DPP DS536 Safety Assessment and Verification for Nuclear Power Plants, Version 10 22nd March 2022

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Korea	1	Title	Safety Assessment and Verification of Engineering Aspects for Nuclear Power Plants	Proposed original title was taken from the existing guide NS-G-1.2. However, the title is so broad that we may not catch the scope of the guide and be confused with the DSA guide. It is closely connected to many guides related to design, DSA, PSA, operation, etc. Nevertheless, the main topics of the guide are focused on the engineering aspects to be considered in plant design and modification.	X	Safety Assessment and Verification of Engineering Aspects important to safety for Nuclear Power Plants		A more precise title is preferred considering the scope of this safety guide
Germany NUSSC	1	Title of Draft Safety Guide	"Safety Assessment and Verification of the design of engineering aspects for Nuclear Power Plants"	According to scope of current DPP this Safety Guide will provide recommendations on safety assessment and verification of the design of engineering aspects of existing NPPs and new NPPs and the intention of this new document is to complement GSR Part 4 (Rev. 1) and further Guides on probabilistic and deterministic analysis. We suggest to make this issue clear in the title of the document.	X	Safety Assessment and Verification of Engineering Aspects important to safety for Nuclear Power Plants		A more precise title is preferred considering the scope of this safety guide
Belgium	1	General		General To our opinion, the DPP needs further clarification on what is understood by "verification" and "independent verification". The reason is explained in the different comments below.	X			The guide will provide a distinction between "verification" of the design as it is conducted by the designer/operating organization and "independent verification" as required in GSR Part 4 (Rev. 1) Requirement 21 by both the designer/operating organization and the regulatory authority (para. 4.71). This safety guide on the contrary will not redefine the term "independent verification" as stated in GSR Part 4 (Rev.1).

France	1	General	The word “verification” shall not be used and another expression shall be used to describe clearly the goal of the guidance: there is some definitions of “verification” and they do not seem consistent with this DPP. As a consequence, the objective of the DPP could not be understood				X	The term “verification” is already used as part of the GSR Part 4 (Rev. 1) Requirement 21 as defined to both the designer/operating organization and the regulatory authority (para. 4.71). The primary intention of this safety guide is to provide recommendations related to requirement 10 on Assessment of engineering aspects important to safety and Requirement 21 on Independent verification. The intended safety guide plays a role of integration, as it was the former NS-G-1.2, where the three aspects of the safety assessment need to be considered altogether, DSA, PSA and engineering judgement on the engineering aspects important to safety. Therefore, the intended safety guide aims to avoid repetition but to make the link between the three previous mentioned topics of the safety assessment which is not covered in any safety guide. In addition, it will be better to avoid dealing with the same topic in different guides. We recognize the role and the scope of each safety guide available today for safety assessment such as SSG-2 (Rev. 1) on DSA, SSG-3 on Level 1 PSA and SSG-4 on level 2 PSA, the last two currently under revision. Therefore, we do not intend to rewrite or rephrase them. The other safety guides available aim to provide recommendations for the design to specific systems (e.g., reactor coolant system, electrical power supply, etc.) or issues (e.g., safety classification, human factors engineering, etc.) but not on the safety assessment. In the gap analysis, we have detected some paragraphs in some safety guides for the design, dealing with the verification of the design recommendations for that system alone but without any link to connected systems. The link among all those aspects is needed. Therefore, the intended safety guide aims at closing this gap and providing the methodology for a comprehensive evaluation of the design in one single document,

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								including key topics such as independence of defence in depth levels, the assessment of relationship among different criteria (criteria for barriers integrity, dose limits for operator actions, PSA results (risk metrics) and radiological criteria for deterministic safety analysis) and assessment of safety margins (for design basis), identification of cliff edge effects and margins for the robustness assessment (for beyond design basis), are not covered in any safety guide.

Japan	1	General	We don't support to develop one safety guide taking into account all of proposed engineering aspects. We propose respective addendum are prepared instead of developing a new guide. There would be some confusions or some difficulties if one specific guide is developed including different nature of safety assessment among any of proposed engineering aspects. In this context, it is proposed to develop the addendum to the existing safety guides for each of the proposed engineering aspects. Please find the attached table, which summarizes correspondence among engineering aspects addressed in NS-G-1.2, proposed engineering aspects in DPP-DS536 and existing relevant Safety Guides. The table indicates that 10 engineering aspects (chapter 3 of OVERVIEW) in 18 engineering aspects described in chapter 3 of NS-G-1.2 will be addressed in the proposed safety guide, meanwhile 8 engineering aspects are not included in this DPP. Those missing 8 aspects are supposed to be excluded from this proposal as they are already addressed in each specific Safety Guide. Identically, 10 proposed aspects are also addressed in relevant Specific Safety Guides shown in the table. In this sense, these 10 aspects are proposed to be developed as addendum to each specific guide				X	Present the new title of section 3 and the detailed table of contents for section 3. First of all the development of this DPP is in compliance to the NUSSC meeting 52 session item 4.1. The primary intention of this safety guide is to provide recommendations related to requirement 10 on Assessment of engineering aspects important to safety and Requirement 21 on Independent verification. The intended safety guide plays a role of integration, as it was the former NS-G-1.2, where the three aspects of the safety assessment need to be considered altogether, DSA, PSA and engineering judgement on the engineering aspects important to safety. Therefore, the intended safety guide aims to avoid repetition but to make the link between the three previous mentioned topics of the safety assessment which is not covered in any safety guide. In addition, it will be better to avoid dealing with the same topic in different guides. We recognize the role and the scope of each safety guide available today for safety assessment such as SSG-2 (Rev. 1) on DSA, SSG-3 on Level 1 PSA and SSG-4 on level 2 PSA, the last two currently under revision. Therefore, we do not intend to rewrite or rephrase them. The other safety guides available aim to provide recommendations for the design to specific systems (e.g., reactor coolant system, electrical power supply, etc.) or issues (e.g., safety classification, human factors engineering, etc.) but not on the safety assessment. In the gap analysis, we have detected some paragraphs in some safety guides for the design, dealing with the verification of the design recommendations for that system alone but without any link to connected systems. The link among all those aspects is needed. Therefore, the intended safety guide aims at closing this gap and providing the methodology for a comprehensive evaluation of the design in one single document,

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			(see page 35 of SPESS A for addendum). This arrangement will give significant benefit to users of safety guides of specific areas of expertise with consulting single safety guides instead of consulting with two or more safety guides.					including key topics such as independence of defence in depth levels, the assessment of relationship among different criteria (criteria for barriers integrity, dose limits for operator actions, PSA results (risk metrics) and radiological criteria for deterministic safety analysis) and assessment of safety margins (for design basis), identification of cliff edge effects and margins for the robustness assessment (for beyond design basis), are not covered in any safety guide. In addition the efforts to modify each safety guide for the design of systems will be more costly given the number and the need to ensure consistency on each of them. The safety assessment is conducted by a multidisciplinary team which are not covered by a single safety guide for the design of a single system or issue subject of the review. This safety guide will cover all aspects to be considered in conducting the safety assessment but not as a "check list" rather as comprehensive evaluation of all aspects important to safety in the design.
ENISS	0	General comment	Would it be relevant to address the interface of this guide with the DS537 on safety demonstration of innovative technology in reactor designs		X	The interface of this safety guide DS536 is at the level of the section on 3, subsection related to the assessment of technology and design options, where innovative design features are assessed.		

