

Form for Comments
Hazards Associated with Human induced External Events in Site Evaluation for Nuclear Installations (DS520)

General Comments

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Country/Organization: Belgium /				Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	Global comment	The reference list does not correspond with the entries in the document!		X			References are corrected.
2.	General comment (amongst others related to Articles 3.13, 5.21, 6.20 and 9.10)	These articles should be reworded to indicate clearly that the probabilistic screening cannot be done on a “particular event”. Instead, it has to be done at the level of “event categories” as defined in Article 1.9. It is only when the total occurrence frequency of an “event category” is lower than a SPL that this “event category” can be screened out for further consideration.	See also several comments made in Step 7. Applying the SPL on “particular events” is unacceptable, since it can lead to “splitting” of events in sub-scenarios and in that way screening them out one by one, while the total occurrence frequency of the “event category” can be significant and should thus not be screened out.			X	Each event has to be considered independently and its probability of occurrence has to be estimated.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Danielle Carrier Country/Organization: Canada /				Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	General	IAEA Safety Standards Series No. DS498, Design of Nuclear Installations Against External Events Excluding Earthquakes [7] [14].	Incorrect reference included in various sections	X			
2.	General	IAEA Safety Standards Series No. DS503, Protection against Internal and External Hazards in the Operation of Nuclear Power Plants [8] [16].	Incorrect reference included in various sections	X			

3.	General	SSR-1 [1] [13]	Incorrect reference included in various sections	X				
COMMENTS BY REVIEWER Reviewer: Country/Organization: China / Page 1 of 1 Date: 20 April 2021				RESOLUTION				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection	
4.	General		The specific assessment method or guide documents for different kind of human-induced hazards should be given in this safety guide.			X	Evaluation of each hazard are given in this safety guide. Further information is referred to IAEA Safety reports.	
COMMENTS BY REVIEWER Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./ Page 1 of 13 Date: 27.04.2021					RESOLUTION			
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejec ted	Reason for modification/rejection
3	1.	General	Most of the references are wrong. Please check and change them. E.g. [1] should be [13]; [7] should be [14]; [15] should be [3]; [16] should be [26]; [17] should be [24]; [3] should be [18]; [5] should be [6]; [6] should be[23]; [20] should be [7]; Also Ref [19] in 6.16 seems wrong and references [22-27] are not used in the document text.	Wrong references.	X			
COMMENTS BY REVIEWER Reviewer: András Gábor Siklósi Country/Organization: Hungary / Hungarian Atomic Energy Authority Page 1 of 5 Date: 14.04.2021					RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection	
1.	General	“Human Induced External Hazard” (HIEH) instead of “Human Induced External Event” (HIEE)	The document uses both “human induced external hazard” and “human induced external events”		X Title is changed as			

			or HIEE terms. I the terminology as well as their acronyms should be used consistently and only one of these terms should be present in the document. I propose to use only the “Human Induced External Hazard” and its HIEH acronym in the document, which is more consistent with the terminology of the requirements and the title of the document.		written in DPP, “Hazards associated with human induced external events in site evaluation for nuclear installations. Text is revised accordingly.		
6.	General	Screening by distance and/or effect	I believe the title and recommendation for this type of screening should be modified a bit. It is also important to highlight that the basis of screening can be the reduced effect due to the distance (e.g. the release of hazardous substances that dilute with distance), purely the distance itself (e.g.: when the distance make it impossible for missiles to reach the site) and purely effect (e.g.: when the human activity in question simply doesn’t have the magnitude to affect the site). In my opinion this should be reflected somehow in the recommendations.			X	Screening by distance is a commonly used terminology. It is directly linked to effect.
COMMENTS BY REVIEWER Reviewer: AP PRORYV Country/Organization: Russia Federation / AP PRORYV				RESOLUTION Page 1 of 1 Date: 26 March 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
9.	General Document structure	To add a section explaining how to consider the external impact of Flooding.				X	In Para. 2.5, it was stated that

		To provide the initial events in the section: the break of the dam, dams, tsunami (for man-made reasons)...					“Structures such as dams that control large volumes of water are stationary sources of HIEEs, for which recommendations are provided in IAEA Safety Standards Series No. SSG-18, Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations [3].”
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Comments on Section 1

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:		Page 1 of 1					
Country/Organization: Belgium /		Date: 27 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3.	1.3	(b) Progress in practices in States relevant to human induced externalevents;	Typographical correction(the practices are relevant; not the States)		X It is changed to “Member States”.		
4.	1.12	The recommendations in this SafetyGuide apply to all stages ...	Typographical correction(add “s”)	X			
5.	1.16	... Due consideration should be given to sensitivity of information on externals hazards from a nuclearsecurity perspective. ...	Typographical correction(delete “s” in externals)	X			
6.	1.17	... Section 3.0 provides recommendations on the identification and screening of sources and evaluation of hazardsfor HIEEs. Section 4 provides recommendations on data ...	3 typographical corrections (3 instead of 0; two times add “s” to “provide”)	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Danielle Carrier		Page 1 of 1					
Country/Organization: Canada /		Date: 27 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.1 footnote 2	"... for which the operating organization is has a very limited or no control ..."	Typo correction.	X			
2.	1.9	Change the last bullet of this paragraph: "Other human induced external events (e.g., orbital debris crashes)"	To complement the list of external man made hazards given in this bullet.		X Orbital debris crashes not discussed but added discussed ones (e.g., ground subsidence, electromagnetic interference, etc)		
3.	1.17	"Section 0 3 provides recommendations on the identification and screening of sources and evaluation of hazards for HIEEs."	Incorrect section number	X			
4.	1.17	"For definitions and explanations of the technical terms used, see the IAEA Safety Glossary [45] [3]"	Incorrect reference	X			All references are corrected.
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: M-L Järvinen		Page.... of....					
Country/Organization: STUK		Date: 1 st June 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.1 Footnote 2	In this publication an external event is defined as an event ... The definition used in this publication is slightly modified compared to the definition used in IAEA Safety Glossary.	The text "A slightly modified definition of the term 'external event' is used in this publication." is still not quite clear. It should be mentioned			X	It is clearly mentioned that it is slightly different to the IAEA Safety Glossary. The revised

			from what the definition is modified, perhaps the footnote refers to the IAEA Safety Glossary? To ensure full coverage of internal and external events, it is important to have clear definitions and to point out the possible differences in IAEA publications.				definition is very comprehensive and clearly defines the events to be covered at site and site vicinity. Events originating on the site but outside the buildings important to safety should be treated the same as off-site external events. This definition will be incorporated in the next revision of IAEA Safety Glossary
2.	1.7 etc.	Please check reference number for DS498, Design of Nuclear Installations Against External Events Excluding Earthquakes [7]	In the references [7] is INTERNATIONAL ATOMIC ENERGY AGENCY, "Leadership and Management for Safety, IAEA General Safety Requirements No. GSR Part 2, IAEA, Vienna," (2016). (Note also that GSR number is missing)	X			All references were corrected.
3.	1.7	IAEA Safety Standards Series No. DS503, Protection against Internal and External Hazards in the Operation of Nuclear Power Plants [8].	Please check all the reference numbers.	X			
4.	1.16	Guidance on security considerations can be found in the IAEA Nuclear Security Series [9-14 4, 5, 9]	4, 5 and 9 refer to Nuclear Security Series.	X			
5.	1.17	Section 3 provides recommendations on the identification and screening ...	Not section 0	X			Corrected
COMMENTS BY REVIEWER Reviewer: Country/Organization: ./France.....				RESOLUTION Page 1 of 1 Date: 26 March 2021			

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.17	Section 2 provides recommendations on the evaluation of hazard associated with HIEEs for nuclear installations. Section 0 3 provide recommendations on the identification and screening of sources and evaluation of hazards for HIEEs.	Typing error	X			

COMMENTS BY REVIEWER					RESOLUTION			
Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./					Page 1 of 13 Date: 27.04.2021			
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3	1.	1.17	Section-0 3 provide recommendations on the identification and screening of sources and evaluation of hazards for HIEEs.	Mistake	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Zsolt Kovacs Country/Organization: Hungary/Paks II. Ltd.				Page 1 of 2 Date: 01.03.2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.8.	Phase 1 includes source identification and screening of potential sources on the site and in the region around the nuclear installation site.	Events originating on the site but outside the buildings important to safety should be considered as HIEEs as well.	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: BAPETEN Country/Organization: Indonesia				Page 1 of 6 Date: 28 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.11/3	Need to provide reference to IAEA definition or elaboration of graded approach	To add better understanding of graded approach.			X	Chapter 11 provides all details
2.	1.17/2	Section 3 provides	Replace 0 with 3	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Aisha Abdelbasat Tantoush		Page 1 of 3					
Country/Organization: Libya		Date: April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.16. 1st line	The external human induced human-induced events considered in this Safety Guide are of accidental origin.	It appears that human induced is missing a hyphen(s).			X	IAEA technical editor will check whole document again during publication process. Hyphen is not missing/ not used.
2.	1.16. line 2	Other events are out of the scope of this Safety Guide,	Improved clarity/grammar.			X	Correctly written
3.	1.16. line 7	[...]may also have an application to the development of measures against malicious activities[...]	Improved clarity/grammar.			X	Correctly written
4.	1.16. line 9	[...]Due consideration should be given to the sensitivity of the information on externals[...]	Improved clarity/grammar.	X			
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: PNRA		Page 1 of 1					
Country/Organization: Pakistan/PNRA		Date: April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.12	The recommendation in this safety guide applies to all stages of the lifecycle of a nuclear installation from site selection to permanent shutdown closure .	The word permanent shutdown may be replaced with closure as per SF-1 and SSR-1. The terminology should be consistent among IAEA documents	X			
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: SEC NRS		Page 1 of 1					

Country/Organization: Russia Federation / SEC NRS				Date: 26 March 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.11, Section 11	The recommendations related to the application of a graded approach to nuclear installations other than NPP are needed to be clarified and the approaches how to apply the recommendations of this Guide regarding different human induced external hazards to nuclear installations other than NPP are needed to be addressed.	The methods how to apply the recommendations to nuclear installations other than NPP and application of a graded approach are important for this revision.			X	The recommendations related to the application of a graded approach to nuclear installations other than NPP are presented in Section 11. A graded approach should be applied to nuclear installations on the basis of their complexity and the potential radiological hazards and other hazards as it was done in other hazard safety guides.
COMMENTS BY REVIEWER Reviewer: AP PRORYV Country/Organization: Russia Federation / AP PRORYV				RESOLUTION Page 1 of 1 Date: 26 March 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
7.	1.9	To add a category: - radiation accident. with subsections: - «GENERAL CONSIDERATION»; - «HAZARD ASSESSMENT». Make appropriate adjustments to tables AI, AII, AIII, AIV, AV.	The presence of other facilities in the area and/or at the site of the Nuclear Installation, radiation accidents on which can lead to radiation of staff above the basic dose limits	X			“Nearby nuclear facilities” already exists in the tables however information are updated.
COMMENTS BY REVIEWER Reviewer: CPI affiliate of Rosenergoatom JSC Country/Organization: Russia Federation / Rosenergoatom JSC				RESOLUTION Page 1 of 1 Date: 26 March 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

10.	1.16	<p><i>To add text in the end::</i></p> <p><i>...Due consideration should be given to sensitivity of information on external hazards from a nuclear security perspective. For example, information on human induced external hazards that can be beyond the safety design basis is highly sensitive because terrorists could use it as a potential way for an attack. Therefore, such information should be handled carefully in cooperation with nuclear security specialists. Notwithstanding to the above, issues of information security in general are not included in the scope of this Safety Guide.</i></p>	It is followed from the text in this section that terroristic acts go beyond the scope of this document. However, some aspects of information security are mentioned in this para. It is worth to indicate that the issues of information security in general likewise the issues related to terrorism are not part of the NPP siting and designing and should be out of the scope of this document			X	It is clearly mentioned in the beginning of the para. that “The external human induced events considered in this Safety Guide are of accidental origin. Other events are out of scope of this Safety Guide, although these will be a consideration in planning the mitigation of and response to such events. Considerations relating to the nuclear security of nuclear installations against malicious activities (i.e. deliberate acts of sabotage, damage), by third parties are outside the scope of this Safety Guide.”
<p>COMMENTS BY REVIEWER</p> <p>Reviewer: Page 1 of 1 Country/Organization: Slovakia/Slovenské elektrárne, a.s. Date:08.03.2021</p>				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.17	Sentence „Section 0 provide recommendations on the identification and screening of sources and evaluation of hazards for HIEEs.“ shall be replaced with „Section 3 provide recommendations on the identification and screening of sources and evaluation of hazards for HIEEs.“	Typo	X			Editorial mistake is corrected.
<p>COMMENTS BY REVIEWER</p> <p>Reviewer: UK consultees via ONR Page.1. of 2 Country/Organization: UK Date: April 2021</p>				RESOLUTION			

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Section 1 Scope/Footnote 1	In the definition of a nuclear installation include specific reference to the sub-surface aspects of a geological disposal facility and post-closure GDF requirements as being either inside or outside the definition.	Clarity on what is excluded from the scope will assist all parties in understanding when this guide is applicable and how it interfaces with other guidance, eg SSG-14 Geological Disposal Facilities for Radioactive Waste.			X	Complete list is provided of what is included in the scope. Geological Disposal Facilities are not included.
2	1.7, 1.11	Provide reference to guidance on sub-surface hazard identification and evaluation or note its absence.	The methodology for deriving and evaluating hazards in a sub-surface environment has no recognized Relevant Good Practice (RGP). The graded approach assumes that the bounding regulatory constraint is understood. On the basis that there is no RGP for sub-surface EH impact assessment on what basis can grading be applied?			X	Identification and evaluation of sub-surface hazards are covered in IAEA safety standards NS-G-3.6. Please see paras 1.2 and 10.3.

