency response may be affected in multiunit site due to occurrences of extreme hazards.			x	Addressed by Requirement 13 paragraph 4.42 (4.39 after revision).
3.	4.40/ Page 12	The direct and indirect pathways by which radioactive material released from the nuclear installation can potentially affect people and the environment shall be identified, **developed on geographical information system database** and evaluated;	Geographical information system database is proved to be helpful for decision making before and after accident conditions and emergency response.			x	I agree however this is the level of details appropriate for Safety Guides (how to do it).

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
4.	Requirement 16:/ Page 14	The ground motion hazard evaluation shall be conducted to provide the input needed for the design or ~~upgrading~~ **safety up-gradation** 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.	The word upgrading may be replaced with safety up-gradation in requirement No.16. The up-gradation will only be for safety and relevant for nuclear installation.		…seismic safety upgrading…		
5.	5.5/ Page 14	Hazards due to earthquake induced ground motion shall be assessed for the site with account taken of the seismic sources characteristics **at different scales i.e.,** of the **near regional &** regional seismotectonics, seismic waves propagation characteristics and site specific conditions using proper **and updated.**~~methods~~ **methodologies**	It may appropriate to mention different scales as per SSG-9, because hazards induced by ground motion at near regional and site vicinity scales could be more devastating. Therefore by replacing regional seismotectonics with various scales (regional, near regional etc as per IAEA SSG-9) will give more complete impression. Similarly, Word proper is bit confusing as it cannot quantify any method, it would be better to use word suitable and updated methodologies.			x	This level of details is appropriate for Safety Guides (e.g. SSG-9)
6.	5.40/ Page 18	The stability **& settlement** of the foundation material under static and seismic loading shall be assessed.	The word settlement shall be added for elaboration of term stability in case of		…and potential excessive settlement…		Settlement is normally addressed by the design (criteria

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
			foundation.				are provided by applicable design standards).
7.	5.41/ Page 18	The groundwater regime and the chemical properties of the soil and groundwater shall be studied by **appropriate simulation techniques** and accounted for.	Simulation techniques will be helpful during review process and hazard establishment.		The groundwater regime and the chemical properties of the soil and groundwater shall be studied by appropriate methods and accounted for.		It is mainly based on measurements and laboratory tests.
8.	5.44/ Page 18	Industrial activities and events **from nearby transportation and military facilities** in the region around the installation shall be investigated **for accidents**, including resource extraction activities, manufacturing, waste disposal, land reclamation and other significant re-contouring of land or water.	Accidents at nearby transportation & military facilities may produce missiles, shock waves, toxic chemicals. These may affect the station itself or the station operators in a way that jeopardizes the safety of the station.		Modified as suggested by other reviewer.		
9.	7.6/3rd Page 23	As part of safety reviews such as periodic safety reviews or safety assessments under alternative arrangements (Ref. [11]), external natural and human induced hazards shall be reassessed **based on updated information and in field if necessary** throughout the lifetime of the nuclear installation,	Reassessment is important part of external hazards evaluation through plant life. As with the passage of time data set improves, new methodologies/models came in and also some time as a result of any big earthquake faults geometry also changes. So keeping in		7.4. As part of safety reviews such as periodic safety reviews or safety assessments under alternative arrangements, external natural and human		Updated information covers everything.

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
			mind all these facts, it is suggested to add proposed sentence in the text.		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		