ENISS	0	General comment	The scope of the guide shows strong interactions with existing guides. The summary addresses topics that are already dealt with in those guides and overlaps can be expected (eg. PIEs in SSG2, DID in DS508, safety classification in SSG30…). Regarding those topics it may be better to update the existing guides if they are not detailed enough, in order to ensure a smooth interface. In any case, there should be a strict requirement to avoid dealing with a same topic in different guides as it would bring a lot of confusion.		X		X	The primary intention of this safety guide is to provide recommendations related to requirement 10 on Assessment of engineering aspects important to safety and Requirement 21 on Independent verification. The intended safety guide plays a role of integration, as it was the former NS-G-1.2, where the three aspects of the safety assessment need to be considered altogether, DSA, PSA and engineering judgement on the engineering aspects important to safety. Therefore, the intended safety guide aims to avoid repetition but to make the link between the three previous mentioned topics of the safety assessment which is not covered in any safety guide. In addition, it will be better to avoid dealing with the same topic in different guides. We recognize the role and the scope of each safety guide available today for safety assessment such as SSG-2 (Rev. 1) on DSA, SSG-3 on Level 1 PSA and SSG-4 on level 2 PSA, the last two currently under revision. Therefore, we do not intend to rewrite or rephrase them. The other safety guides available aim to provide recommendations for the design to specific systems (e.g., reactor coolant system, electrical power supply, etc.) or issues (e.g., safety classification, human factors engineering, etc.) but not on the safety assessment. In the gap analysis, we have detected some paragraphs in some safety guides for the design, dealing with the verification of the design recommendations for that system alone but without any link to connected systems. The link among all those aspects is needed. Therefore, the intended safety guide aims at closing this gap and providing the methodology for a comprehensive evaluation of the design in one single document, including key topics such as independence of defence in depth levels, the assessment of relationship among different criteria (criteria for barriers integrity, dose limits for operator actions, PSA results (risk metrics) and

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								radiological criteria for deterministic safety analysis) and assessment of safety margins (for design basis), identification of cliff edge effects and margins for the robustness assessment (for beyond design basis), are not covered in any safety guide.

USA / USNRC	1	General	The DPP is overly ambitious and appears to duplicate existing SSRs and associated guidance documents or ongoing updates to SSGs. A broad DS of this nature will be difficult to achieve consensus and requires an excessive number of SMEs to develop the guide and corresponding impacts to member states' review. IAEA should be more specific about where a safety gap exists, if any, regarding safety assessment of engineering aspects.				X	The primary intention of this safety guide is to provide recommendations related to requirement 10 on Assessment of engineering aspects important to safety and Requirement 21 on Independent verification. The intended safety guide plays a role of integration, as it was the former NS-G-1.2, where the three aspects of the safety assessment need to be considered altogether, DSA, PSA and engineering judgement on the engineering aspects important to safety. Therefore, the intended safety guide aims to avoid repetition but to make the link between the three previous mentioned topics of the safety assessment which is not covered in any safety guide. In addition, it will be better to avoid dealing with the same topic in different guides. We recognize the role and the scope of each safety guide available today for safety assessment such as SSG-2 (Rev. 1) on DSA, SSG-3 on Level 1 PSA and SSG-4 on level 2 PSA, the last two currently under revision. Therefore, we do not intend to rewrite or rephrase them. The other safety guides available aim to provide recommendations for the design to specific systems (e.g., reactor coolant system, electrical power supply, etc.) or issues (e.g., safety classification, human factors engineering, etc.) but not on the safety assessment. In the gap analysis, we have detected some paragraphs in some safety guides for the design, dealing with the verification of the design recommendations for that system alone but without any link to connected systems. The link among all those aspects is needed. Therefore, the intended safety guide aims at closing this gap and providing the methodology for a comprehensive evaluation of the design in one single document, including key topics such as independence of defence in depth levels, the assessment of relationship among different criteria (criteria for barriers integrity, dose limits for operator actions, PSA results (risk metrics) and

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								radiological criteria for deterministic safety analysis) and assessment of safety margins (for design basis), identification of cliff edge effects and margins for the robustness assessment (for beyond design basis), are not covered in any safety guide. The intent is to complete the structure of the IAEA standards by this missing topic which is currently covered by the safety assessment in Member States and provide clear guidance to those countries embarking in a nuclear power programme. The future safety guide will be attached under both GSR Part 4 (Rev.1) and SSR-2/1 (Rev.1), as SSG-2 (Rev.1) and SSG-3 and SSG-4 are.

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USA / USNRC	2	General	We recommend that a guide not be attempted at this time, rather a focused TECDOC or safety report could be developed on a specific and focused aspect of GSR Part 4 to be examined. For example, the DPP notes an aspect under GSR 4.16, independent verification as a topic of interest. A TECDOC on independent verification of key engineering aspects performed across various engineering disciplines and the role of design control under a quality assurance program may be of interest to member states. The practices of design vendors and operating organizations to independently verify key parameters and assumptions of engineering analysis is one facet. The other facet is the role of the regulatory body's use of independent confirmatory analysis in its assessment of the design vendor's or operating organizations safety assessment. We provide this topic only as an example.				X	Recommendation related to the independent verification will be addressed in chapter 4 in relation to both designer/operating organization and regulatory authority/technical support organization. At this moment, there is a lot of experience among Member States in conducting the independent verification, so we can propose an annex in the safety guide where examples could be provided. However, for those countries embarking in a nuclear power programme, there is a need to have guidance on conducting the independent verification, which is not achievable by a TECDOC or safety report. In addition, other topics such as independence of defence in depth levels, the assessment of relationship among different criteria (criteria for barriers integrity, dose limits for operator actions, PSA results (risk metrics) and radiological criteria for deterministic safety analysis) and assessment of safety margins (for design basis), identification of cliff edge effects and margins for the robustness assessment (for beyond design basis), are not covered in any safety guide.
USA / USNRC	3	General	If a TECDOC or safety report approach is taken in lieu of attempting to develop a guide, the scope should be technology inclusive to be of practical use to near-term deployable SMRs and novel advanced reactors.		X			The recommendations for performing a safety assessment of engineering aspects important to safety for nuclear power plants are technology neutral and technology inclusive. The development of an additional TECDOC or Safety Report to this safety guide should have a starting point as technology inclusive to derive to examples of practices of technology and design specific applicable to advanced nuclear power plants designs (which include SMRs).
Japan	2	1. Introduction	Review Committee WASSC and RASSC be included in the review committees,	There are WASSC and RASSC related aspects in NS-G-1.2.	X			The WASSC and RASSC will be included in the Review Committee list.

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France	2	Chap 2	~~As a result of these developments, IAEA Safety Standards provide recommendations for conducting probabilistic safety assessments and the deterministic safety analyses but not for the safety assessment and verification of engineering aspects of items important to safety of NPPs from a design perspective.~~	The link between the 3 first paragraphs of chapter 2 and the last one is not explained, thus thus "result" should be justified or deleted. Anyway "verification" (see other comment) and the notion of "engineering aspects" should be explained before to be used.	X	~~As a result of these developments~~ Currently, IAEA Safety Standards provide specific set of recommendations for conducting probabilistic safety assessments and the deterministic safety analyses but not for the safety assessment and verification of engineering aspects of items important to safety of NPPs from a design perspective.		The development of a safety guide integrating in one single document all the recommendations for conducting the safety assessment as a whole is missing. This paragraph is just a statement of the current status of IAEA Safety Guides relevant to safety assessment. The notion of independent verification (as corrected in the revised version of the DS536) refers to topics covered by Requirement 21 of GSR Part 4 (Rev.1) and the notion of engineering aspects refers to topics covered by Requirement 10 of GSR Part 4 (Rev.1). Footnotes were added in DS536 as: [1]"Engineering aspects" is understood as all the topics to be covered in the safety assessment as required in Requirement 10 of GSR Part 4 (Rev. 1). [2]"Independent verification" is understood as the independent verification of the safety assessment as required in Requirement 21 of GSR Part 4 (Rev. 1).