Comments on Section 2

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Danielle Carrier		Page 1 of 1					
Country/Organization: Canada /		Date: 27 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	2.3	“The equivalent requirements to those listed in paras 2.1 and 2.2 for research reactors and nuclear fuel cycle facilities are provided in IAEA Safety Standards Series Nos SSR-3, Safety of Research Reactors H-6 [26] and SSR-4, Safety of Nuclear Fuel Cycle Facilities H-7 [24], respectively.”	Incorrect reference	X			
2.	2.5 a)	“... IAEA Safety Standards Series No. SSG-18, Meteorological and Hydrological	Incorrect reference	X			

		Hazards in Site Evaluation for Nuclear Installations 34 [8].”					
<p style="text-align: center;">COMMENTS BY REVIEWER</p> <p>Reviewer: - Mohamed GAHEEN (NUSSC member) - Areej Ahmed</p> <p>Country/organization: Egypt / Egyptian Nuclear & Radiological Regulatory Authority ENRRA</p> <p style="text-align: right;">Page 1 of 1 Date: 11 April 2021</p>				<p style="text-align: center;">RESOLUTION</p>			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2.	2.1	<p>Requirement 11: Special considerations for the ultimate heat sink for nuclear installations that require an ultimate heat sink</p> <p>The evaluation of site specific natural and human induced external hazards for nuclear installations that require an ultimate heat sink shall consider hazards that could affect the availability and reliability of the ultimate heat sink.</p>	<p>➤ It is proposed to add an important requirement which is addressed in SSR-1, This should be reflected and explained in DS520.</p> <p>➤ During the conveyance of hazardous materials by sea or waterways, the accidental release of flammable or toxic vessels and Other cargo that is not formally classified as hazardous material, like wood pellets and sticky chemicals, together with their loads and the possibility of water borne debris, could have the potential for mechanically blocking or damaging cooling water intakes and outfalls associated with ultimate heat sinks.</p>			X	SSR-1 is the main reference and all requirements are important. Requirements 6, 7, 8, 9, 14 and 24 are of particular interest to the evaluation of sites for nuclear installations for hazards associated with HIEEs and are reproduced.
3.	2.1	<p>Requirement 26: Population distribution and public exposure</p> <p>The existing and projected population distribution within the region over the lifetime of the nuclear installation shall be determined and the potential impact of radioactive releases on the public, in both</p>	<p>➤ It is proposed to add it due to the Industrial sites that could impose sources of HIEEs hazards on a nearby nuclear installation will likely also impose those</p>			X	Same as above

		operational states and accident conditions, shall be evaluated and periodically updated.	<p>same hazards on the local population.</p> <p>➤ This may have implications for nuclear emergency planning.</p>				
4.	2.1	<p>Requirement 28: Monitoring of external hazards and site conditions</p> <p>All natural and human induced external hazards and site conditions that are relevant to the licensing and safe operation of the nuclear installation shall be monitored over the lifetime of the nuclear installation.</p>	<p>➤ Monitoring systems should be designed and operated at the site to prevent the evaluation of initiating to accident caused by an external human induced event.</p>			X	Same as above
5.	2.3	IAEA Safety Standards Series Nos No.-_SSR-3,	<p>➤ Wording/Editorial issues</p>	X			
6.	Section 2	2.15 "monitoring systems should be designed and operated at the site to confirm the site evaluation and design assumptions and to prevent the propagation of initiating events into nuclear accidents. To this extent, specific operational procedures should be set up for real time monitoring and operator action following an accident caused by an external human induced event".	<p>➤ After 2.14 , a new para is proposed to be added where HIEEs should be monitored and periodically assessed over the lifetime of the plant to ensure that consistency with the design assumptions is maintained against hazards, and to ensure that overall risk remains acceptably low.</p>		X There is no monitoring system for HIEEs. However, a new para. is added at 2.15 on periodic re-evaluation of hazards associated with HIEEs.		
<p align="center">COMMENTS BY REVIEWER</p> <p>Reviewer: M-L Järvinen Country/Organization: STUK</p>				<p align="center">RESOLUTION</p>			
			Page.... of.... Date: 1 st June 2021				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	2.5	SSG-18, Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations [3 8].	Please check the reference number.	X			
COMMENTS BY REVIEWER				RESOLUTION			

Reviewer: Country/Organization: ./France.....				Page 1 of 1 Date: 26 March 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2	2.5	Unlike road or route, the presence of material all along an operating pipeline is almost continuous.	Add this comment on pipeline hazard With reference to the former France comment on the same topic (NUSSC 50), answer was not fully relevant : even if the material is moving within the pipe, it is always present around the nuclear installation as long as the pipe is being operated. This is not similar to road or railway, on which dangerous goods move with the vehicle.			X	Pipelines are not always operating.
3	2.5 b	Mobile sources of HIEEs are those for which the location of the initiating mechanism is not totally constrained, such as any means of transport for hazardous materials or potential projectiles (by road, rail, waterways, air, pipelines). In such cases, an accidental explosion or a release of hazardous material may occur anywhere along a road, route, or pipeline . They also present an intermittent hazard for the nuclear installation.	Pipelines are already mentioned in 2.5 a) as an example of stationary sources. In a pipeline the source is considered stationary as it is permanent, as opposed to transport related sources for which the hazard for the nuclear installation is only present a fraction of the time.			X	2.5a is corrected and pipelines are to be only considered as mobile source as per existing Safety Guide.
COMMENTS BY REVIEWER						RESOLUTION	
Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./							
Page 1 of 13 Date: 27.04.2021							
Para/Line No.	Proposed new text		Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2.4	HIEEs are caused by people and the way people act creates the environment in which hazardous events can occur and propagate. The important consideration is to recognise the possibility of an event and seek data from experience to support judgements on which events are		Clarification	X			

	likely to be significant and how frequently they are likely to occur. Human factors relevant to the identification and analysis of HIEEs include direct human action (e.g. exceeding a safe speed limit or energising an incorrect item of equipment), indirect human action (e.g. substandard design of equipment, poor maintenance practice), and errors of commission and omission.					
2.5	Potential sources of HIEEs are classified as either stationary or mobile and both should be considered, as follows:	Further in this Guide pipelines can be both stationary and mobile. The same holds for sources of electromagnetic interference hazards.	X			
2.10 Line 11	... To clarify the process of HIEEs and their possible effects on nuclear installations, this guide introduces a number of interrelated terms to describe such events, the most important being source of HIEEs, event and hazard .	The most important terms of this Guide are sources of HIEEs. Terms “event” and “hazard” are already defined in the IAEA Glossary			X	Event and hazard are defined in IAEA Glossary but just to reemphasize their importance in this SG.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: András Gábor Siklósi Country/Organization: Hungary / Hungarian Atomic Energy Authority		Page 1 of 5 Date: 14.04.2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2.	2.4	HIEEs are caused by people and the way people act creates the environment in which hazardous events can occur and propagate. HIEEs are hazardous events occurring directly or indirectly due to human activities (transportation, agricultural, industrial, mining, etc.). The important consideration is to recognise the possibility of an event and seek data from experience to support judgements on which events are likely to be significant and how frequently they are likely to occur. Human factors relevant to the identification and analysis of HIEEs include direct human action (e.g. exceeding a safe speed limit or energising an incorrect item of equipment), indirect human action (e.g. substandard design of	I believe the proposed text has a better wording and describes the nature of human induced hazards better. I believe the purpose of this sentence is unclear and unconnected to the subject, therefore I propose to delete it. Exceeding the speed limit does not directly lead to external human induced external hazards, nor does not exceeding it ensures the avoidance of accidents, nor it is reflected in the relevant			X	The wordings were carefully selected and further improved during this review.

		<p>equipment, poor maintenance practice), and errors of commission and omission.</p>	<p>statistics which only show the number of transportation accidents overall. The same argument can be made for poor maintenance practices, which can be relevant in accidents at chemical plants in the vicinity for example.</p> <p>The new IAEA standards define external hazards as hazards for which the licensee doesn't have the opportunity or authority to act against (e.g.: because they occur outside of the site or has a natural origin like an earthquake). Therefore poor equipment maintenance in this paragraph can only refer to poor maintenance in mines, chemical plants, cars and airplanes travelling within the vicinity of the site for which the licensee won't have any statistical data as input nor it would be relevant for the hazard assessment.</p>				
3.	2.12	<p>2.12. In general, there are three types of protection against HIEE for a nuclear installation: (i) protection through a robust design of the structures, systems and components important to safety, (ii) protection through the provision of site protection measures such as sufficient distance and barriers, (iii) protection through administrative measures such as no-fly zones administrative restrictions on hazardous substance transportation in the vicinity of the site. Administrative measures are generally the least reliable means of protection and they should be considered as complementing the first two.</p>	<p>No-fly-zones are not specifically aimed to reduce aircraft crashes on the site especially for large commercial or military airplanes that are typically used as a design basis/DEC input, these restrictions have more of a security reason. No-fly-zones are typically cylinder shaped regions around the site with a height and radius of a few km, while big commercial airplanes and military aircrafts travel at 10+ km, therefore this restriction doesn't affect them or their flight route</p>		<p>X Modified as:measures such as no-fly zones, administrative restrictions on hazardous substance transportation in the vicinity of the site.</p>		

			<p>nor will it affect their trajectory in case of a catastrophic failure on the plane. No fly zones may reduce crash frequencies for small airplanes and helicopters but these are usually not the basis of the design.</p> <p>Administrative restrictions on hazardous substance transportation however is directly aimed to reduce the occurrence frequency of an accident that would affect the nuclear safety of the plant, therefore I propose to use this as an example.</p>				
<p>OMMENTS BY REVIEWER</p> <p>Reviewer: BAPETEN Country/Organization: Indonesia</p>				<p>RESOLUTION</p>			
			Page 1 of 6 Date: 28 April 2021				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3.	2.9, 2.12, 2.13, 10.6	<p>Use a single terminology to replace these terms:</p> <p>Administrative control, administrative measures, and administrative actions,</p>	Either elaborate on the differences between the terms or simply use a single term to mean all that.			X	They have different meanings and used appropriately in the text.
4.	Para 2.5/15	<p>Pipelines can be categorized as stationary source with random hazard source location</p>	Pipelines are basically fixed and can be considered as line sources.			X	Pipelines transport hazardous materials which are not totally constrained. As in existing safety guide, it is categorized as mobile sources.
5.	2.10/3	<p>HIEEs initiated at a source may eventually result in different hazards at a nuclear installation site after going through an interacting mechanism.</p> <p>A number of potential HIEE sources (e.g., a chemical process site) are presumed to exist around a nuclear installation; each</p>	Consider putting the semicolon right after the word installation and adding a space after the semicolon.	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Aisha Abdelbasat Tantoush Country/Organization: Libya		Page 1 of 3 Date: April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
5.	2.7.	The size of the region to be investigated depends on the type of HIEE source and will range from few kilometres <u>kilometers</u> for fire to tens of kilometres <u>kilometers</u> for aircraft crashes and bombing ranges.	Improved spelling.			X	UK English is used in IAEA safety standards

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: PNRA Country/Organization: Pakistan/PNRA		Page 1 of 1 Date: April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
4.	Para 2.2 (a)/ Addition of Text	Events associated with nearby land, <u>Railway</u> , river, sea or air transport (e.g. collisions and explosions);	Nearby railway line may be one of the potential hazard especially transporting hazardous material through railways.			X	Correct observation however 2.2 (a) is a quotation from SSR-1.
5.	Para 2.2/ Last paragraph	(para. 5.33 of SSR-1 [1]) replaced with (para. 5.37 of SSR-1 [1])	To make reference in-line with SSR 1	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: CPI affiliate of Rosenergoatom JSC Country/Organization: Russia Federation / Rosenergoatom JSC		Page 1 of 1 Date: 26 March 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
11.	2.4	<i>This para should be excluded or completely revised</i>	Text in this para is related to internal events and QA and therefore not applicable to the document			X	Para. 2.4 is related to internal events in nearby facilities which may affect the nuclear installations.

Comments on Section 3

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Country/Organization: Belgium /				Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
7.	3.2	... SDV is as a simple and conservative tool <u>linked to the potential hazard</u> that ...	Typographical correction + SDV does not consider meteorological conditions but it is linked with the kind of potential hazard.	X			
8.	3.9	...The SDVs of both hazards will be quite different as a gas vapor cloud may travel much longer distance than the pressure wave. <u>In this case the SDV shall be defined as the longer distance related to the hazard.</u>	The interest of the added sentence is to give guidelines in the SDV choice in this case.			X	SDV is already based on a particular hazard and a range for each hazard is provided in Table A.II. As such, a MS can select any value. Also sentence with “shall” cannot be used in IAEA safety guides.
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: - Mohamed GAHEEN (NUSSC member) - Areej Ahmed Country/organization: Egypt / Egyptian Nuclear & Radiological Regulatory Authority ENRRA				Page 1 of 1 Date: 11 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
7.	3.2	“For some sources, a simple deterministic study, based on information on the distance and characteristics of the source, may be enough to show that no significant interacting event can occur”.	➤ The effects of interacting events results from HIEEs on the nuclear installation site should be evaluated and if they are not significant they should not be considered further/ no more analysis is necessary.		X The sentence is revised.		
8.	3.3source regions centred centered on the nuclear installation site	➤ Wording/Editorial issues.			X	IAEA safety standards use UK English.

