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Section 1
DS491 Step 7: Deterministic Safety Analysis for NPPs

COMMENTS BY REVIEWER Reviewer: Page.... of.... Country/Organization: Date:				RESOLUTION			
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Canada 1	General	Use common abbreviations for AOO, DBA, DEC, etc.	Many commonly abbreviated terms are spelled out, making the document more wordy than necessary.		*(Editorial)* *The use of abbreviations is defined by the IAEA editors and apply to the other Safety Guides too.*		
Observer ENISS-1	General Comment	**This SG should be devoted only to methods and tools used in the deterministic safety analysis:** the scope of the document is very large (for high level safety principles, it even overlaps with SSR-2/1) and lead subsequently to a level of detail which is not homogeneous between sections. It addresses safety principles, PIEs identification and categorizing, safety criteria and acceptance criteria, analysis methods, calculation tools, ...					*The Safety Guide provides recommendations on how to meet applicable Safety Requirements.*
Canada 1	General	Use common abbreviations for AOO, DBA, DEC, etc.	Many commonly abbreviated terms are spelled out, making the document more wordy than necessary.		*(Editorial)* *The use of abbreviations is defined by the IAEA editors and apply to the other Safety Guides too.*		
Canada 2	1.3 2nd	The modifications incorporated in this Guide	Delete the marked text: it is not necessary.			X	*§1.3 refers to the changes*

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	sentence	reflect recent experience with deterministic safety analysis included in Safety Analysis Reports for ~~present reactor designs and with various applications of deterministic safety analysis of existing~~ nuclear power plants.	Without a clear definition of "present reactor designs" or "existing NPPs" it is not clear how differing requirements for the two classes will be applied. See comment on para 1.6 where this terminology leads to problems.				*incorporated in this draft compared to the published version. Applicability is indicated in SCOPE (see 1.6)*
Germany 1	1.4	1.4. The objective of this Safety Guide is to provide recommendations and guidance on performing deterministic safety analysis for designers, operators, regulators and technical support organizations. It also provides recommendations on the use of deterministic safety analysis in: (a) Demonstrating or assessing compliance with regulatory requirements; (b) Determination of the effectiveness of EOPs and SAMG measures (c) Identifying possible enhancements of safety and reliability;	A relevant application of deterministic safety analyses – especially after the Fukushima accidents – is also the determination of the effectiveness of both emergency operating procedures and preventive and mitigative severe accident management measures. Thus, the list should be expanded.		*Second sentence:* "It also indicate ~~provides recommendations on~~ the use of deterministic safety analysis in purposes such as: (a) Demonstrating or assessing compliance with regulatory requirements; (b) Identifying possible enhancements of safety and reliability;" *(Note: It refers to the Annex)*	X	*Incorporation of new item (b): Determination of EOPs and other procedures are covered by (a)/(b)*
Observer ENISS-5	1.4	1.4. The objective of this Safety Guide is to provide	Where does the draft describe a method for		*See comment GER-1 above*	X	*About (b):* *See items (e) to (i)*

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		recommendations and guidance on performing deterministic safety analysis for designers, operators, regulators and technical support organizations. It also provides recommendations on the use of deterministic safety analysis in: (a) Demonstrating or assessing compliance with regulatory requirements; ~~(b) Identifying possible enhancements of safety and reliability~~;	"Identifying possible enhancements of safety and reliability" applying DSA? "Reliability" is beside "effectiveness" one of the most essential characteristic of safety-related SSC´s to realize safety functions at the required level of safety.				*in the Annex*
Observer EC/JRC-1	1.4/1	The objective of this Safety Guide is to provide recommendations and guidance on performing deterministic safety analysis under the objectives established in paragraph 5.75 of SSR-2/1 Rev. 1 and paragraph 4.15 of GSR Part 4 Rev. 1	1. Identification of target actors of deterministic safety analysis falls more within the scope section of the guide. 2. Bullet (a) is embedded in 5.75 (d) of SSR-2/1; bullet (b) is embedded in 4.15 of GSR Part 4 Rev. 1. It is somewhat misleading to set these two objectives aside, moreover since link with previous paragraph in the text is performed through linguistic sentence connector 'also', i.e. as they will go beyond established uses of deterministic safety analysis by the IAEA.			X	*See Germany-1 above. The change of formulation seems not necessary*

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Observer EC/JRC-2	1.5/1	This Safety Guide applies to new and existing nuclear power plants.	1. All mentions made throughout the 'scope' section pointing out at the target facility of the safety guide should be wrapped up. In this sense, 1.5 and first part of 1.6 are brought together into one single para. 2. It is somewhat confusing to lift up only two of the objectives within the wide myriad of objectives pursued through deterministic safety analysis. These two objectives should only be explicitly mentioned as long as the rest of the objectives included in 5.75 of SSR-2/1 falls beyond the scope of the current guide –which is not the case. 2. 1.5 and first sentence of 1.6 should be merged and rephrased.			X	*See USA-1 to §1.6 below*
Observer ENISS-9	1.5…1.14	SCOPE 1.5. This Safety Guide applies to…	The scope of this Guide is unnecessary broadly described and should be significantly shortened (e.g. deletion of 1.11 and 1.12).			X	*See CAN-42 below. To §1.11.* *Section 1 does not provide guidance/ recommendations. §1.11 and §1.12*