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France	3	Chap 3	The justification for the production of the document shall be complemented: NS-G-1.2 has been considered as superseded by GSR part 1 and SSG-2 along time ago and both of these standards have been even revised. Moreover, SSG-3 and 4 are currently under revision process. As a consequence, it is difficult to understand that a document considered as superseded could be necessary now whilst documents that supersede it still exist, have been updated and are even complemented by other document (under revision process): this is not explained in the gap analysis and it is a major lack. The future structure of IAEA standards regarding assessment topic could become fuzzy.		X			This safety guide is a result of the gap analysis performed after the developments of the safety guides for the conducting deterministic safety analysis and probabilistic safety assessments. There is no safety guide providing recommendations related to the assessment for engineering aspects important to safety and making the link between deterministic safety analysis and probabilistic safety assessments. The safety assessment of engineering aspects important to safety for NPP are not covered as whole in one single document, only recommendations for the system designs or issues are provided in different safety guides from the design perspective but not from the safety assessment. The intent is to complete the structure of the IAEA standards by this missing topic which is currently covered by the safety assessment in Member States and provide clear guidance to those countries embarking in a nuclear power programme. The future safety guide will be attached under both GSR Part 4 (Rev.1) and SSR-2/1 (Rev.1), as SSG-2 (Rev.1) and SSG-3 and SSG-4 are.
France	4	Chap 3	In addition, during the 52nd NUSSC Meeting, under item 4.1 as part of its medium-term work plan, NUSSC members agreed on the ~~development~~ preparation of the DPP for a new Safety Guide on safety assessment and verification for NPPs. ~~Therefore, the development of this DPP aims at answering the NUSSC members request.~~	NUSSC agreement was related to a preparation to better understand the proposal, thus is not a request for a development.	X			

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France	5	Chap 4	~~In addition, this Safety Guide will provide a standard framework to facilitate a regulatory reviews and independent or peer reviews (e.g. TSR) of the safety assessment and its applications.~~	Such an objective does not seem to be consistent with SPESS. If it is, it could be mentioned for any IAEA standard. Moreover, it is not consistent with the list of stakeholders which the guidance is intended for according to the last paragraph of the chapter.			X	It is in compliance with the SPESS as requested for the description of its objective as: OBJECTIVE (Describe the objective of the publication in terms of what it is expected to achieve and what the target audience is. It should focus on the objective of the proposed publication rather than on the objective of the topic, which is covered in section 2). The paragraph describes the objective of this publication as proposed for a harmonization of practices among different stakeholders. Independent reviews and peer reviews are not conducted solely by the regulatory authority. Indeed, the designer and the operating organization also performs those activities on regular basis.
Finland/ STUK	1	4. Objective	… In addition, the recommendations provided in this Safety Guide will focus on the assessment and verification of compliance with the requirements for the design and operation of items important to safety of NPPs established in SSR-2/1 (Rev. 1) and SSR-2/2 (Rev. 1), the requirements for radiation protection established in GSR Part 3, as well as requirements established in SSR-1 for the protection of items important to safety against hazards from site characteristics. These recommendations will complement the recommendations in the IAEA Safety Guides on deterministic safety analysis as well as on probabilistic safety assessment <u>and assessment of the defense-in-depth and DEC-conditions.</u>	Please add: <u>and assessment of the defense-in-depth and DEC-conditions.</u> <u>DS508 covers this topic, and it should be considered in the overall planning of the new SSG.</u>		X Agree and the recommendations will be in compliance with the recommendations in DS508.		

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Canada / CNSC	1	4		Will the guide also consider design of engineering aspects related to decommissioning and waste management? If so, it should be specified in this section.			X	The safety guide is focused on the safety assessment of the design of engineering aspects important to safety for NPPs in operation and low power and shutdown states. The safety case for the decommissioning, and the waste management are different topics as presented in the safety analysis report (e.g., waste management assessment as part of the Environmental Impact Assessment).
UK/ONR	1	Section 4	Propose an explicit statement in Section 4 that the recommendations in this guide will be appropriately graded ensuring that safety significant engineering aspects across all levels of defence in depth will assessed and verified but not necessarily to the same extent or with the same level of confidence.	It is clear that this guide is supporting GSR Part 4, SSR2/1 and SSR2/2. The need to consider defence in depth and Design Extension Conditions is fundamental to these guides and therefore it may be implicitly assumed they will be considered in this guide. SSG-2 (which this guide is proposed to sit alongside) very clearly sets out graded expectations for analysis for different plant states. It is not explicitly stated in this DPP that the new guide will similarly set out different expectations for assessment and verification for engineering aspects important to safety for eg normal operation, AOOs, DBAs and design extension conditions.	X	The assessment of the implementation of engineering aspects important to safety for the defence in depth levels is planned to be considered in section 3.2.2 of the detailed table of contents. The recommendations related to the graded evaluation will be proposed with regard to the design of specific engineering aspects important to safety for different defence in depth levels in relation to their objectives.		
Germany NUSSC	2	4. Line 3	The recommendations will target the phases of review for authorization (licensing) of the construction~~, modification~~ and operation of new NPPs, and the <u>modification and</u> re-evaluation of safety of existing NPPs during periodic safety reviews…	Meaning of modification is unclear in this context: modification of the concept during design or of the plant during construction or after commissioning? Temporary or permanent modifications? We suggest to clarify.	X			

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Pakistan/ PNRA	1	Section 5	This Safety Guide will provide recommendations on safety assessment and verification of existing and new NPPs.	To make the scope consistent with NS-G-1.2 and with the title of the safety guide.	X	This Safety Guide will provide recommendations on safety assessment and independent verification of the design of engineering aspects important to safety for new nuclear power plants with a new or already existing design, including SMRs. The recommendations for performing a safety assessment are suitable also as guidance for the safety review of an existing plant.~~of existing NPPs and new NPPs.~~		
Germany NUSSC	3	5. Line 1	This Safety Guide will provide recommendations on safety assessment and verification of the design of engineering aspects of existing NPPs and new NPPs, including advanced reactors designs and SMRs as well.	The question of applicability of this guideline to new designs with innovative technology, especially SMRs, is currently on the agenda as well.	X	This Safety Guide will provide recommendations on safety assessment and independent verification of the design of engineering aspects important to safety for new nuclear power plants with a new or already existing design, including SMRs. The recommendations for performing a safety assessment are suitable also as guidance for the safety review of an existing plant.~~of existing NPPs and new NPPs.~~		

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Sweden	1	5 Scope, 2nd para	The interfaces between safety and security in the assessment of possible radiation risks will be included on an overall level, while specific guidance on the assessment of hazards arising from malicious acts will not be included within this Safety Guide.	Holistic view and balance of interface between safety and security is important. For this reason, it would be positive if it is possible to balance the message and scope, not necessarily to include malicious acts, but to identify and acknowledge possible interfaces. E.g. in the identification of possible radiation risks and assessment of engineering aspects could include a comparison between possible loads and effects from safety related events with possible loads and effects on safety functions from hazards arising from malicious acts, i.e. how the safety assessment also could be a basis for threat assessment (in more detail described within the Security Series).	X			The proposed new text will identify and acknowledge possible interfaces between safety and security.