9.	3.13	"Such a value should be defined or approved by the regulatory body coherently with the policy for risk management in the region for nuclear and industrial facilities"	➤ It is proposed that this new paragraph be added to clarify the responsibility of determining screening probability level of Initiating events have implications on safety of nuclear installation.			X	Which organization defined or approved is up to MSs. Some MSs experience are provided in footnote #4. 10^{-7} is used as SPL in some MSs.
10.	3.13	the limiting value of the annual probability of occurrence of events with potential radiological consequences is called the screening probability level (SPL)	➤ It is appropriate to explain the meaning of the Essential terminologies required to understand safety guide, as stated in para 3.2. where the screening distance value (SDV) have been explained, even if IAEA glossary used.		X Footnote revised by including definition.		
11.	Section 3 Figure I Page.11	It is proposed to replace this figure with a clearer one.	Figure resolution is not good.	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Country/Organization: /France.....				Page 1 of 1 Date: 26 March 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
4	3.13	If the probability of occurrence of an event under consideration is less than the specified Screening Probability Level (SPL) ⁴ , no further analysis is necessary (see box 7 in Fig. 1). The SPL should be chosen such that the radiological risk associated with hazards is acceptable low. The comparison to SPL should be performed by gathering the probabilities of events of the same type arising from the same potential source (mobile or stationary).	With reference to the previous France comment on this topic (NUSSC 50), the answer provided is not fully relevant because it does not consider that, if the comparison to SPL is performed considering each event individually, most of them won't need further analysis as there probability of occurrence should be low enough.			X	This revised version follows the methodology in existing safety guide. NS-G-3.1 Para. 4.8 states " If the site is not outside the SDV for the initiating event under consideration, the probability of occurrence of such an event should be determined and compared with the specified SPL (see box 6 in Fig. 1). If the probability of occurrence of the

								event under consideration is smaller than the SPL, no further analysis should be made (see box 7 in Fig. 1).”
COMMENTS BY REVIEWER						RESOLUTION		
Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./						Page 1 of 13 Date: 27.04.2021		
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3	1.	3.2, Line 3	[...] SDV is as a simple and conservative tool that ignores any additional factors like involved mass or typical atmospheric conditions. [...]	Editorial	X			
1	2.	3.7	For each type of effect that could arise from a HIEE, a maximum acceptable loading limit should be established, based on the vulnerabilities of structures, systems and components. In early stages of the siting process, standard values or minimum requirements for the nuclear installation design could be applied.	Please add this further recommendation taken from experience.		X Para. 3.7 is revised.		
1	3.	3.8, Line 5	... These characteristics may be assumed for the early stages of siting process to be those corresponding to the <i>standard nuclear installation design</i> .	Explanation needed for “the standard nuclear installation design”. The expression is not defined neither in this guide, nor in Glossary.			X	All member states even the embarking NP countries are familiar with the standard designs (e.g., ATMEA, USA, Chinese, etc)
2	4.	3.11, Line 4	[...] It should be ensured that the enveloped sources are considered if and when the event frequency is estimated. Care is also needed regarding the potential reduction of the number of events that could affect the nuclear installation, and thus the probability.	The last sentence seems to replicate the idea of the sentence before and should be deleted for the sake of clarity.			X	This was included during Step 7 as MS comment.
2	5.	3.13, Line 2	[...] The SPL should be chosen such that the radiological risk associated with hazards is acceptably low. [...]	Clarification	X			
3	6.	3.15, Line 3	Hazard analysis should be performed to check whether hazards from HIEEs will interact ⁵ with the	Editorial	X			

		nuclear installation site. If the hazard analysis results show that the hazards will not interact <u>with</u> the nuclear installation site, no further analysis is necessary (see box 9 in Fig. 1).					
		footnote 5. Interact means a hazard reaches the nuclear installation site based on hazard analysis.					
COMMENTS BY REVIEWER Reviewer: András Gábor Siklósi Country/Organization: Hungary / Hungarian Atomic Energy Authority					RESOLUTION		
Page 1 of 5 Date: 14.04.2021							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
4.	Section 3 Fig. 1. Process for the source identification, screening, and detailed evaluation for each source type	-	The figure in the draft version has a very low resolution. I suggest to provide a higher resolution version for the draft.	X			
COMMENTS BY REVIEWER Reviewer: BAPETEN Country/Organization: Indonesia					RESOLUTION		
Page 1 of 6 Date: 28 April 2021							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
6.	3.6/3	A Source Display Map showing all potential sources of HIEEs (both present and foreseeable sources) should be prepared and these sources should be listed along with the distances from the nuclear installation site (Ds)	Add Ds as a distance of potential source from the nuclear installation	X			
7.	3.7/1	For each type of effect that could arise from a HIEE, a maximum acceptable loading limit should be established, based on the vulnerabilities of structures, systems and components.	Deleted or move this sentence to box 8 in Fig. 1, because it still discusses screening related with the SDV.		X Para. is modified as proposed by a MS.		

8.	3.7/2	For each type of effect that could arise from a HIEE, a maximum acceptable loading limit should be established, based on the vulnerabilities of structures, systems and components of nuclear installations	Add the words 'of nuclear installations.' To be consistent with the rest of the document. Otherwise provide a statement that installation in the document refers to nuclear installation.		X Para. is modified as proposed by a MS.		
9.	Section 3 Fig.1	Resolution of Fig. 1.	The resolution of Fig. 1 needs to be increased	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: AP PRORYV		Page 1 of 1					
Country/Organization: Russia Federation / AP PRORYV		Date: 26 March 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
6.	3.13, 5.21, 6.20, 7.11, 8.13, 8.16, 8.19, 9.10, 9.22	It is proposed to add a quantitative value of the probability limit below which the initial event can be excluded from consideration, or to indicate a reference to the source (standard, methodology, manual) by which such an indicator can be calculated (estimated)	This version demonstrates the uncertainty in justifying the selection of the list of initial events taken into account in the draft			X	Example is given in footnote 4 as "In some States, a value for the probability of 10 ⁻⁷ per reactor-year is used in the design of new facilities as one acceptable limit on the probability value for interacting events having serious radiological consequences, and this is considered a conservative value for the SPL if applied to all events of the same type (such as all aircraft crashes, all explosions)....."

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: UK consultees via ONR		Page.1. of 2					
Country/Organization: UK		Date: April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

3	<u>3.3</u>	These values should also be checked if the nuclear installation design and layout present any potential weakness to HIEEs.	Final sentence refers to nuclear power plant design and layout – this should be nuclear installation design and layout.	X			
4	<u>3.15</u>	...the hazards will not interact with the nuclear installation site...	Missing word	X			
5	Section 3 Footnote 5	Interact means a hazard reaches the nuclear installation site...	Typo	X			

Comments on Section 4

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:		Page 1 of 1					
Country/Organization: Belgium /		Date: 27 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
9.	4.4	(b) ... The appropriate regulator(s) should be consulted for advice and in any case should be made aware of the development of the nuclear installation and the likely hazards it may pose to industrial sites in the region. <u>The nuclear operator should ensure a clear description of the aim and scope of his request in order to ensure a best quality and accuracy of the gathered data.</u>	Added sentence: The appropriate regulator does not know often the aim of the request. It's important to ensure a good comprehension and communication to get the best quality of data.	X			
10.	Sentence below 4.4	The information received from the operators of the sources of HIEEs should be verified and validated and, wherever possible, be validated by an independent reviewer. <u>Often, the appropriate regulator could be the independent reviewer.</u>	Added sentence: For a lot of hazardous installations, the related regulation requires specific risk analysis or scientific studies which are reviewed/ approved by the appropriate regulator. This review is independent from the operator.	X			
11.	4.19	Mobile sources of HIEEs are typically aircraft (and other aerial vehicles), road and rail	According to 4.14 and as detailed in 4.25, pipelines are included as a mobile source.	X			

		vehicles, sea and river transportvessels <u>and</u> <u>pipelines.</u>					
COMMENTS BY REVIEWER Reviewer: Danielle Carrier Country/Organization: Canada /				RESOLUTION Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	4.11	“Values thus obtained should be examined to determine whether they should to be adjusted...”	Editorial change	X			
2.	4.12	“The following information for stationeary sources should be collected...”	Editorial change	X			
3.	4.23	With respect to this para, add the following footnote: “Hazards from small recreational vessels may not be considered as they will have insignificant impact on the intake channel structure”	To identify exceptions related to the hazard of marine accidents and its impact on the NPP.			X	It could matter for small research reactor for once through cooling system.
COMMENTS BY REVIEWER Reviewer: Country/Organization: /France.....				RESOLUTION Page 1 of 1 Date: 26 March 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
5	4.14	Pipelines carrying hazardous materials that leave or transit between different stationary source locations may be included as mobile sources if periods of those transfers are available and relevant to the safety assessment. They should be considered as stationary otherwise.	-See reason for comment on 2.5 a) - The previous France comment on this topic (NUSSC 50) is complemented: dangerous good is continuously present with the pipe as the pipe must be continuously operating. Please re-consider the answer			X	See above. Such statements will lead to confusions only.
6	4.20 c	Information on aircraft accidents for the region and for similar types of airport and air traffic. Information should be collected for general aviation, civil and military air traffic. Of particular interest are military	Fire-fighting planes present a high level of danger during the stage of water filling	X			

		aircraft training areas (especially low flying areas) and water filling fire-fighting plane areas within the region, since these may indicate areas of relatively high crash probability.					
7	4.23	<p>Experience indicates that the bulk of sea traffic accidents occur in coastal waters or harbours, so it is important that shipping lanes near the site should be identified. Information should be collected on the characteristics of traffic flows in the region, such as:</p> <p>(a) The location of shipping lanes local to the nuclear installation site;</p> <p>(b) The nature, type and quantities of material conveyed along a route in a single transport movement;</p> <p>(c) The sizes, numbers and types of vessels;</p> <p>(d) The point of closest approach to the nuclear installation site;</p> <p>(e) Accident statistics including consequences.</p> <p>Harbours should be also studied as stationary sources due to the continuous presence of dangerous cargo.</p>	This suggestion was accepted in the previous reviewing phase, but the new text is not clear enough	X			
8	4.24	<p>Railway rolling stock and road traffic, together with their loads, are potential sources that should be given careful attention, particularly for busy routes, junctions, marshalling yards and loading areas. Information should be collected on the characteristics of traffic flows in the region, such as:</p> <p>(a) Location of road and rail routes local to the nuclear installation site;</p> <p>(b) The nature, type and quantities of material conveyed along a route in a single transport</p>		X			

		movement; (c) The sizes, numbers and types of vehicles; (d) The point of closest approach to the nuclear installation site; (e) Speeds, control systems and safety devices; (f) Accident statistics including consequences. Marshalling yards should be also studied studied as stationary sources due to the continuous presence of dangerous cargo.						
COMMENTS BY REVIEWER Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./ Page 1 of 13 Date: 27.04.2021					RESOLUTION			
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejec ted	Reason for modification/rejection
1	1.	4.9	Military sites and civil sites undertaking national defence work These sites will almost always be subject to extensive restrictions on the dissemination of information about the processes and activities that take place, which may make it impossible for the operating organization of a nuclear installation to undertake a credible safety analysis of potential HIEEs arising from such sites. National regulators, as government agencies themselves, may have preferential access or even information exchange agreements with the defence agencies controlling these sites. Operating organizations of nuclear installations should seek advice from the regulatory body on the need for and the extent of HIEE safety analysis that is necessary in these cases. If specific information is not made available, generic data can be used.	Is generic data for military sites available and useful? We doubt the usefulness of this recommendation and suggest to delete the sentence			X	Recommendation is given in case a specific information is not made available.
2	2.	4.11	For many HIEEs there is often insufficient information available locally to permit a reliable evaluation of probability of occurrence and of the probable severity of the event. It may therefore be useful to obtain statistical data on a national, regional	As epistemic and aleatory uncertainties are being referred later in the text (paras 12.5 and 12.11), it is	X			

			or global basis. Values thus obtained should be examined to determine whether they should to be adjusted to compensate for unusual characteristics of the source, or the nuclear installation site and its environs. Where there is no reliable basis for calculating the severity of the effects of an external human induced event using local data, all available information and assumptions about that event should be obtained on a global basis and the hazard analysis undertaken also using expert judgement. <u>In other words, both epistemic and aleatory uncertainties should be taken into account</u>	suitable to introduce them in this para first.				
1	3.	4.12	The following information for stationery sources should be collected but the necessary level of detail could vary according to the specific <u>site conditions</u> and site evaluation stage: (a) The nature of hazardous material involved and the quantities in storage, being processed and in transit on the source site; (b) The types of storage (physical conditions) and processes (flow sheets); (c) The dimensions of major vessels, stores or other forms of containment (d) The locations <i>and distances to the site</i> of these forms of containment, their construction and their isolation systems; (e) The operating conditions of these forms of containment (including the frequency of maintenance); (f) The active and passive safety features of these forms of containment.	We suppose issues (d) – (f) are introduced with a special focus on sites, other than NPPs. If so, this aspect should be clearer.	X			
2	4.	4.15	Other sources to be considered are construction yards, mines and quarries that use and store explosives and may cause the temporary damming of water courses with the possibility of subsequent flooding, subsidence, or collapse of ground at the site should also be considered.	The risks caused by mines and quarries are explained in 4.16. Part of current sentence could be deleted to avoid ambiguities and duplications.	X			
2	5.	4.17	Fracking ⁶ and other natural gas extraction activities should also be considered as they may be hazardous to	Besides fracking, there are other	X			

			nuclear installations and are similar to mining activities in that they can cause ground vibrations, subsidence and even ground failure.	methods for natural gas extraction. As these methods might also cause the mentioned effects (although to a lesser degree), they should not be neglected.				
2	6.	4.21	The size of the geographical region considered for aircraft crash hazard should, in general, be larger than that for other sources because of the high speeds associated with air transport <u>air traffic is not localized as other traffic means.</u>	Clarification	X			
2	7.	4.26	<i>The hazards to a nuclear installation arising from surface transport (by road, rail, sea, inland waterways and pipelines) are similar to those from industrial plants. On-site transport of hazardous material relevant to collocated nuclear installations should also be considered as potential sources of HIEEs. Air traffic presents a different type of mobile source of HIEEs because of the possibility of an aircraft crash directly on to the nuclear installation and this should be taken into consideration.</i>	<p>We suggest shifting this Para just after Para 4.19.</p> <p>This statement does not fit under the header “Transport by pipelines” – and such is the first impression by reading.</p> <p>If this statement should be a summary of the general chapter – please make it clear.</p>	X			

COMMENTS BY REVIEWER					RESOLUTION		
Reviewer: András Gábor Siklósi		Page 1 of 5					
Country/Organization: Hungary / Hungarian Atomic Energy Authority		Date: 14.04.2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
5.	4.20	4.20 e) During the collection of data for aircraft crashes attention should be paid for the ratio of in-flight crashed and accidents during take-off (and low altitude ascending) and landing (or low altitude descending), since (depending on the distance between the plant and the airport) accidents during	I suggest to add this recommendation to the aircraft crash data collections session. I believe it is important to note that the summary/overall aircraft crash data may not be applicable directly for the purposes of			X	Observation may be correct however this is not in practice.