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							are included for clarification
Canada 3	1.6 1st sentence	1.6. This Safety Guide focuses primarily on the deterministic safety analysis for the design safety of new[x] nuclear power plants and, as far as reasonably practicable or achievable, also the safety re-evaluation or assessment of existing nuclear power plants when operating organizations review their safety assessment. [footnote x] The meanings of "new" and "existing" and their application are as described in SSR-2/1 paragraphs 1.1 to 1.3.	There can be problems caused by use of terms like "new" or "present NPP' and "existing NPP". The guide must explain the dividing line between new and existing. In particular, we need to lock the definition to the date of publication, otherwise "new" NPPs become "existing" once they enter service and all the requirements become guidance! SSR-2/1 para 1.1 clearly implies that the publication date of a standard is considered "present". SSR-2/1 para 1.2 and 1.3 considers NPPs to be "existing" when they are in operation, or they are under construction, or the design has been approved by regulatory body			X	*Definition of "new" is outside the scope of this Safety Guide and applies to many other. The terms "existing" and "new" are used in the Glossary and in the Safety Requirements.*
USA 1	1.6	The guidance provided is	The standard is not		"The guidance provided is		

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	Second sentence (p. 2)	~~intended to be as much as possible technology neutral, although it is particularly~~ based on experience with deterministic safety analysis for existing water cooled reactors and should be used with caution in considering new water-cooled or other advanced reactor designs.	technology neutral. It clearly applies to current light- and heavy-water-cooled reactors, and it may apply to some new water-cooled designs. It is not clear that it has any relation to gas-cooled or other advanced reactor designs.		intended to be as much as possible consistent with §1.6 of SSR-2/1 (Rev. 1) [1] and ~~technology neutral, although~~ it is particularly based on experience with deterministic safety analysis for water cooled reactors.”		
Observer EC/JRC-3	1.6/4	"This Safety Guide addresses the main aspects concerning the performance of deterministic safety analysis for designers, operators, regulators and technical support organizations as listed in paragraph 5.75 of SSR-2/1 Rev. 1, including improvements in safety provisions through backfitting design."	1. One of the most far-reaching consequences of Fukushima Dai-chi lessons learned consists of the installation of totally new safety systems (traditionally binned under the category of 'backfitting') where Deterministic Safety Analysis plays a fundamental role, e.g. for the design phase of related severe-accident mitigating systems such as PARs, FCV, etc. Since this is a sound aspect of deterministic safety analysis, I would outline it explicitly.			X	*The change seems not justified (see other comments to this paragraph)*
Observer EC/JRC-4	1.6/4	Second sentence to be replaced in new dedicated para.	First and second sentence of 1.6 touches different issues: First sentence is			X	*Taking into account the other comments it seems better not*

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			about whether the safety guide applies to new / existing plants while second sentence talks about the type of plant design.				*to split the paragraph*
Japan 1 Line 2	1.8.	radioactive ~~substances~~ materials	To be consistent with used in SSR-2/1 (Rev. 1).	X			
Belgium 1	1.8 and 3.51	Make article 1.8 and articles 3.51 till 3.54 coherent.	At one hand, art. 1.8 says that internal and external hazards are not covered. At the other hand, article 3.51 till 3.54 cover these hazards. This seems not coherent.		*1.8 (second sentence):* … "Analysis of hazards themselves, either internal or external (natural or human induced) is not covered by this Guide, although the effects and loads potentially inducing the failures in plant systems are taken into account in determining initiating events to be analysed~~.~~ *(3.51 is treated with the comments to Section 3)*		
Observer ENISS-6	1.8 Line 1.	This Safety Guide deals with those failures in the reactor core, reactor coolant system (RCS), fuel storage, systems containing radioactive substances or any other system that ~~affect~~ have the potential to challenge performance of safety	In a DSA it is shown, that failures do not affect safety functions.		"…any other system that has the potential to affect the performance of safety functions…"		

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		functions potentially leading to loss of physical barriers against releases of radioactive substances. Analysis of hazards, either internal or external (natural or human induced) is not covered by this Guide, although the loads potentially inducing the failures in plant systems are taken into account in determining initiating events to be analysed~~.~~					
Observer EC/JRC-5	1.8/3	… against releases of radioactive substances in all operational conditions of the plant (i.e. full power, low power and shutdown).	The scope does not say anything about operational conditions of the plant, e.g. low power and shutdown, whereas SSG-3 on PSA indeed does. It is clear that PSA models must be specifically developed to LP&S modes but also emphasis on deterministic safety analysis applied to LP&S should be included in the scope.			X	*It seems understood in the sentence*
Observer ENISS-7	1.9	This Safety Guide is devoted to the deterministic safety analysis for design or licensing purposes, which are aimed at demonstration of compliance with acceptance criteria ~~with adequate~~	Acceptance criteria may already integrate margins with regards to the safety limit.		*Editorial* "… which are aimed at ~~demonstration~~ demonstrating, with adequate margins, ~~of~~ compliance with acceptance criteria ~~with adequate margins~~.		