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Canada	2	6		Will this Safety Guide nullify any of the contents of the IAEA Safety Standards Series and other publications it interfaces with? Also, the following publications might also interface with DS536, and should be considered for inclusion in this section: – Assessment of Equipment Capability to Perform Reliably under severe accident conditions, IAEA-TECDOC 1818. – Accident monitoring systems for nuclear power plants, NP-T-3.16. – External Human Induced Events in Site Evaluation for Nuclear Power Plants NS-G-3.1 – Disposal of Radioactive Waste SSR-5 The Safety Case and Safety Assessment for the Disposal of Radioactive Waste SSG-23.	X			This safety guide will not intent to nullify any published IAEA safety guide. It aims to close the gaps detected with regard to the safety assessment of engineering aspect important to safety. Information available in related IAEA documents will be considered as appropriate. The list within the DPP of potential interactions with IAEA publications is illustrative but not to be final or exhaustive.

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Finland	2	6. Place in the overall structure of the relevant series and interfaces with existing and/or planned publications	please update the list of related safety standards: at least 28) DS498 – Design of Nuclear Installations Against External Events Excluding Earthquakes (revision of NS-G-1.5); 29) DS503 – Protection against Internal and External Hazards in the Operation of Nuclear Power Plants (revision of NS-G-2.1); have been published as DS498 -> SSG-68 DS503 -> SSG-77		X			The list of safety guides with interface with this safety guide was updated accordingly. … ~~DS490~~SSG-67 – Seismic Design for Nuclear Installations (2021); ~~DS494 – Protection against Internal Hazards in the Design of Nuclear Power Plants (revision and combination of NS-G-1.7 and NS-G-1.11);~~ ~~…~~ ~~DS498SSG-68 Design of Nuclear Installations Against External Events Excluding Earthquakes (2021);~~ ~~DS503SSG-77 Protection against Internal and External Hazards in the Operation of Nuclear Power Plants (2022);~~ ~~…~~ DS524 - Radiation Protection Aspects of Design for Nuclear Power Plants (NS-G-1.13);

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Germany NUSSC	4	6	… 12) SSG-30 – Safety Classification of Structures, Systems and Components in Nuclear Power Plants (~~2016~~ 2014); 13) SSG-39 – Design of Instrumentation and Control Systems for Nuclear Power Plants (~~2013~~ 2016); …. 23) ~~DS494~~ SSG-64 – Protection against Internal Hazards in the Design of Nuclear Power Plants ~~(revision and combination of NS-G-1.7 and NS-G-1.11)~~ (2021); … 29) ~~DS503~~ SSG-77 – Protection against Internal and External Hazards in the Operation of Nuclear Power Plants ~~(revision of NS-G-2.1)~~ (2022); … 33) DS524 Radiation Protection Aspects of Design for Nuclear Power Plants (Revision of NS-G-1.13)	Clarification. Please also add DS524 (Revision of NS-G-1.13).	X			The list of safety guides with interface with this safety guide was updated accordingly. … ~~DS490~~SSG-67 – Seismic Design for Nuclear Installations (2021); ~~DS494 – Protection against Internal Hazards in the Design of Nuclear Power Plants (revision and combination of NS-G-1.7 and NS-G-1.11);~~ ~~…~~ ~~DS498SSG-68 Design of Nuclear Installations Against External Events Excluding Earthquakes (2021);~~ ~~DS503SSG-77 Protection against Internal and External Hazards in the Operation of Nuclear Power Plants (2022);~~ ~~…~~ DS524 - Radiation Protection Aspects of Design for Nuclear Power Plants (NS-G-1.13);
Belgium	2	§ 7 (Overview)	None. (We have a need for clarification. See column Reason	In the title of Chapter 3 of DS 536 "… verification …" is mentioned, while in the title of Chapter 4 "Independent verification …" is mentioned. Are these different things? Is the "verification" of Chapter 3 not independent? Is the "verification" of Chapter 3 to be done by the designers/operating organization, and the "independent verification" in Chapter 4 by the regulatory body? Please clarify.	X	Sections titles will be changed as: 2. GENERAL CONSIDERATIONS RELATED TO THE PERFORMANCE AND USE OF SAFETY ASSESSMENT AND VERIFICATION FOR NUCLEAR POWER PLANTS 3. SAFETY ASSESSMENT OF ENGINEERING ASPECTS IMPORTANT TO SAFETY FOR NUCLEAR POWER PLANT DESIGN AND MODIFICATIONS 4. INDEPENDENT VERIFICATION OF THE SAFETY ASSESSMENT		The chapter 4 will cover both the independent verification conducted by either the designer/operating organization and the regulatory authority in compliance with Requirement 21 of GSR Part 4 (Rev. 1).

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Japan	2	7. Overview	How to deal with use of non-permanent equipment for DEC in this document?		X			The safety assessment of the use of non-permanent equipment will be assessed in section 3.4. Safety Requirements and Functional Criteria for the System and its auxiliary, supporting systems and non-permanent equipment
Japan	3	7. Overview	3. SAFETY ASSESSMENT ~~AND VERIFICATION~~ OF NUCLEAR POWER PLANT DESIGN AND MODIFICATIONS	"Verification" is addressed as "independent verification" in chapter 4. Also, "verification" is not dealt with in the subchapter of chapter 3. Therefore, "AND VERIFICATION" should be deleted.	X	3. SAFETY ASSESSMENT OF ENGINEERING ASPECTS IMPORTANT TO SAFETY FOR NUCLEAR POWER PLANT DESIGN AND MODIFICATIONS		
Canada	3	7-2	GENERAL CONSIDERATIONS RELATED TO THE PEFORMANCE AND USE OF SAFETY ASSESSMENT AND VERIFICATION FOR NUCLEAR POWER PLANTS	The objective of this section is not clear, specifically how the items under it are related.	X	2. GENERAL CONSIDERATIONS RELATED TO THE PERFORMANCE AND USE OF THE SAFETY ASSESSMENT AND INDEPENDENT VERIFICATION 2.1. Project Management and Organization 2.2. Consideration of Applicable Design and Regulatory Requirements 2.3. Familiarization with the Site Characteristics, Plant Design and Operation, Emergency Operating Procedures and Severe Accident Management. 2.4. Required Information 2.4.1. Conceptual safety design report 2.4.2. Safety analysis report 2.4.3. Additional information 2.5. Uses and Applications		

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Germany EPReSC	1	7. Overview Chapter 3	3.1. Safety Functions and Postulated Initiating Events 3.2. Implementation of the Defence in Depth Concept 3.3. Protection Against Internal Hazards and External Hazards 3.4. Associated Functional Requirements and Criteria 3.5. Safety Classification 3.6. Design Basis, Margins, Loads and Load Combinations 3.7 ~~Human Engineering Factors~~ Testing, maintenance and ageing 3.~~7~~8. Human Engineering Factors 3.~~8~~9. Provisions for Ensuring Radiation Protection 3.~~9~~10. Auxiliary and Support Systems 3.~~10~~11. Operation and Technical Specifications	We suggest adding a subchapter about the in-service testing, maintenance, repair, inspections and monitoring, including the ageing and wear-out mechanism. These topics were also included in NS-G-1.2 and are important when considering engineering aspects of items important to safety. This would also include Requirement 12 of GSR Part 4 (Assessment of safety over the lifetime of a facility or activity).	X	Please see detailed table of contents revised.		The detailed table of contents already contained the in-service testing, maintenance, repair, inspections and monitoring, including the ageing and wear-out mechanism
Finland	3	7. Overview	3.1a Design basis and related design assumptions 3.1. Safety Functions and Postulated Initiating Events 3.2. Implementation of the Defence in Depth Concept	Please start the chapter 3 by 3.1a Design basis and related design assumptions As an example the topic of practical elimination coved by DS508 relays on the substantiation that a high level of quality is achieved at all stages of the lifetime of the components, i.e. , tis design, manufacture, implementation, commissioning and operation (including periodic testing and in-service surveillance, if any).			X	The design basis of the system is defined according to the role of the system for the fundamental safety functions and the derived safety functions. The identification of the safety functions to be performed allow to define the design basis, classification, safety design principles, etc. See the revised and detailed table of contents for chapter 3.