		these manoeuvres may not be relevant for the site safe and the collected data should be post processed accordingly.	aircraft crash/accident frequency determination.				
COMMENTS BY REVIEWER Reviewer: BAPETEN Country/Organization: Indonesia				RESOLUTION Page 1 of 6 Date: 28 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
10.	Para 4.16/2	the possibility of ground collapse and landslides, as well as sedimentation	Some sites may be located near river deltas where mining activities are upstream and causing river and sea sedimentation.			X	Not appropriate to add as it discusses the ground collapse and landslides in context to mining and mining is carried out in rocks.
11.	4.19/2	Mobile sources of HIEEs are typically aircraft (and other aerial vehicles); road and rail vehicles; sea and river transport vessels, as well as pipelines	Para. 4.14. states,” Pipelines carrying hazardous materials that leave or transit between different stationary source locations should be included as mobile sources.” However, Para.4.25 also mentions that “Transport by pipeline is also described in topic group on mobile sources of human induced external events.”	X			
15.	4.23/5	The location of shipping lanes local, regional, or international to the nuclear installation site	Sea currents might bring debris from sources far away depending on current characteristics.			X	As bulk of sea traffic accidents occur in coastal waters or harbours, the local lane to the nuclear installation is only important. Sect 4.23 talks about this aspect.
COMMENTS BY REVIEWER Reviewer: Aisha Abdelbasat Tantoush Country/Organization: Libya				RESOLUTION Page 1 of 3 Date: April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

6.	4.22.	[...], together with their loads and the possibility of water borne water-borne debris, [...]	It seems that water borne is missing a hyphen.		X No hyphen, it is one word.		
COMMENTS BY REVIEWER Reviewer: SEC NRS Country/Organization: Russia Federation / SEC NRS				RESOLUTION Page 1 of 1 Date: 26 March 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2.	4.3	Recommended to highlight that «Generic data on HIEEs from literature» may be used only as additional data, not main data.	Clarification	X			
3.	4.11	Recommended to add a requirement to experts in case of the expert judgement is used when there is no reliable basis for calculating the severity of the effects of an external human induced event.	Clarification	X			
COMMENTS BY REVIEWER Reviewer: Country/Organization: Slovakia/Slovenské elektrárne, a.s.				RESOLUTION Page 1 of 1 Date:08.03.2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2.	4.25	It is difficult to obtain such kind of information because it might be subject to classified info	Comment	X			Efforts need to be made to collect data and information.
COMMENTS BY REVIEWER Reviewer: UK consultees via ONR Country/Organization: UK				RESOLUTION Page.1. of 2 Date: April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
6	4.6	Footnote – The degree to which land use planning legislation considers sub-surface land use varies between countries. The potential for sub-surface human activities to change the external hazards for an	Consideration is not currently given to sub-surface land use (i.e. fracking, CO2 storage etc. in proximity to an NPP or GDF) in a	X			

		installation should be considered under the national legal framework.	GDF. This presents an entirely different set of hazards and FSPs.				
7	4.14, 4.25	Add reference to industrial hydrogen storage and distribution.	Consideration should be given to referring to industrial hydrogen storage and distribution for domestic use explicit.	X			
8	4.12	In the first sentence 'stationery' should be 'stationary'.	Typo	X			
COMMENTS BY REVIEWER Reviewer: Karel Deknopper Country/Organization: ENISS				RESOLUTION ENISS			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	P16 §4.20 (d)	Information on crash rates of each aircraft types flying near the nuclear installation in the respective flight mode (enroute, landing, and taking off including normal or special flight mode for military aircraft).	Some freedom should be left to avoid excessive data collection requirements, e.g. in case some aircraft types do not fly often near the nuclear facility.			X	It says that each aircraft type flying near the NI. Each type is important to capture all types of aircraft. It is already written in the text that the ones flying near the nuclear installations.

Comments on Section 5

COMMENTS BY REVIEWER Reviewer: Country/Organization: Belgium /				RESOLUTION			
Page 1 of 1 Date: 27 April 2021							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
12.	5.3	This section considers each of the major groups of hazardous substance in turn: (a) Hazardous liquids; (b) Hazardous gases; (c) <u>Sub-cooled or liquefied gas</u>	As detailed in 5.26 to 5.28, sub-cooled and liquefied gases are modelled by taking in account the "rain-out phase" (part of liquid which depend of the flow rate and evaporation rate). The phenomena is different and so it should be defined as a whole			X	Hazards are classified into two major categories, liquids and gases. Sub-cooled or liquified gases are considered under gases.

			category (neither gas neither liquid).				
13.	5.4	<p>A significant factor affecting the dispersion mechanisms for liquids is the local topography <u>and type of soil</u> between the source of HIEEs and the nuclear installation site.</p> <p>Liquids disperse across land primarily under gravity by flowing downhill; their dispersion is therefore heavily dependent on regional and source-to-site topographical features and is very likely to be directional and this should be considered. <u>The dispersion depends also of the roughness of the ground which differs according to the type of soil (concrete, sand, gravel,...).</u></p>	The roughness of the soil is also a parameter influencing the liquid dispersion on the ground. Bold part to add in § 5.4 or may be in an additional §.	X			
14.	5.6	If the hazardous liquid is volatile (<u>high vapor pressure</u>), such as petroleum <u>gasoline</u> , it can give rise to ...	To link the volatile aspect to the physical properties which identify the volatile property	X			
15.	5.9	Chemicals including hazardous liquids stored <u>or handled</u> at the nuclear installation site may vary ...	A toxic release or hazardous event could occur from a chemical reaction (process deviation or during handling) – so not only limited to storage but also process oriented handlings.	X			
16.	5.30	To evaluate the maximum concentration at the site, the models presented in IAEA Safety Standards Series No. NS-G-3.2, Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluation for Nuclear Power Plants [5] may be used. They should be used with caution, since often the gases released are at a very low temperature and the models may not be strictly applicable to a gas–air mixture of negative or positive buoyancy.	Methods and mathematical equations used in the models (what we need to evaluate the maximum concentration) are not discussed in NS- G-3.2, but for instance in Safety Reports Series No. 19. We propose to add some further references in addition to NS-G-3.2, in particular SRS No. 19. Also, the most appropriate models for the chemical dispersion calculation should be referred. For example: Methods for the		X Para. is modified. NS-G-3.2 will be revised as models can be used for neutral buoyant gases.		

			calculation of physical effects– due to releases of hazardous materials (liquids and gases) – “Yellow book” from TNO. A lot of software used in the Chemical Industry is based on these TNO models CHEF (Chemical Hazard Engineering Fundamentals (a Dow Chemical method) is also available to CCPS ¹ /EPSC ²				
17.	5.35	(d) Maximum credible release, or frequency versus quantity release curve. <u>The maximum credible release includes gathering data/parameters related to the storage/process like dimension, horizontal or vertical storage, max pressure rupture, height and shape of the release. In the case of a chemical reaction leading to hazardous release, the release rate due to the chemical reaction should be known as well as the location of the source release (i.e. size and height of the stack).</u>	Hazardous parameters should consider data related to the “geometrical” dimensions of the source because it will impact the modelisation	X			
18.	5.35	To be added: ... <u>(j) type of the soil/subsoil (nature, roughness, permeability,....)</u>	Information on the type of soil is important. So we propose to add the (j)	X			

¹ Center for Chemical Process Safety: brings together manufacturers, government agencies, consultants, academia and insurers to lead the way in improving industrial process safety.

² European Process Safety Center: an international not for profit organization providing an active network for members to work together on process safety.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Danielle Carrier		Page 1 of 1					
Country/Organization: Canada /		Date: 27 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

1.	5	<u>“Uncontrolled</u> Release of Hazardous Substances”	<p>The title of this section is misleading, as it does not relate to controlled releases of treated liquid effluent or airborne emissions, containing hazardous substances, but instead seems to focus on uncontrolled releases such as spills, accidental releases, and fugitive emissions of normally contained substances.</p> <p>The section title should be changed if this is in fact the case</p>			X	It is not uncontrolled release of hazardous substances but stored somewhere inside the boundary of nuclear installations or outside a nuclear installation and that should be studied as a human induced hazard.
2.	5.1	“Hazardous substances (flammable, corrosive and toxic, including liquefied gases) are normally kept in closed containers but upon an uncontrolled release (e.g., accidental release, spill, or fugitive emission) could cause a hazard to ...”	Without specifying the type of releases being considered, this seems to apply to controlled treated releases of effluent discharges. This is not necessarily the focus of this section. Language should be added to make the distinction that this refers to uncontrolled releases of normally contained substances.			X	Please see the response to #10.
3.	5.4	<u>Hazardous liquids can be released on land, into water bodies, and into the ground.</u> A significant factor affecting the dispersion mechanisms for liquids is the local topography between the source of HIEEs and the nuclear installation site.	A new statement should be provided to clearly articulate that hazardous liquids can be released and disperse over land, water and within the ground	X			
4.	5.30	“To evaluate the maximum concentration at the site, the models presented in IAEA Safety Standards Series No. NS-G-3.2, Dispersion of Radioactive Material in Air and Water and Consideration of Population	Incorrect reference	X			

		Distribution in Site Evaluation for Nuclear Power Plants [5] [6].”						
COMMENTS BY REVIEWER				RESOLUTION				
Reviewer: - Mohamed GAHEEN (NUSSC member) - Areej Ahmed Country/organization: Egypt / Egyptian Nuclear & Radiological Regulatory Authority ENRRA Date: 11 April 2021								
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection	
12.	5.26	"gases in group (a) are kept in insulated containers at very low temperatures, while gases in group (b) are maintained at ambient temperatures".	➤ For more clarification the difference between the two groups.			X	Gases are kept in liquefied form by either keeping them sub-cooled or pressurized in a nuclear installation. Existing classification is well-known.	
COMMENTS BY REVIEWER				RESOLUTION				
Reviewer: Country/Organization: ./France..... Date: 26 March 2021								
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection	
9	5.1 b	Toxic and asphyxiant gases and liquids that can threaten human life and impair indirectly safety functions;	Adding “indirectly” because toxic and asphyxiant substances don’t damage directly safety equipment	X				
COMMENTS BY REVIEWER				RESOLUTION				
Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./ Date: 27.04.2021								
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.	5.16	Local meteorological conditions should be considered conservatively in estimating the danger due to a drifting cloud. In particular, dispersion studies based on probability distributions of wind direction, wind speed	Please change this formulation to avoid potential contradiction of contents of 5.16 and	X			

			<i>and atmospheric stability class should be made. A secondary consideration is local topography between the source of HIEEs and the nuclear installation site, especially for dense (heavier than air) gases that will tend to form gravity flows downhill in a similar way to liquids.</i>	5.24, as in 5.24 worst case assumptions regarding atmospheric conditions are demanded.				
1	2.	5.29	The characteristics of the pool formed by the liquid, such as its location, surface area and evaporation rate, should be evaluated, with account taken of the wind speed and the permeability and thermal conductivity of the soil (if the spillage occurs on soil). If the source site has arrangements for containing any spills or releases, these should be accounted for in the hazard modelling. However, giving credit to such arrangements should be well justified.	The wind speed and direction in case of an accident is not known beforehand. Therefore, it cannot be considered reasonably during siting. Instead, conservative assumptions should be made regarding these parameters.	X			
3	3.	5.32	As with subcooled liquefied gases, the release of gases liquefied by pressure and noncondensable compressed gases should be characterized by a leak rate or by a sudden total release, and a similar evaluation should be carried out. [...]	Editorial	X			

OMMENTS BY REVIEWER				RESOLUTION			
Reviewer: BAPETEN Country/Organization: Indonesia		Page 1 of 6 Date: 28 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
12.	5.1/6	Flammable gases, liquids, vapours and aerosol that can form explosive clouds and can enter ventilation system intakes and burn or explode;	Dust explosion is evaluated in detail analysis i.e., in 6.4 “ <i>In addition, dust explosions can also occur</i> ...” and in 6.8 about dust explosion. In 5.26, it is also included aerosol. However, it is not mentioned in the general consideration of hazardous substances, as mentioned in “5.3. <i>This section considers each of the major groups of hazardous substance in turn:</i>	X			

			(a) Hazardous liquids; (b) Hazardous gases.				
13.	5.20/5	Meteorological and topographical considerations are important in this evaluation. Geological condition sometimes play important role in specific situations	Addition of Geological condition sometimes play important role in specific situations. For example, geological seepage route is important for underground sources			X	This part relates to hazardous gases.
14.	5.23/5	These aspects should be modelled explicitly or extremely conservative assumptions should be made.	Deleted extremely	X			
16.	5.34/8	at least initially, to use a simplified dispersion model with assumptions made on a conservative basis.	Deleted this part Simplified dispersion model should not be performed for the detailed evaluation			X	It is recommended the use of simplified model but with conservative assumptions.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Aisha Abdelbasat Tantoush		Page 1 of 3					
Country/Organization: Libya		Date: April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
7.	5.6.	[...]whose dispersion as a plume will be consistent with the characteristics of <u>the</u> gas or <u>a</u> gas cloud dispersion and this should be considered.	Improved clarity/grammar.	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: AP PRORYV		Page 1 of 1					
Country/Organization: Russia Federation / AP PRORYV		Date: 26 March 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
8.	5.1	To add a requirement to account for biohazard emissions after 5.1 (c): 5 (d) Biologically hazardous emissions that can threaten human life and indirectly jeopardize safety functions.	These effects can have a negative impact on the health (life) of staff, as well as on elements important for safety, adversely affected by such substances (creatures, organisms)			X	It is a natural event and does not fit here. Biohazards mainly affect the availability of cooling water from the UHS and the

							service water system as consequence of excessive growth of algae, mussels or clams, or clogging by exceptional quantities of fish or jellyfish
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: UK consultees via ONR		Page.1. of 2					
Country/Organization: UK		Date: April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
9	<u>5.1, 5.19</u>	Include reference to gases that are heavier than air.	Explicit consideration should be given to gases that are heavier than air and prone to pooling/displacement of breathable air	X			
10	5.11	If probabilistic arguments are made when considering airborne dispersal then these should include identification of prevailing and dominant wind directions.	There is a need to add a comment about the effects of prevailing wind on dispersal of fluids in water (eg in a dock, cooling ponds, etc)	X			