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		~~margins~~.					
Observer EC/JRC-6	1.9/all	To be removed because of redundancy	First and second sentences embedded in new para 1.6 when objectives are referred to.		*(It seems better to keep it, see ENISS-7 above)*		
Observer EC/JRC-7	1.10/all	This Safety Guide covers different options available for performing deterministic safety analysis, whether conservative or not.	Terminology in Table 2 makes use of terms standing for different options in performing deterministic safety analysis, among which 'conservative' and 'realistic'. If 1.10 employs exactly the same terms, it is not clear whether such options are being referred or if they are being used under their conventional meaning. In fact, para 1.16 on structure of the report, line 13, rather talks about "conservative and best estimate". To avoid misleading, rewording is suggested.	X			
Canada 42	1.11	*Suggest the following changes,* This Safety Guide focuses on neutronic, thermal hydraulic, fuel (and fuel channel for PHWR) and radiological analysis.	The behaviour of fuel (& fuel channel for PHWR) is critical in the evaluation against the acceptance criteria.	X			
Observer	1.12/1	The extent of radiological	Source term release is		"1.12. The extent of radiological		

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EC/JRC-8		analysis in this Safety Guide is limited to the transport and release analysis of radioactive substances within the buildings of the nuclear power plant, in particular in anticipated operational occurrences and accident conditions, as one of the inputs for determining the radiation doses to the nuclear power plant staff (see GSR Part 3). All aspects going beyond the determination of source term release to the environment, such as dose calculation, radioactive gaseous and liquid effluent calculations or dispersion of radioactive substances in the environment, are not covered by this Safety Guide. While general rules… for example in *[5]*.	also comprised within the radiological analysis as accounted for in the current safety guide. Instead of splitting similar intimately related contents between 1.12 and 1.13, it would become better organized if combining them into one single para addressing all aspects related to radiology.		analysis in this Safety Guide include ~~is limited to~~ the transport and release analysis of radioactive substances ~~inside~~ within the buildings and structures of the nuclear power plant, in particular in anticipated operational occurrences and accident conditions, as one of the inputs for determining the radiation doses to the nuclear power plant staff (see GSR Part 3) [4]. The aspects going beyond the determination of source term release to the environment, such as dose calculation, radioactive gaseous and liquid effluent calculations or dispersion of radioactive substances in the environment, are not covered by this Safety Guide. It is however recognized that minimization of the staff…"		
Czech 1	1.13 Last line	Such specific guidance can be found in ~~other~~ IAEA Safety Guide, ~~for example in~~ [5].	When using singular word Guide, wording "for example" doesn't sense.		"…found in other IAEA Safety Guides, e.g. ~~for example~~ in [5]." *(See ENISS-8 below)*		
Canada 4	1.13, sentences 1 & 2	1.13. This Safety Guide also covers some aspects of the analysis of radiological releases. ~~radiological aspects associated with different plant~~	The first sentence is very unclear and the intended meaning is already covered by the following		1.13. This Safety Guide also covers ~~some~~ aspects of the analysis of radiological releases, ~~radiological aspects associated with different plant states with~~		

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		~~states with potential releases of radioactive substances to the environment as the source term evaluation for determining radiation doses to the public.~~ However, these aspects are only covered ~~up to~~ for the determination of the source term to the environment for AOOs and accident conditions.	text. Simplify the text as indicated.		~~potential releases of radioactive substances to the environment as the source term evaluation for determining radiation doses to the public. However, these aspects are only covered~~ up to the determination of the source term to the environment for AOO and accident conditions (§2.16 to §2.18).		
Observer ENISS-8	1.13	While general rules …such analysis. Such specific guidance can be found in other IAEA Safety Guides ~~, for example in [5]~~.	Ref [5] is under revision (revises NS-G-3.2), and the changes introduced are not known. Therefore it's preferable to not give it as an example, or refer to the current published version.		*(See Czech-1 above)* *Editorial clarification: DS427 is indicated provisionally in [5]. The draft is in step 11 and its publication is expected by the time of starting the publication process of DS491. Otherwise NS-G-3.2 would be referenced.*		
Canada 5	1.16 all	Use bullets for each section	This paragraph would be much easier to read if a bullet were used for each section.			X	*Formatting is indicated in IAEA Guidelines (SPESS C)*
USA 2	1.16 (p. 4), Last sentence	Some terms and explanations for ~~consideration in the preparation or revision of safety standards and so for~~ possible inclusion in the IAEA Safety Glossary are provided at the end, under Definitions. These terms and explanations	Current wording of sentence is confusing.		*Last sentence will be removed*		

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		should be considered in the preparation or revision of safety standards.					
Observer ENISS-10	1.16	Besides this introduction, this Safety Guide consists of ~~nine~~ **eight** additional sections and one annex.	The SG has 9 sections in totality (8 in addition to the introduction).	X	*Editorial*		