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Sweden	2	7. Overview 3.3	Protection Against Internal Hazards and External Hazards, <u>incl. interface to malicious acts</u>	Proposal how/where to highlight the safety/security interface. Alt. add an annex in order to give some further examples, also in relation to the expected content of 3.6.	X	The last sentence of the scope section is modified as follow: The interfaces between safety and security in the assessment of possible radiation risks will be included on an overall level, while specific guidance on the assessment of hazards arising from malicious acts will not be included within this Safety Guide. Agree to add an annex in relation to section 3.8 (former 3.6) in the revised detailed table of contents		The interface to malicious acts will be identified where appropriate (e.g., internal and external hazards, I&C, human factors engineering, etc.)
Germany NUSSC	5	7. Part 3	3. SAFETY ASSESSMENT AND VERIFICATION OF NUCLEAR POWER PLANT DESIGN AND MODIFICATIONS 3.1. Safety Functions and Postulated Initiating Events 3.2. Implementation of the Defence in Depth Concept 3.3. Protection Against Internal Hazards and External Hazards 3.4. Associated Functional Requirements and Criteria <u>(System Interactions)</u> 3.5. Safety Classification 3.6. Design Basis, Margins, Loads and Load Combinations <u>(Single Failure Assessment, Redundancy, Independence, and Diversity)</u> 3.7. Human <u>Factors</u> Engineering ~~Factors~~ 3.8. Provisions for Ensuring Radiation Protection 3.9. Auxiliary and Support Systems 3.10. Operation and Technical Specifications <u>(Selection of Materials, Ageing and Wearout Mechanisms)</u>	Summary of gap analysis, given in this document, provides overview for NS-G-1.2 issues, where a gap is to be covered. However, it is not clear if the new document (its chapter 3) includes all the issues from the NS-G-1.2. We would like to suggest to clarify this matter – perhaps in form of additional explanation to each item of content. Current comment is intended to represent few noticed points.	X	Please see detailed table of contents revised.		The detailed table of contents already contained the design safety principles such as single failure criteria, diversity, redundancy, etc. The topics related to selection of materials, ageing and wear-out mechanism were considered in section 3.8 Design basis, margins, loads and loads combinations.

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Finland	4	7. Overview	3.4. ~~Associated~~ Functional and non-functional Requirements and Criteria for …	please clarify: Associated referes to ? Please ensure that non functional requirements are also included and non-funcional requirements.	X	Please see new title in the revised and detailed table of contents of section 3.4. is: 3.4 Safety Requirements and Functional Criteria for the System and its auxiliary, supporting systems and non-permanent equipment.		This section aims to provide recommendations for the assessment first (safety requirements) of the completeness of the situations for which the safety functions of the SSCs of the system are required to ensure the fundamental safety functions and second (functional criteria) of the expected performance of the SSCs of the system for those situations. Recommendations related to the assessment of relationship among different criteria (criteria for barriers integrity, dose limits for operator actions, PSA results (risk metrics) and radiological criteria for deterministic safety analysis) will be presented. Link with relevant safety guides will be ensured.
Japan	5	7. Overview	3.4. ~~Associated~~ Functional Requirements and Criteria	Meaning of "Associated" is not clear. Maybe un-necessary	X	Please see new title in the revised and detailed table of contents of section 3.4. is: 3.4 Safety Requirements and Functional Criteria for the System and its auxiliary, supporting systems and non-permanent equipment.		This section aims to provide recommendations for the assessment first (safety requirements) of the completeness of the situations for which the safety functions of the SSCs of the system are required to ensure the fundamental safety functions and second (functional criteria) of the expected performance of the SSCs of the system for those situations. Recommendations related to the assessment of relationship among different criteria (criteria for barriers integrity, dose limits for operator actions, PSA results (risk metrics) and radiological criteria for deterministic safety analysis) will be presented. Link with relevant safety guides will be ensured.

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Sweden	3	7. Overview	3.4 Associated Functional Requirements and Criteria <u>for Integrity of barriers, Dose, Risk, Radiological consequences and the environment</u>.	The nuclear safety community could benefit from some clarifying guidance on the purpose and relationship between different types of safety assessments and related criteria, e.g. - *dose criteria* in ex. GSG-7 & GSG-8, - *risk criteria*/*risk constraints* (of potential exposure) in GSG-10 etc., - *risk criteria* (of core damage/releases) in SSG-3 & SSG-4, and - *radiological criteria* in SSG-2. This new guide could help to sort these criteria and put them in a comprehensive framework. This suggestion is also related to the suggestion in the NUSSC/SE comment to CSS draft medium term plan for safety standards.	X			The revised and detailed table of contents for section 3.4: This section aims to provide recommendations for the assessment first (safety requirements) of the completeness of the situations for which the safety functions of the SSCs of the system are required to ensure the fundamental safety functions and second (functional criteria) of the expected performance of the SSCs of the system for those situations. Recommendations related to the assessment of relationship among different criteria (criteria for barriers integrity, dose limits for operator actions, PSA results (risk metrics) and radiological criteria for deterministic safety analysis) will be presented. Link with relevant safety guides will be ensured.

Finland	5	7. Overview	3.6. Design Basis, Margins, Loads and Load Combinations	please clarify: …?				This section aims to provide recommendations for the assessment of the appropriateness of: 1. Design basis of SSCs of the system; 2. Use of codes and standards, including recommendations related to dealing with different codes and standards; And considerations of: 1. Technology and design options related to: (i) Proven engineering practices and operating experience; (ii) Design features for innovative reactor designs; (a) Passive Systems; (b) Systems shared between several modules; (c) Control room operating several modules, remote control room and remote operation; (d) Impact of installation of additional modules / units on a facility in operation; (e) Applications other than for electricity production: (i) Assessment of initiating events induced by the operation in the coupled facility; (ii) Assessment of hazards induced by the coupled installation; (iii) Assessment of potential containment by-pass; (f) Use and verification of artificial intelligence (for design and operation); (iii) Research, testing, analysis and demonstration programme where recommendations related to scale of the mock-up, testing installation, materials, layout, etc. will be provided. 2. Materials options; 3. Loads and loads combinations; 4. Identification of cliff edge effects and assessment of margins; 5. Identification of ageing mechanisms and potential effects at the design stage;

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
								6. Acknowledgement and adaptability of design solutions to climate change. Where appropriate, recommendations related to the assessment of exceptions will be provided. Link with relevant safety guides will be ensured.
Japan	6	7. Overview	3.7. Human Engineering Factors	Clarify Human Engineering Factors, as this wordings differ from commonly used wordings “Human Factors Engineering.	X	3.9. Human Factors Engineering		
Sweden	4	7. Overview 3.7	Human Factors Engineering	The concept of Human Factors Engineering (HFE) is established also within the IAEA Safety Guides through SSG-51. Within the guide DS536, the same name of the concept should be used. We also expect the content in this part of DS536 to give an introduction or interface to what is already included in SSG-51, which is positive.	X	3.9. Human Factors Engineering		This section aims to provide recommendations for the assessment of the appropriateness of proposed implementation of human factors engineering for the SSCs of the system. Recommendations related to the assessment of exceptions will be provided. Link with relevant safety guides will be ensured.