Comments on Section 6

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:		Page 1 of 1					
Country/Organization: Belgium /		Date: 27 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
19.	6.1	... This facilitates comparison of the explosive potential of different substances and many empirical formulae for predicting the effects of explosives are derived on the basis of TNT equivalence [19]. These should be used with care like detailed in 6.19.	This introduction comment should refer to 6.19 which mentions limitation of TNT equivalent model for VCE.	X			

20.	6.4	Explosion at an industrial site usually occur due to over- pressurization of contained liquids and/or gases, or due to deflagrations of liquid pool fires, leaks from or failure of storage tanks and pipelines, <u>chemical reaction/run-away</u> and accidents with explosives. In addition, dust explosions can also occur where any dispersed powdered combustible material is present in high-enough concentrations in the atmosphere or other oxidizing gaseous-medium gaseous medium. Explosions caused by any reason should be considered.	Add “chemical reaction/run-away” because they should be also considered as a cause of explosion. Gaseous medium :Delete repeated words	X			
21.	6.6	... Liquid Petroleum Gas (LPG), ...	Capital letter “L”	X			
22.	6.7	In case of hydrocarbon liquid pool fires or similar, the hydrocarbon has escaped containment, <u>vapor formed a cloud and this vapor cloud ignited (known as vapor cloud explosion)</u> . In flammable atmospheres, the explosion pressure wave is characterized by a flame front. The speed of propagation of the flame front depends on the availability <u>quantity/concentration</u> and rate of burning of the fuel source (e.g petroleum vapor). These events generally produce deflagration pressure waves and should be considered. A flammable gas release leading also to a vapor cloud which could be ignited.	The phenomena describes finally a VCE (like detailed further) and it’s important to describe entirely the phenomena and understand that in the case of an explosion, the cloud (formed by the vapors) ignites and not directly the “liquid pool” because it’s the difference between a pool fire and VCE. Availability is not the appropriate term. It should be reworded.	X			
23.	6.8	... often with very dramatic effects and should be considered. <u>Hybrid explosion (ignited mixture cloud with gas and dust) can cause more intensive effects and could be difficult to predict because the data known for separated substances (gas and dust) change in the mixture (lower limit of explosion. Pmax. ...). A specific attention should be required in the assessment of these</u>	Sentence added at the end of 6.8, to draw attention on this important specific phenomena of explosion, for which impact could be more difficult to model	X			

		<u>potential hybrid explosion.</u>					
24.	6.10	An explosion can produce pressure waves (dominant hazard), projectiles, heat, smoke, dust and ground shaking. A vapour cloud-explosion is also possible if relevant conditions are met and these should also be considered	See comment about 6.8 –VCE is considered in this point and should not be “partially”discussed in 6.10.			X	It does not create any issue; however it reinforces that statement as explosion is also linked to VCE.
25.	6.17	... (SE See Table A.II). ...	Typographical correction	X			
26.	6.19 and 6.20	Insert title “ Screening by distance ”above 6.19 and move title “Screening by probability” above 6.20	6.19 is related to screening by distance (not by probability). Should be adapted similar to titles above 5.20 and 5.21.	X			
27.	6.20	If a hazard cannot be screened out by distance, generic event data can be used. ..	Generic event data concerning what? Concerning occurrence frequencies? Please clarify.	X			It is clarified.
28.	6.26 (and table A.III in annex)	Additional point: Parameters allowing the determination of the release rate of the flammable source have to be known (evaporation rate in the case of a flammable pool of hydrocarbon, release rate for flammable gas release)	Proposal to add this hazardous parameter	X			
COMMENTS BY REVIEWER Reviewer: Danielle Carrier Country/Organization: Canada /				RESOLUTION Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	6.4	“In addition, dust explosions can also occur where any dispersed powdered combustible material is present in high-enough concentrations in the atmosphere or other oxidizing gaseous medium gaseous medium. ”	Editorial change	X			
2.	6.6	At the end of this para, add the following: “BLEVE induced missile damage should also be considered”.	To identify the need to include BLEVE induced missile damage in hazard assessment.	X			

3.	6.17	"First, the regions should be located based on SDV ^g values (SE See Table A.II)."	Editorial change	X			
COMMENTS BY REVIEWER Reviewer: - Mohamed GAHEEN (NUSSC member) - Areej Ahmed Country/organization: Egypt / Egyptian Nuclear & Radiological Regulatory Authority ENRRA Date: 11 April 2021				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
13.	6.4	" in the atmosphere or other oxidizing gaseous medium gaseous medium ".	➤ it is repeated two times (Editorial issues).	X			
14.	6.12	"..... local topography and the layout of structures at the site".	➤ It should be noted that the layout of structures at the site can lead to reflected pressure wave, the pressure may increase several times and is designated as reflected overpressure and It should be applied as an additional external pressure on the structures, so in order to provide for protection against reflected overpressure special attention should be paid for the layout of structures (conceptual or preliminary design) at the site and provide pressure resistance of the structures concerned.		X		
15.	6.20	".....expert opinion after technical inspections of the potential sources in the vicinity of the site".	➤ It is more appropriate methods for calculating the likelihood of an explosion with expert opinion after technical inspections of the potential sources in the vicinity of the site if there are not enough statistical data available for the region		X Para. is revised adding site visit.		

			to conduct an adequate analysis or references to global statistics data from similar regions.					
COMMENTS BY REVIEWER					RESOLUTION			
Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./ Page 1 of 13 Date: 27.04.2021								
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.	6.3, last sentence	These pressure waves, also known as blast waves, propagate approximately as spherical waves expanding away from the source location and should be considered. However, they are influenced by the ground and other confining surfaces. The specific energy in a spherical wave front attenuates according to the inverse square law based on distance from the source if no further energy is being added (e.g. by continued burning) to the wave. However, constrained blast waves may attenuate much more slowly ⁸ . <i>More details are provided in Ref. [19].</i>	Change reference to “Methods for the calculation of physical effects – due to releases of hazardous materials (liquids and gases) –“ ‘Yellow Book’ CPR 14E Editors: C.J.H. van den Bosch, R.A.P.M. Weterings The Hague, 1996 The Director-General for Social Affairs and Employment Committee for the Prevention of Disasters Third edition Second revised print 2005 This reference is widely accepted as state of the art in determining explosion effects, rather than reference [19]			X	IAEA safety guides cannot give reference to yellow book.
3	2.	6.4	6.4. Explosions at an industrial site usually occur due to over-pressurization of contained liquids and/or gases, or due to deflagrations of liquid pool fires,	An issue concerning specific hazard of underground	X			

			leaks from or failure of storage tanks and pipelines, and accidents with explosives. In addition, dust explosions can also occur where any dispersed powdered combustible material is present in high-enough concentrations in the atmosphere or other oxidizing gaseous medium gaseous medium . <u>In underground operations, also outbursts of natural gases such as methane may create explosions.</u> Explosions caused by any reason should be considered.	(industrial) sites such as mines should be mentioned as well.				
2	3.	6.6, Line 5	... BLEVEs can occur to all sorts of contained substances, but generally occur when tanks containing pressurised liquid Petroleum Gas (LPG), Liquid- Nitrogen Natural Gas (LNG) or propane fail catastrophically. ...	LNG is usually the abbreviation of “Liquified Natural Gas” and this is what is probably intended here. This assumption is supported by the fact that later in the paragraph the ignition of LNG is mentioned.	X			
1	4.	6.11.	Explosions are very likely to create secondary hazards. For example, structural damage close to the event can generate projectiles, <u>destroy critical infrastructure</u> and initiate fire. Secondary hazards associated with explosions should be considered.	We suggest to add “destroy critical infrastructure” in this place as a major secondary effect of explosion to be considered, since it may lead to further effects such as dam failures.	X			
3	5.	6.17	Sources of explosions are listed in Table A.III. Guidance on data collection is provided in Section 4. First, the regions should be located based on SDV ^g values (SE <u>see</u> Table A.II).	Editorial	X			
COMMENTS BY REVIEWER Reviewer: India Country/Organization: India					RESOLUTION Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection	

1.	Page 29 7.18	(d) Quantity of the hazardous substance.	The quantity of the material has implications with respect to escalation and severity of consequences.		X Added in Table A.III to cover all quantities of all hazardous material		
COMMENTS BY REVIEWER Reviewer: India Country/Organization: India				RESOLUTION Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
5.	Page 26 Para 6.20 Line 3	If there are not enough statistical data available for the region to permit an adequate analysis, reference should be made to global statistics, to pertinent data from similar regions and/or expert elicitation method .	Proper 'expert elicitation method' should be considered instead of 'expert opinion'.	X			
Note: the proposed additions are made in Red Color in Bold font with yellow highlight. The proposed deletion is kept in Red Color with Red-strikethrough							

Comments on Section 7

COMMENTS BY REVIEWER Reviewer: Country/Organization: Belgium /				RESOLUTION Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
29.	7.2	A survey should be made at and around the site to identify potential sources of fire, such as forests, peat, storage areas for low-volatility flammable materials (especially hydrocarbon storage tanks), wood or plastics, f	Proposal to use " <i>flammable material</i> ", instead of " <i>low-volatility flammable material</i> ". We assume the intent is to cover flammable liquids, but even flammable gas can cause a fire hazard, independently of an explosion, such as a jetfire	X			

30.	7.3	“Fires arising from highly flammable materials such as petroleum products typically occur as fireballs (...)” Depending on the nature and properties of the flammable substance (volatility, physical state, storage conditions, release type...) different fire phenomenon can be observed: e.g. pool fire, jet fire, fireball, or vapour cloud explosion...These events may occur simultaneously or sequentially and must be taken into consideration	We do not completely agree with the sentence struck through: fireballs usually result from the “violent” release of the substance (BLEVE, or aircraft crash) associated with instantaneous ignition: for example kerosene released from an aircraft crash is not “highly flammable” but can nevertheless lead to a fireball. Proposal for a significant rewording	X			
31.	7.6 (and table A.V)	<u>Propose to add an additional point:</u> Thermal heating from external fire could create secondary hazard. For example, structural damage creating a leak with a hazardous release leading itself to another phenomena. Secondary hazard associated with thermal heating should be considered.	potential damage on structure can create a secondary hazard (– fire, explosion, release of hazardous substances)	X			
COMMENTS BY REVIEWER Reviewer: Danielle Carrier Country/Organization: Canada /				RESOLUTION Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	7.17	Suggest adding a foot note regarding the sources of thermal exposure: The thermal radiation hazards of concern are: <ul style="list-style-type: none"> • BLEVE hazard with accompanying fireball – e.g. from a rail line LPG; • Jet fire hazard from natural gas pipeline failure; 	To identify sources of thermal exposure to SSCs			X	Detailed information on thermal exposure to external nuclear installation structures, systems and components are provided in IAEA safety report [19].

		<ul style="list-style-type: none"> • Pool fire hazard from a fire in an oil storage tank dike; and • Fuel fire following an aircraft crash. <p>Thermal radiation impacts to outdoor equipment are the only effect of concern at a nuclear power plant.</p> <p>Thermal radiation levels exceeding 37 kW/m² are considered to damage process equipment. In addition, with the exception of the BLEVE hazard, thermal radiation effects are localized and do not impact over large distances.</p>					
<p align="center">COMMENTS BY REVIEWER</p> <p>Reviewer:</p> <ul style="list-style-type: none"> - Mohamed GAHEEN (NUSSC member) - Areej Ahmed <p>Country/organization: Egypt / Egyptian Nuclear & Radiological Regulatory Authority ENRRA</p> <p align="right">Page 1 of 1 Date: 11 April 2021</p>				<p align="center">RESOLUTION</p>			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
16.	7.7	".... external fires on the nuclear installation. For example, automatic sprinkler systems or the presence of permanent local fire fighters can reduce the probability of a serious fire ".	➤ it is just to explain what is means by " The protective measures at the nuclear installation against fires".			X	Para. provides general recommendations. Such details are not necessary.
<p align="center">COMMENTS BY REVIEWER</p> <p>Reviewer:</p> <p>Country/Organization: ./France.....</p> <p align="right">Page 1 of 1 Date: 26 March 2021</p>				<p align="center">RESOLUTION</p>			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
10	7.19	Remove (a) and (b)	Those two load characterization parameters (Overpressure as a function of time and Projectiles) are relevant to an explosion hazard, not a fire hazard	X			

COMMENTS BY REVIEWER					RESOLUTION			
Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./ Page 1 of 13 Date: 27.04.2021								
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3	1.	7.18 (a) Bullet 3	Max. credible substance/thermal release, or fire frequency vs. severity relationship	Wording.	X			
2	2.	7.19 (a) and (b)	The following are example of parameters that should be considered and are given in Table A.V (1), (2), (3), (4) and (5): (a) Overpressure as function of time. (b) Projectiles. (c) Heat: — Maximum temperature flux and duration.	Parameters (a) Overpressure and (b) Projectiles are not related to explosions, which are dealt with in chapter 6.	X			

Comments on Section 8

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Country/Organization: Belgium / Page 1 of 1 Date: 27 April 2021							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
32.	8.1	(c) Frequency analysis to determinethe crashes per year per km2 at the location of the nuclear installation site for each aircraft category . In relation to the aircraft category, insert the following guidance oncategories to be considered: • General aviation (up to 5.7ton); • Commercial civil aviation; • Military aviation	See also comment on 8.9			X	Three types of aircraft crashes as explained in 8.9 for each aircraft category. These three types are widely accepted and being followed by MSs for a long time. Any changes will lead to confusions especially in nuclear power embarking countries.
33.	8.9 (relatedarticles such as 8.12)	New text to be added: At the beginning of Chapter 8, it should beclearly indicated	See also our comment made in Step 7 (and to our opinion			X	Same as above

		<p>that there are 3 categories of <u>aircraft types</u> to be considered in the evaluation:</p> <ul style="list-style-type: none"> • General aviation (up to 5.7 ton); • Commercial civil aviation; • Military aviation <p>Further on it should be mentioned that there also different <u>types of aircraft movements</u>: “in flight”, take-off, landing, approaching an airport, etc.</p> <p>And these should not be mixed up, which is the case now in Article 8.9.</p>	<p>“rejected” by IAEA for inappropriate reason).</p> <p>The types of aircraft crashes mentioned in 8.9 are an inappropriate categorization to apply screening.</p> <p>Especially the probabilistic screening in Article 8.12 should be done on the <u>aircraft types</u> (and not on the aircraft movements). This will then lead to a conclusion which types of aircraft have to be considered in the design.</p>				
34.	8.22	<p>... Typical screening parameters that should be applied in this phase are design robustness, distance and magnitude and probability, and zones of influence. ...</p>	<p>See also our comment made in Step 7 (and to our opinion “rejected” by IAEA for inappropriate reason).</p> <p>“Design robustness” is not a screening parameter. We can accept that “design robustness” is moved to Art. 24</p>			X	Design robustness is a very important parameter when considering hazards from HIEEs. For e.g., a NPP with robust design (thick concrete walls) will easily bear high blast pressures or thermal loads or ejected projectiles as compared to a small research reactor constructed in ordinary buildings. So, design robustness should be considered as screening parameter.
35.	8.24	<p>The systematic approach to the evaluation should consider the <u>design robustness of buildings</u> containing ...</p>	See comment on 8.22			X	It is not relevant.
<p>COMMENTS BY REVIEWER</p> <p>Reviewer: Country/Organization: China /</p>				<p>RESOLUTION</p>			
<p>Page 1 of 1 Date: 20 April 2021</p>							

Comment No.	Para/Line No.	Proposed new text		Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	8.17	Sources are included in Table A.III and SDVg in Table A.II. Recommendations on data collection are provided in Section 4. The potential hazards arising from aircraft crashes due to air traffic in the main civil traffic corridors and military flight zones if airways or airport approaches pass within 4 km (SDV3) of the site should be considered.		4 km is from margin or center of the traffic corridors should be clarified, because in common the traffic corridors always with certain width.	X			
COMMENTS BY REVIEWER Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./ Page 1 of 13 Date: 27.04.2021						RESOLUTION		
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejec ted	Reason for modification/rejection
2	1.	8.5, second bullet	It is important to consider all the potential effects of the aircraft crash event on the nuclear installation if any aircraft crash is not screened out, as follows: (a) Direct effects: — Impact damage to structures including perforation and penetration; — Vibration effects; — Global stability. (b) Secondary effects: — Secondary missiles ejected from the impact site and scattering widely; — Rapid spread of flammable liquid from the point of impact, including impulsive damage to structures from the released momentum of the liquid when ejected from the aircraft; — Entry of combustion products into ventilation or air supply systems; — Fire and explosion generating heat and blast effects and generating tertiary missiles, — Release of hazardous substance carried as cargo.	The momentum of released liquids can be considered a third order effect in comparison to projectiles caused by an aircraft crash. One should not deal here with minor aspects.	X			
1	2.	8.7	Fire from fuel spillage can result into fireball or pool fire or both and should be considered. Combustible	The current text is incomplete, because it	X			

			<p><u>cabin materials, payloads or carbon fibre based structural materials will also be involved into fire and should be counted as fire loads.</u></p> <p>Details are provided in Ref. [19].</p>	<p>addresses only "fuel", resulting into "fireball" and "pool fire". This excludes solid fire loads. The solid fire loads mentioned in the proposal represent an important fraction of the total fire load. Especially because a major fraction of the kerosine immediately burns in a fire ball, the solid materials play an important role for the ground fire scenario and for fire duration. When the scenario is an aircraft that hits a building, the typical assumption is that the wings including the wing-tanks will be separated and do not enter the building. In contrast, the fuselage, which contains a lot of solid combustibles (cabin materials, payload) may enter the building. New aircraft designs like the B-787 are even constructed of a carbon-based, combustible fuselage. To ignore solid combustibles is a methodical shortcoming which could lead to a massive</p>					
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				underestimation of fire loads for many relevant accident scenarios. Adding them in the para. has nothing to do with too much details.				
2	3.	8.10	Information of aircraft crashes in respective country should be collected from the civil and military aviation authorities of the country or other departments working in the aviation industry. Details should include aircraft crashes of all types of different aircrafts flying in the country. SDV^s is not applicable for this type event.	Clarification. Duplication with 8.11	X			
3	4.	8.11	Screening by distance is not applicable for this type of event.	Wording.	X			
3	5.	8.25	All buildings housing the structure, system and components necessary to prevent an accident should be identified for screening or evaluation.	Wording.	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Prof. Dr. Attila Aszódi Country/Organization: Hungary/ Budapest University of Technology and Economics, Institute of Nuclear Techniques Date: 20.04.2021				Page 1 of 4			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	Regarding Page 30 / Para 8.1		It could be mentioned (maybe in the footnote) that in several countries the crash of a large passenger airplane shall be postulated, independently from the actual probability. It is also in-line with international recommendations.	X			Added in the beginning as (e).
2.	Section 8		Regarding the determination of the crash probability and screening probability I see some uncertainties in the document.			X	Comment is not clear, and no specific proposal was given.
3.	In the Chapter 8. <i>Aircraft crash</i> in		“each type of both civil and military crashes” is mentioned.	X			No comment

	subchapter <i>Hazard assessment</i> in Paragraph 8.12. (Page 31)					
4.	In Paragraph 8.13.		<p>“classes of aircraft” is mentioned</p> <p>It is not clear what do you mean by “<i>each type of both civil and military crashes</i>” and by “<i>classes of aircraft</i>”. What is the relation of those two expressions to each other used in Paragraph 8.12 and Paragraph 8.13?</p>		X	There are different types of both civil and military aircrafts are flying in a country. For e.g Cessna, B737, B747, phantom Mirage etc and each kind of this aircraft should be studied.
5.	Para 8.19. (Page 32)		<p>For the Type 3 events in Para 8.19. it is stated: <i>“Those aircrafts for which probability of occurrence is less than the SPL can be screened out.”</i> Here <i>aircraft</i> is mentioned, not <i>type</i> and not the <i>classes</i>. In my view it is not clear in this terminology what do you mean by type? Is Boeing 737 an aircraft type? Or Boeing 737-100, -200, -400 etc. are separate types? Is the Boeing 737 MAX a separate type? It is not clear from the draft. What do you mean by classes? And maybe more importantly it is not clear, what was the intention, should be the crash probability of those – let’s call them – “sub-types” added? In my view in big categories – like small aircrafts, large passenger airplanes, military aircrafts – all the probabilities shall be summed up. The different types and sub-types cannot be screened out individually.</p>		X Para 8.19 is modified. Please see reply to No.4.	

			I don't see clearly the intention related to this issue in the draft. Maybe I was not precise enough by reading the document. It would be useful to add the appropriate definitions and use the expressions consequently. The text on screening should be clarified and specified more comprehensively.				
COMMENTS BY REVIEWER Reviewer: Zsolt Kovacs Country/Organization: Hungary/Paks II. Ltd.				RESOLUTION Page 1 of 2 Date: 01.03.2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2.	8.1.		<p>"Frequency analysis to determine the crashes per year per km² at the location of the nuclear installation site for each aircraft category."</p> <p>Is it allowed to use probability based screening for aircraft categories independently from each other, or should frequencies for categories be summed up before screening?</p> <p>Should frequencies for aircraft categories or types be defined?</p> <p>Clarification is needed.</p>			X	<p>"Is it allowed to use probability based screening for aircraft categories independently from each other".</p> <p>Answer is yes.</p> <p>"should frequencies for categories be summed up before screening?"</p> <p>Answer is no.</p> <p>"Should frequencies for aircraft categories or types be defined?"</p> <p>Question is not clear.</p>
3.	8.30		<p>Should a BDEE (small) and a BDBEE (heavy commercial) aircraft types be determined associated with aircraft crash? The acceptance criteria should be different in the two cases.</p>	X			Acceptance criteria is different.
COMMENTS BY REVIEWER Reviewer: India Country/Organization: India				RESOLUTION Page 1 of 1 Date: 27 April 2021			

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2.	Page 8 Para 3.4 Line 4	Safe distances from potential sources vary greatly, for example a chemical plant located close to a nuclear installation which is well protected by hills may have a smaller SDV^g as compared to a nuclear installation located far away on flat area with predominant winds blowing towards the site	For better clarity.			X	Safe distances from potential sources vary greatly depending on conditions. Safe distance could be smaller depending on local topography. Sentence is clear.
3.	Page 30 Para 8.2 Line 3	Aircrafts should be considered to be a mixture of hard and soft missiles and impact onto reinforced concrete structures typically results in damage modes such as perforation, penetration, scabbing, spalling , local punching, bending failure and vibrations.	Spalling can also happen due to aircraft impact. So this may also be included.	X			
4.	Page 31 Para 8.6 Line 4	Use of concrete constitutive models should be verified by numerical analysis. The constitutive model of concrete shall be capable of capturing the nonlinear behavior at high strain rates and high confining pressure.	Additional sentence proposed to bring more details on the constitutive model.			X	The proposal is correct however it should not be in this hazard guide. It is in the scope of design guide. Previous sentences as also removed.

<p style="text-align: center;">OMMENTS BY REVIEWER</p> <p>Reviewer: BAPETEN Country/Organization: Indonesia</p>				<p style="text-align: center;">RESOLUTION</p>			
<p style="text-align: right;">Page 1 of 6 Date: 28 April 2021</p>							

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
17.	8.13/3	The probability of occurrence of all types of aircraft crashes should be evaluated by dividing site area by the regional area and multiplying by crashes/year for different types, considering the site as a tract or circular area of 0.1–1 km².	Move the phrase of “ <i>considering the site as a tract or circular area of 0.1–1 km²</i> ” to the end of the sentence or clarity purposes. Please also define tract or circular area, especially when the actual site area more than 1 km ² .		X Already modified with another MS comment		

<p style="text-align: center;">COMMENTS BY REVIEWER</p> <p>Reviewer: Japan NUSSC Member</p>				<p style="text-align: center;">RESOLUTION</p>			
<p style="text-align: right;">Page 1 of 1</p>							

Country/Organization: Japan / Nuclear Regulation Authority (NRA)				Date: 1 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2.	8.12. 8.13. 8.14. 8.17. 10.18.	<p>8.12. Aircraft crash data covering a regional circular area of 100-200 km in radius for each type of both civil and military crashes should be determined <u>(e.g. typically 100-200 km in radius, as stated in TABLE A.II.)</u>.</p> <p>8.13. The probability of occurrence of all types of aircraft crashes should be evaluated by considering the site as a tract or circular area of 0.1-1 km², by dividing site area by the regional area and multiplying by crashes/year for different types <u>(e.g. typically 0.1-1 km², as stated in TABLE A.II.)</u>.</p> <p>8.14. A separate check should be carried out for both types. Most aircraft crashes tend to occur within approximately semi-circular areas of 8 km (SDV2) in radius centred at the ends of the runways <u>(e.g. typically 8 km in radius, as stated in TABLE A. II.)</u>.</p> <p>8.17. The potential hazards arising from aircraft crashes due to air traffic in the main civil traffic corridors and military flight zones if airways or airport approaches pass within 4 km (SDV3) of the site should be considered <u>(e.g. typically 4 km, as stated in TABLE A. II.)</u>.</p> <p>10.18. This hazard should be handled in a special way if the bombing and firing ranges are within the SDV of 30 km <u>(typical SDVg is given in TABLE A.II.)</u></p>	<p>The same comment in #1.</p> <p>These generic specific distance values should be referred the table in the annex as typical values.</p> <p>It is the same in para. 3.3.</p> <p>In addition, these values are updated in annex in SSG-35 from older information stated in footnotes in NS-G-3.1.</p>	X			

3.	8.23.	Significant effort has been expended internationally to develop cost effective approaches to addressing the issues of extreme human induced external events by following a systematic approach. An approach similar to the zone of influence approach is recommended should be used. The concept of defining areas of consequence for each of the hypothesized impact locations is employed. The areas of consequence are denoted as damage footprints. Damage footprints are defined for impact, shock and fire loading conditions.	Completeness. “Significant effort has been expended internationally” is too vague without any references in the guide. In addition, it should be specified a recommendation clearly as the guide using “should” statement.	X			
COMMENTS BY REVIEWER Reviewer: Aisha Abdelbasat Tantoush Country/Organization: Libya				RESOLUTION Page 1 of 3 Date: April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
8.	8.19	[...]which <u>the</u> probability of occurrence is less than the SPL can be screened out. <u>Otherwise</u> , it should be retained for detailed evaluation.	Improved clarity/grammar.	X			
COMMENTS BY REVIEWER Reviewer: PNRA Country/Organization: Pakistan/PNRA				RESOLUTION Page 1 of 1 Date: April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2.	8.2	Aircrafts should be considered to be a mixture of hard and soft missiles and impact onto reinforced concrete structures typically results in damage modes such as perforation, penetration, scabbing, spalling , local punching, bending failure and vibrations.	In addition to mentioned damage modes, spalling (the ejection of target material from the front face of the target) also results after aircraft impact. This may also be included.	X			
COMMENTS BY REVIEWER Reviewer: Country/Organization: Slovakia/Slovenské elektrárne, a.s.				RESOLUTION Page 1 of 1 Date:08.03.2021			

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3.	8.3	Modified sentence: ... Malicious aircraft crash is not considered in this Safety Guide however some of the methods recommended herein, may also be applicable to malicious aircraft crash when such scenario can not be screened out.	The addition specifies that only those malicious scenarios are considered which can not be screened out as mentioned in the first sentence. This modified sentence is now harmonised with 8.5.	X			

Comments on Section 9

COMMENTS BY REVIEWER					RESOLUTION			
Reviewer: Danielle Carrier Country/Organization: Canada / Page 1 of 1 Date: 27 April 2021								
Commen t No.	Para/Line No.	Proposed new text		Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	9.9	“If it does not a ship(s) cannot impact, the hazard can be screened out.”		Editorial change	X			
COMMENTS BY REVIEWER					RESOLUTION			
Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./ Page 1 of 13 Date: 27.04.2021								
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejec ted	Reason for modification/rejection
1	1.	9.9	Screening by distance <i>Based on the collected data and the protective measures at the site, it should be checked whether a ship(s) can impact an intake structure. Local bathymetry and predominant tide and wind direction are important considerations, but worst met conditions should be considered. If it does not impact, the hazard can be screen out.</i>	Please check the content or the placing of this paragraph (relation to heading “screening by distance”?) It is not clear what is the relation to distance.	X			Clarified in text.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: BAPETEN Country/Organization: Indonesia		Page 1 of 6 Date: 28 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
18.	9.1/2	<p>need additional description on:</p> <p>hazard assessment for trucks or trains carrying hazardous substances, specifically description on:</p> <ul style="list-style-type: none"> • source identification • screening by distance, • screening using probability, • detailed evaluation 	<p>Para 9.1 road transport and rail transport, marine transport, river transport, and pipelines are categorized in “mobile sources excluding air traffic which may create HIEEs”.</p> <p>Chapter 9 only provides hazard assessment for: marine and river vessels and cargoes consisting of, and pipelines conveying, hazardous substances</p>			X	Please see section 9.4: All hazards should be dealt in accordance with the recommendations provided in the previous sections by taking minimum distance from the nuclear installations.
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: SEC NRS Country/Organization: Russia Federation / SEC NRS		Page 1 of 1 Date: 26 March 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
4.	9.22	Recommended to define the term «conservative».	Clarification			X	Need not to be defined as used commonly in engineering to show that there exists a margin in estimated parameters.