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Ukraine	1	7. Overview 3.8		Similarily as above to SSG-51, the interface to what is included in DS524 (rev. NS-G-1.13) could be important to include/describe within this proposed section. Also suggest to include DS524 to the list of other related Safety Guides in section 6 of this DPP. This new guide could thereby enhance the understanding of interfaces and common bases for safety and security.	X	3.10. Provisions for ensuring radiation protection This section aims to provide recommendations for the assessment of the appropriateness of proposed implementation of provisions for ensuring radiation protection during all plant states and operating modes for the SSCs of the system. Recommendations related to the assessment of exceptions will be provided. Link with relevant safety guides will be ensured. The list of relevant Safety Guides has been updated and DS524 was added. The term “security” is not associated to DS524. However, the scope has been updated to reflect the interfaces between safety and security as: The interfaces between safety and security in the assessment of possible radiation risks will be included on an overall level, while specific guidance on the assessment of hazards arising from malicious acts will not be included within this Safety Guide.		
Finland	6	7. Overview	3.10 <u>Operational limits and conditions for safe operation</u>	Please harmonize the text with the IAEA glossary. IAEA is using a term Operational limits and conditions for safe operation instead of the term “Operation and technical specifications”	X	3.11. Operational limits and conditions for safe operation		

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Finland	7	7. Overview	3.11 Maintenance of the NPP and in-service inspection programs	Please add: maintenance and ISI programs. The assumption made at the beginning of the design process when specifying safety functions should be considered. Also the ISI-programs needs specific qualifications.	X	The revised and detailed table of contents included those activities. 3.7. Associated relevant activities This section aims to provide recommendations for the assessment of the appropriateness of different relevant activities to ensure the performance of the safety functions of the SSCs of the system in relation to quality assurance process; manufacturing; commissioning tests including pre-operational tests after maintenance activities; start-up, shutdown and interconnections; monitoring activities; in-service-inspection; periodic testing and maintenance. Recommendations related to the assessment of exceptions will be provided. Link with relevant safety guides will be ensured.		
Canada	4	7-3	Add: 3.11 Single Failure Criterion in DBA analyses	The implementation of Single Failure Criterion in DBA analyses is challenging and it would be beneficial to include guidance in this section.			X	The implementation of SFC in DBA is in the scope of SSG-2 (Rev.1) on Deterministic safety analysis for NPPs and it is not intended in this safety guide to reassess the application of SFC as it is for DBA in SSG-2 (Rev.1). However, this safety guide intent to cover the assessment of SFC of systems in section 3.6 as: 3.6. Safety design principles The aim of this section is to provide recommendations for the assessment of the appropriate implementation of safety design principles to ensure the performance of the safety functions of the SSCs of the system and with account taken of the safety classification and categorization of the system. Those safety design principles are single failure criteria (active and passive), reliability, redundancy, diversity, physical separation, qualification, fail safe design and spurious activation. Recommendations related to the assessment of exceptions will be provided. Link with relevant safety guides will be ensured.

Canada	5	7-3	Add: 3.12 Safety Margin	Guidance on how to quantify adequate/acceptable safety margins would be helpful.	X	Margins were considered as part of 3.6 of the DPP. The revised and detailed table of contents identify this topic in section 3.8. 3.8. Design Basis, Margins, Loads and Loads Combinations This section aims to provide recommendations for the assessment of the appropriateness of: 1. Design basis of SSCs of the system; 2. Use of codes and standards, including recommendations related to dealing with different codes and standards; And considerations of: 1. Technology and design options related to: (i) Proven engineering practices and operating experience; (ii) Design features for innovative reactor designs; (a) Passive Systems; (b) Systems shared between several modules; (c) Control room operating several modules, remote control room and remote operation; (d) Impact of installation of additional modules / units on a facility in operation; (e) Applications other than for electricity production: (i) Assessment of initiating events induced by the operation in the coupled facility; (ii) Assessment of hazards induced by the coupled installation; (iii) Assessment of potential containment by-pass; (f) Use and verification of artificial intelligence (for design and operation); (iii) Research, testing, analysis and demonstration programme where		

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
						recommendations related to scale of the mock-up, testing installation, materials, layout, etc. will be provided. 2. Materials options; 3. Loads and loads combinations; 4. Assessment of safety margins (for design basis), identification of cliff edge effects and margins for the robustness assessment (for beyond design basis); 5. Identification of ageing mechanisms and potential effects at the design stage; 6. Acknowledgement and adaptability of design solutions to climate change. Where appropriate, recommendations related to the assessment of exceptions will be provided. Link with relevant safety guides will be ensured.		

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Finland	8	7. Overview	3.12 Qualification of the equipment important to safety	Please add: qualification of the equipment important to safety	X	Qualification was considered as part of section 3.5 of the DPP.\ In the revised and detailed table of content is considered in section 3.6. 3.6. Safety design principles The aim of this section is to provide recommendations for the assessment of the appropriate implementation of safety design principles to ensure the performance of the safety functions of the SSCs of the system and with account taken of the safety classification and categorization of the system. Those safety design principles are single failure criteria (active and passive), reliability, redundancy, diversity, physical separation, <u>qualification</u>, fail safe design and spurious activation. Recommendations related to the assessment of exceptions will be provided. Link with relevant safety guides will be ensured.		
Finland	9	7. Overview		Please clarify where the codes are discussed. SSG-2 deals with the deterministic analysis. However there are several other type of codes used during the design of the NPPs.	X	Codes and standards were considered in section 3.6 of DPP. In the revised and detailed table of content is considered in section 3.8. 3.8. Design Basis, Margins, Loads and Loads Combinations This section aims to provide recommendations for the assessment of the appropriateness of: 1. Design basis of SSCs of the system; 2. <u>Use of codes and standards, including recommendations related to dealing with different codes and standards;</u>		

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Finland	10	7. Overview	3.13 Safety analysis report	Please add: Safety analysis report. SSG-61 deals with safety analysis report, but it would be useful to summarize main requirements for documenting safety assessments in SAR in this guide, too. In particular, it is relevant to highlight what is expected in different stages of the lifetime of a NPP (PSAR/FSAR).	X	The information related to the safety analysis report was considered in section 2.4 of DPP. In the revised and detailed table of content is considered in section 2.4. 2.4. Required Information This section will provide recommendations related to the need to identify and use different sources of information such as conceptual safety design report, safety analysis report (PSAR/FSAR), environmental impact assessment report, and additional information which might be relevant for conducting the safety assessment and independent verification. Link with relevant safety guides will be ensured.		
Canada	6	7-4	Add: 4.4 Criteria for Independent Verification	Criteria for the independent verification should be provided. Also, guidance on verification and validation of safety software should be considered.	X	The criteria for judging the safety assessment was considered as part of the section 4.1 in the DPP. 4.1. Purpose of the independent verification This section will provide recommendations related to the purpose of the independent verification of the safety assessment in relation to Requirement 16: Criteria for judging safety and Requirement 21: Independent verification of GSR Part 4 (Rev. 1) for both the designer/operating organization and the regulatory authority/technical support organization.	X	The recommendations on validation and verification of computer codes for design basis analysis and probabilistic safety assessments are covered respectively in SSG-2 (Rev.1) and SSG-3 and SSG-4. In addition, recommendations for the verification and validation of software used in digital I&C is covered in SSG-39. References to those recommendations will be made. However, recommendations related to the verification and validation of artificial intelligence codes will be presented in tis safety guide.