Comments on Section 10

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Danielle Carrier		Page 1 of 1					
Country/Organization: Canada /		Date: 27 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	10.3	“Recommendations on local geotechnical issues are provided in IAEA Safety Standard Series No. NS-G-3.6, Geotechnical Aspects of Site Evaluation and Foundations for Nuclear Power Plants 6 [23] and...”	Incorrect reference	X			All references corrected
2.	10.3	“...recommendations on geological issues are provided in IAEA Safety Standard Series No. DS507, Seismic Hazards in Site Evaluation for Nuclear Installations [2].”	Reference [2] is not DS507 report. DS507 reference is missing	X			
3.	10.7 (c)	“Relevant geological, <u>hydrogeological</u> and geotechnical ground conditions;	Extraction of oil and ground water in the vicinity of the site can lead to subsidence, which need the hydrogeological condition of the site for subsidence evaluation.	X			
4.	10.9	In the last 2 nd line of the para, “When information on these cannot <u>be</u> obtained...”	Editorial Change	X			
5.	10.13	“The sources could include both portable and fixed equipment (e.g. portable transceivers, arc weld <u>ers</u> ing, power supplies, and generators).”	Editorial Change	X			
6.	10.18	“This hazard should be handled in a special way if the bombing and firing ranges are within the SDV <u>g</u> of 30 km.”	Editorial change	X			
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:							
- Mohamed GAHEEN (NUSSC member)							
- Areej Ahmed							
		Page 1 of 1					

Country/organization: Egypt / Egyptian Nuclear & Radiological Regulatory Authority ENRRA				Date: 11 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
17.	10.3	It is proposed to add " IAEA Safety Standard Series No. DS507, Seismic Hazards in Site Evaluation for Nuclear Installations [2] " to the reference section.	➤ it has not been added in the reference section (missed in references section).	X			All references are corrected.
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: M-L Järvinen Country/Organization: STUK				Page.... of.... Date: 1 st June 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	10.18	Information on the frequency of <u>overhanging ordnance</u> , flight path(s) taken to a <u>recovery site</u> ...	Please check the expressions overhanging ordnance and recovery site. Also consider using more explicit expressions.			X	This section refers to data collection from military facilities. It is a military terminology and recommended by a MS.
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Zsolt Kovacs Country/Organization: Hungary/Paks II. Ltd.				Page 1 of 2 Date: 01.03.2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
4.	10.		Further hazards should be considered (or mentioned at least) as other human induced external events, such as: <ul style="list-style-type: none"> radiation effect (in case of severe accident of nearby nuclear installations), disturbances in the connection of external electric grid, including 		X The first three item are mentioned under other human induced events at 10.19. However drop of heavy loads		

			its lasting and total inoperability, <ul style="list-style-type: none"> • impact of damage to the facilities of headrace and tailrace (in case of fresh water cooling, e.g. river), • drop of heavy loads (on site event), • site dust burden (on site event). 		and site dust are minor events to be mentioned.		
5.	10.		In case of multiple nuclear installations, the unit under construction could have an impact on the operating unit.	X			
COMMENTS BY REVIEWER Reviewer: PNRA Country/Organization: Pakistan/PNRA				RESOLUTION Page 1 of 1 Date: April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3.	10.6/4such solutions might not be possible but administrative measures like restrictions on mines, exploitation of natural gas fields, water wells and oil wells etc. in the site vicinity might be available.	On existing NPP site, engineering solutions to avoid ground subsidence may be difficult and costly. Therefore, administrative measures like restrictions of such human induced activities should be taken.	X			
COMMENTS BY REVIEWER Reviewer: Aisha Abdelbasat Tantoush Country/Organization: Libya				RESOLUTION Page 1 of 3 Date: April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
9.	10.10.	[...]and control systems is are increasing the vulnerability to electromagnetic interference	Improved clarity/grammar.			X	Correctly written

Comments on Section 11

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:		Page 1 of 1					
Country/Organization: Belgium /		Date: 27 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
36.	11.10	In applying the graded approach to existing nuclear installations, it should be noted that most installations other than NPPs may not have sufficient inherent robustness against HIEEs. It may also be inappropriately costly to protect them against some HIEE through design, e.g. the crash of a large aircraft. Therefore For new nuclear installations , necessary precautions should be taken at an early stage to protect the nuclear installation through appropriate siting whereby ampleSDVs are provided for major HIEEs.	In Step 7, our commentson Art. 11.12 was rejected, saying that thisSG will be applicable tonew and existing installations. We agree with that, but then Art. 11.10 in Step 8 should be reworded as indicated.		X Para is modified. First part should be general. But second part is for new nuclear installations.		
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Danielle Carrier		Page 1 of 1					
Country/Organization: Canada /		Date: 27 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	11.8	"...should be based on the radiological consequences of the release of radioactiveity from the installation..."	Editorial change	X			
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:		Page 1 of 1					
Country/Organization: China /		Date: 20 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

2.	11	EVALUATION OF EXTERNAL HUMAN INDUCED HAZARDS FOR NUCLEAR INSTALLATIONS OTHER THAN NUCLEAR POWER PLANTS.	Detailed classification suggestion list should be given for different kind of Nuclear installations.			X	Sufficient information is given to classify the nuclear installation other than NPPs in Section 11.	
COMMENTS BY REVIEWER Reviewer: M-L Järvinen Country/Organization: STUK				RESOLUTION Page.... of.... Date: 1 st June 2021				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection	
1.	11.8	... consequences of the release of radioactive <u>substances</u> from the installation ...	A word seems to be missing.	X			It is modified as “radioactivity”.	
COMMENTS BY REVIEWER Reviewer: Country/Organization: ./France.....				RESOLUTION Page 1 of 1 Date: 26 March 2021				
Para/Line No.	Proposed new text		Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection	
11.8	This may have been performed at the design stage or later. In general, the criteria for categorization should be based on the radiological consequences of the release of radioactive materials from the installation		Missing word		X Already changed to radioactivity. There is a comment also from a MS.			
COMMENTS BY REVIEWER Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./					RESOLUTION Page 1 of 13 Date: 27.04.2021			
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3	1.	11.4	The likelihood that an HIEE will give rise to radiological consequences will depend on the characteristics of the nuclear installation (e.g. its purpose, layout, design, construction and operation)- and .	Surplus word.	X			

1	2.	11.4 (f)	The changing nature of the configuration and layout of installations designed for experimental work (such activities have an associated intrinsic unpredictability or underground openings);	Underground development works (e.g. driving new tunnels) may also lead to a changing nature of nuclear installations (e.g. ventilation routes or disposal chambers).	X			
1	3.	11.5.	Although most nuclear installations are located at surface sites, some smaller nuclear installations may be located below the surface. Most HIEEs are expected to have limited potential to affect the safety of a subsurface installation, although those that can induce ground failure or affect ventilation systems should be considered. However, any effects will depend on the HIEEs to which the installation is subjected to and the nature of the installation.	Provision of fresh air and removal of exhaust air is another important safety feature to underground workings.	X			
2	4.	11.8 Line 2	... In general, the criteria for categorization should be based on the radiological consequences of the release of radioactive material from the installation, ranging from very low radiological consequences to potentially severe radiological consequences.	Missing word.		X Already corrected to radioactivity		
2	5.	11.10, Line 1	In applying the graded approach to nuclear installations, it should be noted that most installations other than NPPs may not have sufficient inherent robustness against HIEEs	There are nuclear installations other than NPPs that are robust. "Most" is not needed here.	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: BAPETEN		Page 1 of 6					
Country/Organization: Indonesia		Date: 28 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
19.	Para 11.9/1	three or more categories of nuclear installation may	Relevant only to nuclear facilities or radioactivity related hazard.	X			
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: SEC NRS		Page 1 of 1					
Country/Organization: Russia Federation / SEC NRS		Date: 26 March 2021					

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
5.	11.11 (c).	Examples of application of a graded approach to the intermediate category of hazardous installation are proposed to be provided.	Providing some practical examples of application of a graded approach to the intermediate category of hazardous installations as the most numerous (e.g. for nuclear fuel cycle facilities) is to be useful.		X Para. 11.11 is modified.		
COMMENTS BY REVIEWER Reviewer: UK consultees via ONR Country/Organization: UK Date: April 2021				RESOLUTION Page.1. of 2			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
11	11.4	Correct “operation) and. Such”	Incomplete sentence	X			
12	11.5	A subsurface installation will be supplied by services that could be affected by a HIEE. Also, not all subsurface installations will be small.	Scope should be as wide as possible to include sub-surface installations.	X			
13	11.10	This paragraph seems to undermine the graded approach. Suggest deletion.	Consistency of message.			X	It gives an important message to conduct appropriate siting for installations other than NPPs.

Comments on Section 12

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Danielle Carrier Country/Organization: Canada /				Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	12.1	“A management system is required to be established, applied and maintained in	Incorrect reference	X			

		accordance with IAEA Safety Standards Series No. GSR Part 2, Leadership and Management for Safety [20] [7].”					
COMMENTS BY REVIEWER Reviewer: Aisha Abdelbasat Tantoush Country/Organization: Libya				RESOLUTION Page 1 of 3 Date: April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
10.	12.12.	The independent peer review team members should include the multidisciplinary Expertise to address all technical and process related aspects of the HIEE hazard analysis. [...]	Its seems the article use may be incorrect here.			X	Correctly written
COMMENTS BY REVIEWER Reviewer: UK consultees via ONR Country/Organization: UK				RESOLUTION Page.1. of 2 Date: April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
14	12.6	Reference 21 doesn't appear to be correct. Should it be 22?		X			Corrected

Comments on Appendix

COMMENTS BY REVIEWER Reviewer: Country/Organization: Belgium /				RESOLUTION Page 1 of 1 Date: 27 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
37.	Table A.V	For 1) Pressure wave, in the column “Consequences of hazard effects”, add the following : Collapse of parts of structure or disruption of systems and	These additional consequences of hazardeffects can also occur with pressure wave andwithout projectile	X			

		components; <u>Damage to structure Secondary hazard</u> <u>(– fire, explosion, release of hazardous substances)</u>					
38.	Table A.V	For 3) Heat, in the column “Consequences of hazard effects”, add the following : Associated flames and fires. Sparks can ignite other fires Smoke and combustion gas of fire can drift towards the installation Heat (thermal flux) and potential damage on structure Secondary hazard (– fire, explosion, release of hazardous substances)	Thermal heating could lead to damage structure leading itself to hazardous release.		X Added secondary effects as sparks, fires, smoke, etc		
COMMENTS BY REVIEWER Reviewer: Danielle Carrier Country/Organization: Canada / Page 1 of 1 Date: 27 April 2021				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
4.	Appendix, Table A.III, Item 4	Item d) Aircraft crash	No chance to lead to aircraft crash by railway trains and wagons, road vehicles, ships, barges, pipelines.			X	Observation is correct but it is written for completeness of the table.
5.	Appendix Table A.III Item 1 f) other HIEES, Page 56, Bullet 6 in the column of Relevant source-related information to be collected	“Relevant geological/ <u>hydrogeological</u> /geotechnical ground conditions”	Extraction of oil and ground water in the vicinity of the site can lead to subsidence, which need the hydrogeological condition of the site for subsidence evaluation.	X			
6.	Appendix Table A.IV Item a)	1) Remove the following under HIEES <ul style="list-style-type: none"> • Release of large volumes of water or change of watercourse 	Miscategorized external flooding into the category of Release of Hazardous Substance.	X			

		2) Remove the following under Possible hazard at NI site • Flooding on to the nuclear site, or change of water table Address the above under Item f) Other HIEEs (see Comment 37)					
7.	Appendix Table A.IV Item f)	1) Add the following under HIEEs “Release of large volumes of water or change of watercourse” 2) Add the following under Possible hazard at NI site “Flooding on to the nuclear site, or change of water table”	Recategorize external flooding from Release of Hazardous substance to the category of Other HIEEs	X			
8.	Appendix Table A.V Item 9) page 68	“Settlement, differential settlement, settlement rate...” settlement displacement	Improper wording	X			
COMMENTS BY REVIEWER Reviewer: M-L Järvinen Country/Organization: STUK				RESOLUTION Page.... of.... Date: 1 st June 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	Appendix Table A1 (f)	... ground borne currents ...	Remove “eddy”. Stray or leak currents in the ground close to e.g. electric railways may be cause significant problems but we have not found reference of problems due to especially eddy currents in the ground.	X			It is deleted.
COMMENTS BY REVIEWER Reviewer: Country/Organization: /France.....				RESOLUTION Page 1 of 1 Date: 26 March 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

12	Table A.III (1)	Remove d) Aircraft crash	The mentioned stationary sources cannot cause an aircraft crash			X	Observation is correct and redirects to (3), For completeness.
13	Table A.III (3)	Airport facilities or traffic? , air traffic	Airport facilities including fuel storages are stationary sources. Or is it "airport traffic" (runway, etc.) ? which may cause a hazard only if the airport is very close to the nuclear installation. Alternatively "airport" should be deleted	X			
14	Table A.III (3)	d) Aircraft crash Add " National and regional crash data " in Relevant source-related information to be collected	Those data are required to perform the screening detailed in the guide	X			
15	Table A.III (4)	Remove d) Aircraft crash	The mentioned transport related sources cannot cause an aircraft crash			X	Observation is correct and redirects to (3), For completeness.
16	Table A.III (4)	e) Transport events Add " Transportation accident data " in Relevant source-related information to be collected	Those data are required to perform the screening detailed in the guide	X			
17	Table A.IV d)	<ul style="list-style-type: none"> Impact damage to structures including perforation, penetration Vibration effects Global stability should be marked as primary effects of an aircraft crash	Consistency with paragraph 8.5	X			
18	Table A.IV f)	o Fire should be marked as a secondary event	Listed Other HIEEs would directly cause a fire	X			
19	Table A.V 4)	Blockage of ventilation intake filters	Added precision	X			
20	Table A.V 8)	Add Loss of safety functions requiring water (in case of drought) in Consequences of hazard effects	Missing consequence related to drought	X			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK) Country/Organization: Germany./				Page 1 of 13 Date: 27.04.2021			

Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.	Table A.I (f), second column, line 4-5	Other human induced external events. These include hazards arising from stationary and mobile sources not included in (a) – (e). Four types of HIEEs are included: Subsidence, electromagnetic interference, ground borne eddy currents and bombing and firing ranges, all except the last one without generic SDVs.	Delete “, ground borne eddy currents” – they are mentioned only in this table. If important, it has to be introduced in the analyses chapters.	X			
1	2.	Table A.IV b)	<i>Add (8) in right column.</i>	Dam failure as a secondary effect of explosions (also underground)	X			
1	3.	Table A.IV, d), Aircraft crash	Release of flammable, explosive, asphyxiant , corrosive, toxic or radioactive substances	It is physically impossible that an aircraft carries such amounts of asphyxiant that the gas poses a threat by displacement of air. Only a blimp carries a large amount of asphyxiant helium – however this gas does not care.	X			
2	4.	Table A.V, No. 4) Smoke and Dust	Blockage of intake filters <u>and diesel engine combustion air filters.</u>	These filters do not belong to the ventilation system and may be forgotten. And when filters of the EDGs are clogged by any smoke or dust cloud, this may even be a common mode failure.	X			

OMMENTS BY REVIEWER				RESOLUTION			
Reviewer: BAPETEN		Page 1 of 6					
Country/Organization: Indonesia		Date: 28 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

20.	Table A.III	Peat-land/forest fire	May pose direct and indirect hazard to nuclear facilities operation in forms of fire or smoke.		X Peat is included.		
21.	Table A.IV (c)	Forest and peat-land fire can be added if it is not included in the hydrocarbon category.	Some areas have peat-land areas that can cause fire and smoke impacting wide areas.			X	Hydrogen carbon fire is already included as a broad category.
22.	Table A.IV (d)	Small flying objects such as drones and kites can be added as potential sources.	Popularity of drones for beneficial and recreational activities.		X Drone is added.		
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Aisha Abdelbasat Tantoush Country/Organization: Libya			Page 1 of 3 Date: April 2021				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
11.	Table IV (d) aircraft crash, second column	Release of flammable, explosive, asphyxiant, corrosive, toxic or radioactive substances.	Aircrafts may release hazardous materials while crashing, but to our understanding not asphyxiants in relevant amount. Please clarify	X			
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: UK consultees via ONR Country/Organization: UK			Page.1. of 2 Date: April 2021				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
16	Table A.I (f)	Add text explaining why an SDV ^g cannot be defined for EMI?	It is not self-evident why this is the case			X	Please see para. 10.11. "Generic SDV have not been developed for electromagnetic interference by States and therefore, it should be managed on a site-specific basis for each nuclear installation site."

17	Table A.IV	Either: Write the full hazard name in the final column. Or: State that the numbers are explained in Table A.V.	It was not readily apparent what the numbers in the final column referred to.			X	Already mentioned at the bottom of Table A.IV.
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Comments on References

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Danielle Carrier		Page 1 of 1					
Country/Organization: Canada /		Date: 27 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	References	<p>Please correct the following typographical errors:</p> <p>[1] Change “Safey” to “Safety”</p> <p>[3] Change “Radiaiton” to “Radiation”</p> <p>[12] Change “Installaitons” to “Installations”; Change “Requirments” to “Requirements”</p> <p>[18] Change “Ncuclear” to “Nuclear”; change “Exteranl” to “External”</p> <p>[22] Change “Managmeent” to “Management”</p>	Editorial change	X			
COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:							
- Mohamed GAHEEN (NUSSC member)							
- Areej Ahmed							
Country/organization: Egypt / Egyptian Nuclear & Radiological Regulatory Authority ENRRA							
		Page 1 of 1					
		Date: 11 April 2021					

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	References 1.7, 5.2, 1.10, 6.5, 1.1, 2.1, 2.2, 4.3, 2.3, 1.17, 5.30, and 10.3	It is proposed to correct the number of references which is mentioned in paragraphs to cope with the harmony as stated in reference section. Correct the following: Ref 14 instead of 7 Ref 16 instead of 8 Ref 13 instead of 1 Ref 26 instead of 16 Ref 24 instead of 17 Ref 3 instead of 15 Ref 6 instead of 5 Ref 23 instead of 6	➤ In the reference section, reference 7 stated for IAEA General Safety Requirements No. GSR Part 2 "Leadership and Management for Safety", while in para 1.7 mentioned for IAEA DRAFT SAFETY GUIDE No. DS498 "Extremal Events Excluding Earthquakes". ➤ Likewise in the other references.	X			All references are corrected.
COMMENTS BY REVIEWER Reviewer: - Mohamed GAHEEN (NUSSC member) - Areej Ahmed Country/organization: Egypt / Egyptian Nuclear & Radiological Regulatory Authority ENRRA Page 1 of 1 Date: 11 April 2021				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
18.	Reference 1&2	... Safety Safety Aspects of Nuclear Power Plants.....	➤ Wording/Editorial issues.	X			
19.	Reference 3	It is proposed to use "IAEA Safety Glossary: Terminology Used in Nuclear Safety and Radiation Protection : 2018 Edition".	➤ The DS520 should refer to the last edition/ publication of IAEA Safety Glossary: 2018 instead of IAEA Safety Glossary: 2016.	X			
20.	Reference 3	"Terminology Used in Nuclear Safety and Radiation radiation Protection".	➤ Wording/Editorial issues.	X			
21.	Reference 16	INTERNATIONAL ATOMIC ENERGY AGENCY, "Protection against Internal and External Hazards in the Operation of Nuclear Power Plants, IAEA DRAFT STANDARD DS503, IAEA, Vienna," (in preparation).	➤ the title of safety guide has not been written.	X			

22.	Reference 18	"Office for Neuclear Nuclear Regulation, "Nuclear Safety Assessment Guide - Externanl External Hazards...."	➤ Wording/Editorial issues.	X			
23.	Reference 22	"Application of the Managmeent Management System for Facilities and Activities..."	➤ Wording/Editorial issues.	X			
24.	Reference 27	[21] "dBSdasd".	➤ there is no details or mention to use reference 27.	X			
COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Country/Organization: Japan / Nuclear Regulation Authority (NRA)				RESOLUTION Page 1 of 1 Date: 1 April 2021			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
4.	REFERENCES	<p>[1] INTERNATIONAL ATOMIC ENERGY AGENCY, "Safety Aspects of Nuclear Power Plants in Human Induced External Events: General Considerations <u>Site Evaluation for Nuclear Installations, IAEA Specific Safety ReportStandard</u> Series No. 86SSR-1, IAEA, Vienna," (20179).</p> <p>[7] INTERNATIONAL ATOMIC ENERGY AGENCY, "Leadership and Management for Safety, IAEA General Safety Requirements No. GSR Part 2 Design of Nuclear Installations Against External Events Excluding Earthquakes, DS498, IAEA, Vienna," (2016).</p> <p>[8] INTERNATIONAL ATOMIC ENERGY AGENCY, "Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations, IAEA Specific Safety Guide No. SSG-18Protection against Internal and External Hazards in the Operation of Nuclear Power Plants, revision of NS-G-2.1, DS503, IAEA, Vienna," (2014).</p> <p>[15] INTERNATIONAL ATOMIC ENERGY AGENCY, "External Events</p>	<p>Missing references.</p> <p>[1] must be SSR-1.</p> <p>[7] must be DS498.</p> <p>[8] must be DS503.</p> <p>[15] must be Glossary.</p> <p>References that differ from the citations in the text are listed.</p> <p>[22]-[27] are not cited in the text.</p>	X			All references are corrected.

		<p>Excluding Earthquakes in the Design of Nuclear Power Plants, IAEA Safety Guide No. NS-G-1.5, IAEA, Vienna,” (2003)</p> <p>IAEA Safety Glossary, Terminology Used in Nuclear Safety and Radiation Protection, 2018 Edition,”. (2018)</p> <p>{22} INTERNATIONAL ATOMIC ENERGY AGENCY, “Application of the Managmeent System for Facilities and Activities, IAEA Safety Guide No. GS-G-3.1, IAEA, Vienna,” (2006).</p> <p>{23} INTERNATIONAL ATOMIC ENERGY AGENCY, “Geotechnical Aspects of Site Evaluation and Foundations for Nuclear Power Plants, IAEA Safety Guide NS-G-3.6, IAEA, Vienna,” (2004).</p> <p>{24} INTERNATIONAL ATOMIC ENERGY AGENCY, “Safety of Nuclear Fuel Cycle Facilities, IAEA Specific Safety Requirements SSR-4, IAEA, Vienna,” (2017).</p> <p>{25} INTERNATIONAL ATOMIC ENERGY AGENCY, “Safety of Nuclear Power Plants: Design, IAEA Specific Safety Requirements SSR-2/1 (Rev. 1), IAEA, Vienna,” (2016).</p> <p>{26} INTERNATIONAL ATOMIC ENERGY AUTHORITY, “Safety of Research Reactors, IAEA Specific Safety Requirements SSR-3, IAEA, Vienna,” (2016).</p> <p>{27} “dasdasdasd”.</p>					
<p>COMMENTS BY REVIEWER</p> <p>Reviewer: UK consultees via ONR Country/Organization: UK</p>				<p>Page.1. of 2</p> <p>RESOLUTION</p>			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

15	Ref 3, 18, 22, 27	Various typos.		X			Corrected
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Comments on Annex

COMMENTS BY REVIEWER					RESOLUTION			
Reviewer: Country/Organization: China /					Page 1 of 1 Date: 20 April 2021			
Comment No.	Para/Line No.	Proposed new text		Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3.	TABLE A.II.	GENERIC SCREENING DISTANCE VALUES (SDVg) WHICH ARE USED BY SOME MEMBER STATES		“4 Military installations storing munitions(8km) ” has been included in “6 Distance from military installations or air space usage such as practice, bombing and firing ranges (30km) ”	x			Impact on nuclear installations from military installations storing munitions and military installations or air space usage such as practice, bombing and firing ranges are different.

COMMENTS BY REVIEWER					RESOLUTION			
Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS, BASE, RSK and ESK)								
Country/Organization: Germany./					Page 1 of 13 Date: 27.04.2021			
Relevance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2	1.	Table A.II 5 (i) third column	i) A crash at the site resulting from the general air traffic in the region. 100–200 km SDV ^g do not apply <u>here</u>	Screening by distance is not applicable for this type event – see also Para 8.10 and 8.11. The distance values are no SDV ^g values, but the radius which should be taken for determining the aircraft crash frequency in the region of the site.		X Agreed to modify as Not applicable, guidance at 8.12		

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Japan NUSSC Member		Page 1 of 1					
Country/Organization: Japan / Nuclear Regulation Authority (NRA)		Date: 1 April 2021					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	APPENDIX TABLE A.II	APPENDIX-ANNEX TABLE A.II <u>TYPICAL</u> GENERIC SCREENING DISTANCE VALUES (SDVg) WHICH ARE USED BY SOME MEMBER STATES	This table should be stated in annex not in appendix and should be specified as references for basis of distance values. 1) It is true that this draft is revision of NS-G-3.1, which was issued in 2002. At the time of issuance of NS-G-3.1, there was no unified formal policy to develop IAEA Safety Standards. After that time, IAEA secretariat began to develop quality management system for establishing IAEA Safety Standards and issued SPESS-A (ver. 1) (April 2010), SPESS-A is further improved with adding some policies. Among these improvement, the secretariat has added policy on quantitative/qualitative safety standards as its ANNEX VI (approved by CSS in March 2015), which states in the last paragraph that “In other areas, and particularly for what relates to the safety of facilities, the standards are designed to be qualitative and performance based rather than quantitative.” 2) SSG-35, which was published in July 2015, the relevant typical values were presented in the ANNEX, which have been deemed to follow the policy. In	X			Appendix Table A.II is moved to Annex.

			<p>addition, it is clearly stated references for the basis of the values.</p> <p>3) These distance values are presented as “used in some member states as typical examples” in the title of the table. SPESS-C states that “Annexes and footnotes to the main text are used to provide practical examples or additional information or explanation.” Therefore, it should be stated as “typical values” in the title of the table.</p>				
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