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Ukraine	2	SUMMARY OF GAP ANALYSIS Table, p.3 Independent verification	Relationship between the design, safety assessment and independent *verification*	Dropped word	X			
Belgium	3	Summary of Gap Analysis	Insert a definition of "verification" and, if different, of "independent verification"	In this summary, a definition of "safety assessment" is given. (taken from the IAEA Safety Glossary). Also a definition of "verification" and (if different) "independent verification" would be welcome, to better understand the goal of this DS536	X	The table of contents of the proposed DS536 has been updated to consider independent verification only as Requirement 21 of GSR Part 4 (Rev.1).		
Belgium	4	Summary of the Gap Analysis (page 3, Figure 2)	Indicate in Figure 2 where DS536 will be situated in this structure.	Will DS536 be a SSG under SSR-2/1? Or under GSR Part 4	X	DS536 is intended to address the safety assessment therefore it should be under both of the general requirements GSR Part 4 (Rev.1) and specific requirements in SSR-2/1 (Rev.1).		

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
Belgium	5	Summary of the Gap Analysis (page 3 and 5)	Page 3 : " Covered in GSR Part 4 (Rev. 1) Req. ~~24~~ 21, …" Page 5: "Covered in general by Req. ~~24~~ 21 of GSR Part 4 (Rev. 1), …"	Req. 24 seems to be the wrong requirement (says nothing on "verification"). Further, Req. 21 says explicitly that the operating organization shall do an "independent verification", while Article 4.71 also indicates that the regulatory body shall do a separate independent verification. Will DS536 cover the independent verification by the operating organization, by the regulatory body, or both? Please clarify. Note that Fig. 1 of GSR Part 4 Rev.1) gives two separate blocks for "Independent verification" and for "Submission to regulatory body (Regulatory review)"	X	Number of the requirement corrected. 4. INDEPENDENT VERIFICATION OF THE SAFETY ASSESSMENT The objective of this chapter is to provide specific recommendations for conducting the independent verification of the safety assessment of engineering aspects important to safety for nuclear power plants during the design stage or modifications in compliance with relevant requirements of GSR Part 4 (Rev. 1) such as Requirement 16: Criteria for judging safety, Requirement 14: Scope of the safety analysis, Requirement 15: Deterministic and probabilistic approaches and Requirement 21: Independent verification of GSR Part 4 (Rev. 1) <u>for both the designer/operating organization and the regulatory authority/technical support organization.</u>		
ENISS	1	Summary of gap analysis - Independent verification (page 2)	Covered in GSR Part 4 (Rev. 1) Req <u>21 (§4.66-4.71)</u> ~~24,~~ in SSG-2 (Rev. 1) but only related to deterministic safety analysis, and in SSG-3 and SSG-4 but only related to probabilistic safety assessment	Editorial	X			

ENISS	2	Summary of gap analysis - Proven engineering practices and operational experience (page 2)	There is a gap to be covered	Please clarify which gap has to be covered because SSR-2/1 and other safety guides in interface cover most of these areas (e.g. SSG-64, SGG-68, SSG-77, SSG-69...)				The primary intention of this safety guide is to provide recommendations related to Requirement 10 on Assessment of engineering aspects important to safety and Requirement 21 on Independent verification. The intended safety guide plays a role of integration, as it was the former NS-G-1.2, where the three aspects of the safety assessment need to be considered altogether, DSA, PSA and engineering judgement on the engineering aspects important to safety. Therefore, the intended safety guide aims to avoid repetition but to make the link between the three previous mentioned topics of the safety assessment which is not covered in any safety guide. In addition, it will be better to avoid dealing with the same topic in different guides. We recognize the role and the scope of each safety guide available today for safety assessment such as SSG-2 (Rev. 1) on DSA, SSG-3 on Level 1 PSA and SSG-4 on level 2 PSA, the last two currently under revision. Therefore, we do not intend to rewrite or rephrase them. The other safety guides available aim to provide recommendations for the design to specific systems (e.g., reactor coolant system, electrical power supply, etc.) or issues (e.g., safety classification, human factors engineering, etc.) but not on the safety assessment. In the gap analysis, we have detected some paragraphs in some safety guides for the design, dealing with the verification of the design recommendations for that system alone but without any link to connected systems. The link among all those aspects is needed. Therefore, the intended safety guide aims at closing this gap and providing the methodology for a comprehensive evaluation of the design in one single document, including key topics such as independence of defence in depth levels, the assessment of relationship among different criteria (criteria for barriers integrity, dose limits for operator actions, PSA results (risk metrics) and

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
								radiological criteria for deterministic safety analysis) and assessment of safety margins (for design basis), identification of cliff edge effects and margins for the robustness assessment (for beyond design basis), not covered in any safety guide.
ENISS	3	Summary of gap analysis - 5. Independent (page 3)verification	Covered in general by Req. 21 ~~24~~ of GSR Part 4 (Rev. 1), and particularly for deterministic safety analyses in SSG-2 (Rev. 1), and for probabilistic safety assessment in SSG-3 and SSG-4	Editorial	X			
ENISS	4	Summary of gap analysis - Requirement 8: Assessment of site characteristics (page 4)	Not covered	This ought to be clarified because some of the aspects are covered by SSR-1 and SGG-9 Rev 1 (e.g. seismic)	X			Aspects such as the identification of hazards from the SSR-1 and the assessment of external hazards in relevant safety guides (e.g., SSG-9, SSG-67) are already provided, however what is missing is the link to the assessment of engineering aspects important to safety specifically for NPPs with regard to all other topics covered by the safety assessment.
ENISS	5	Summary of gap analysis - Requirement 11: Assessment of human factors (page 4)	Not covered	This ought to be clarified because it is covered by SSG-51	X			Considerations for human factors engineering in the design and their verification is provided in SSG-51, however what is missing is the link to the assessment of engineering aspects important to safety with regard to all other topics covered by the safety assessment for a given system. The intention is not to rewrite the recommendations but to make the link to the question related to human factors engineering for the system under assessment.

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
ENISS	6	Summary of gap analysis - Requirement 13: Assessment of defence in depth (page 4)	Not covered	This ought to be clarified because the overall implementation of DiD and its assessment (including independence) is addressed by DS508	X			The objective of this safety guide (DS536) is not to rewrite recommendations as in DS508 but to make the link between the assessment of the application of defence in depth to items important to safety required as presented in DS508 to other key aspects to be evaluated during the safety assessment to complement DS508, if necessary.
Germany NUSSC	6	"Gap analyssis" Page 5, Bullet 1, Line 4	… postulated ~~initiated~~ initiating events and external events for which the SSCs are required;	Clarification	X			
ENISS	7	Summary of gap analysis – page 5	Adequate implementation of the defence in depth concept for NPPs, with consideration of independence among those SSCs required at different levels of defence;	Please refer to the DS508 (under Step11) which will address recommendations on this topic.	X			The objective of this safety guide (DS536) is not to rewrite recommendations as in DS508 but to make the link between the assessment of the application of defence in depth to items important to safety required as presented in DS508 to other key aspects to be evaluated during the safety assessment to complement DS508, if necessary.

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
ENISS	8	Summary of gap analysis – page 5	Adequate and effective implementation of the safety related classifications for SSCs and the associated relevant activities comprehensively across different systems to ensure their	Please refer to the SSG-30 recommendations on this topic	X			The recommendations in SSG-30 are applicable to the design of structures, systems and components. This safety guide aims at providing recommendations for assessing the implementation of the safety classification and categorization for engineering aspects important to safety including the barriers, the seismic categorization, the electrical classification, the I&C classification, the mechanical classification and the fire protection classification (considered with regard to internal hazards). The use of PSA to complement and verify the safety classification is also considered. An indicative table presenting a general overview the application of safety classifications and categorization for SSCs will be provided. The link between all classification and the categorization and PSA is no provided in any safety guide. In addition, recommendations related to exception will be provided.

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
ENISS	9	Summary of gap analysis – page 6	Completeness and adequacy of the set of expected internal and external hazards resulting from the site evaluation to be considered in the design of SSCs and the adequate and effective implementation of design provisions for their protection against internal and external hazards and their combinations across different systems to ensure their required functions in all plant states	Please refer to SSG-64, SSG-68, SSG-9,SSG-77, DS490 and indicate what additional areas of recommendation are necessary	X			The areas of recommendations are related to the evaluation of the assessment first of the appropriate and complete list of selected internal hazards and external hazards including their combinations and the beyond design basis external hazards that might impact the system functions of the system and second of the effectiveness of the protection measures against the selected hazards. The safety guides SSG-64, SSG-68, SSG-9, and DS490 mainly provide recommendations for the protection against internal hazards or external hazards in the design of NPPs. SSG-77 provides recommendations for ensuring protection against internal hazards and external hazards during operation of NPP. Some recommendation in those safety guides aim at the safety assessment of engineering aspects important to safety against internal hazards or external hazards (some deal with design against beyond design basis external hazards), however the recommendations related to the assessment of combinations of initiating events, internal hazards and external hazards are less explicit as well as those related to the use of engineering judgement, probabilistic safety assessment and deterministic safety analysis to evaluate the robustness of the design (considerations of application of design safety principles, classification and categorization, materials selection, ageing mechanisms, etc.). In addition, recommendations related to how assess the exceptions in relation to protection against internal hazards or external hazards and their combinations are not provided. The intention is not to rewrite recommendations but to reference and compile them for a comprehensive safety assessment.

Country	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
ENISS	10	Summary of gap analysis – page 6	Completeness and adequacy of the set of expected loads and loads combinations (including those induced by internal and external hazards) to be considered for the design of SSCs important to safety and the adequate and sufficient implementation of design assumptions to enable SSCs capacity and the margins to withstand the identified loads and loads combinations across different systems to ensure their required functions in all plant states while preventing cliff-edge effects;	Same as above	X			The area of recommendations is related to the adequate consideration of loads and loads combinations in the design of SSCs to ensure the performance of their safety related functions. As mentioned in previous answer, there are several safety guides providing recommendations for the design of SSCs against internal hazards and/or external hazards and some recommendations related to the safety assessment are provided but not in the perspective of verifying the use of engineering judgement, probabilistic safety assessment and deterministic safety analysis together to evaluate the robustness of the design with regard to the loads and loads combinations as it is in a comprehensive safety assessment while evaluating the application of design safety principles, safety classification and categorization, etc. In addition, recommendations related to how assess the exceptions in relation to protection appropriate consideration of loads combinations are not provided. The intention is not to rewrite recommendations but to reference and compile them for a comprehensive safety assessment.
ENISS	11	Summary of gap analysis – page 6	Adequate and sufficient implementation of design safety principles, of human engineering factors and of provisions for ensuring radiation protection, across different systems, to enable SSCs to ensure their required functions in all plant states	Please refer to SSG-51 and indicate what additional areas of recommendation are necessary	X			The recommendation provided in SSG-51 are mainly for the human factors engineering in the design. The overall assessment of the correct application design safety principles with regard to human factors engineering is not covered in this safety guide (SSG-51), which is the intention in DS536, including the recommendations for assessment of provisions to ensure radiation protection in all plant states.
Germany NUSSC	7	"Gap analyssis" Page 6, Bullet 3, Line 1	Adequate and sufficient implementation of design safety principles, of human <u>factors</u> engineering ~~factors~~ and of provisions for ensuring radiation protection, ….	Clarification	X			

Table: Correspondence between NS-G-1.2, DPP-DS537, and Specific Safety Guides

Contents in Sec.3 of NS-G-1.2 ENGINEERING ASPECTS IMPORTANT TO SAFETY	Subjects proposed in new Safety Guide (from **7. OVERVIEW** of DPP)	Relevant Specific Safety Guides already published or in development
General	-	-
Proven engineering practices and operational experience	-	SSG-56: Design of the Reactor Coolant System and Associated Systems for NPPs
Innovative design features	-	SSG-39: Design of Instrumentation and Control Systems for NPPs SSG-56 DPP-DS537: Safety Demonstration of Innovative Technology in Reactor Designs,
	3.1. Safety Functions and Postulated Initiating Events	SSG-2 (Rev. 1): Deterministic Safety Analysis for NPPs SSG-56
Implementation of defence in depth	3.2. Implementation of the Defence in Depth Concept	SSG-56 DS508: Assessment of the Safety Approach for Design Extension Conditions and Application of the Concept of Practical Elimination in the Design of NPPs
Radiation protection	3.8. Provisions for Ensuring Radiation Protection	DS524: (revision of NS-G-1.13) Radiation Protection Aspects of Design for NPPs
Safety classification of structures, systems and components	3.5. Safety Classification	SSG-30: Safety Classification of Structures, Systems and Components in NPPs
Protection against external events	3.3. Protection Against Internal Hazards and External Hazards	SSG-64: Protection against Internal Hazards in the Design of NPPs
Protection against internal hazards	3.3. Protection Against Internal Hazards and External Hazards	SSG-67: Seismic Design for Nuclear Installations SSG-68: Design of Nuclear Installations Against External Events Excluding Earthquakes DS522: (revision of NS-G-2.13) Evaluation of Seismic Safety for Existing Nuclear Installations

Contents in Sec.3 of NS-G-1.2 ENGINEERING ASPECTS IMPORTANT TO SAFETY	Subjects proposed in new Safety Guide (from **7. OVERVIEW** of DPP)	Relevant Specific Safety Guides already published or in development
Conformity with applicable codes, standards and guides	3.4. Associated Functional Requirements and Criteria	SSG-56
Load and load combination	3.6. Design Basis, Margins, Loads and Load Combinations	SSG-56
Selection of materials	-	SSG-5
Single failure assessment and redundancy/independence	-	SSG-39
Diversity	-	SSG-39
In-service testing, maintenance, repair, inspections and monitoring of items important to safety	-	DS497E: (Revision of NS-G-2.6) Maintenance, Surveillance and In-Service Inspection in NPPs
Equipment qualification	-	SSG-69: Equipment Qualification for Nuclear Installations
Ageing and wear-out mechanisms	-	SSG-48: Ageing Management and Development of a Programme for Long Term Operation of NPPs
Human–machine interface and the application of human factor engineering	3.7. Human Factors Engineering	SSG-51: Human Factors Engineering in the Design of NPPs
-	3.9. Auxiliary and Support Systems	SSG-62: Design of Auxiliary Systems and Supporting Systems for NPPs
-	3.10. Operation and Technical Specifications	DS497a: (revision of NS-G-2.2) Operational Limits and Conditions and Operating Procedures for NPPs
System interactions	-	
Use of computational aids in the design process	-	
5. INDEPENDENT VERIFICATION	5. INDEPENDENT VERIFICATION 4.1. Purpose of the Independent Verification 4.2. Scope of the Independent Verification 4.3. Use of the Results of the Independent Verification	DS513 (GS-G-3.1): Application of the Management System for Facilities and Activities SSG-2 (Rev. 1) DS523: (revision of SSG-3) Development and Application of Level 1 Probabilistic Safety Assessment for NPPs DS528: (revision of SSG-4) Development and Application of Level 2 Probabilistic Safety Assessment for NPPs