Document Preparation Profile (DPP)
Version 4~~3~~ dated 18 November~~19 September~~, 2014

1. IDENTIFICATION

Document Category	Specific Safety Guide
Working ID:	DS491
Proposed Title:	Deterministic Safety Analysis for Nuclear Power Plants, Rev. 1
Proposed Action:	Revision of Safety Standards Series No. SSG-2, IAEA, Vienna (2009)

Review Committee(s) or Group: NUSSC, RASSC, WASSC

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2. BACKGROUND

The IAEA Safety Guide SSG-2, "Deterministic Safety Analysis for Nuclear Power Plants" was published in 2009 to provide recommendations on meeting the requirements established in NS-R-1, "Safety Requirements on the Safety of Nuclear Power Plants: Design" of 2000.

General safety requirements were developed in parallel to SSG-2 under GSR-Part 4 "Safety Assessment for Facilities and Activities" (2009). A few years later NS-R-1 was superseded by SSR-2/1, "Safety of Nuclear Power Plants: Design" in 2012.

Among the significant changes incorporated in SSR-2/1 are the inclusion of design extension conditions in the plant design and the strengthening of the independence and effectiveness of the different levels of defence in depth. The importance of addressing these changes was strongly highlighted by the feedback of experience from the Tepco Fukushima Daiichi nuclear power plant accident.

3. JUSTIFICATION FOR THE PRODUCTION OF THE DOCUMENT

~~Since~~ SSG-2 was developed to provide guidance in fulfilling the requirements of NS-R-1. ~~and~~ Since the requirements of SSR-2/1 represent a significant change with respect to those of NS-R-1~~,~~ it is necessary to revise SSG-2 for making it consistent with SSR-2/1. On the other hand, in the process of review and revision of the IAEA ~~s~~ Safety ~~g~~Guides conducted mainly in 2013 to account for the feedback of experience from the Tepco Fukushima Daiichi nuclear power plant accident, several gaps were identified in the relevant IAEA safety assessment guidance and SSG-2 is one of the main ~~s~~Safety ~~g~~Guides affected by the outcome of this exercise. The pilot review of SSG-2 led to the conclusion endorsed by NUSSC in July 2014 that it is necessary to produce a new version of the guide (See Annex 1).

4. OBJECTIVE AND SCOPE

The main objective of the revised Safety Guide is to provide recommendations and guidance on the use of deterministic safety analysis and its application to nuclear power plants in compliance with the safety requirements established in GSR Part 4 and SSR-2/1. The publication is intended for use by designers, regulators, technical support organizations and operators regarding primarily the safety design of new nuclear power plants and, as far as reasonably achievable, also ~~to~~ the safety re-evaluation or assessment of existing nuclear power plants taking into account applicable feedback of recent regulation developments and experience from the Tepco Fukushima Daiichi nuclear power plant accident and from other sources of lessons learned, such as the conclusions arising from the stress tests performed at national level and the use of the current version of the Safety Guide by the IAEA Member States.

The main changes to be covered by the revised Safety Guide are:

- In general, the terminology of the Safety Guide needs to be revised and made consistent with the plant states described in SSR 2/1.
- The approach to establish deterministic safety analysis in the framework of the safety assessment of the nuclear power plant will be included.
- Deterministic safety analysis for design extension conditions needs to be included in the scope of the revised ~~s~~Safety ~~g~~Guide.
- Potential role of decommissioning tasks in deterministic safety analysis will be taken into account, referring to corresponding guidance already available, including WS-G-5.2 on "Safety Assessment for Decommissioning of Facilities using Radioactive Material", 2008, and DS452 for „Decommissioning of Nuclear Facilities"
- Regarding individual and collective doses to workers and the public, the reference to NS-R-1 needs to be replaced by GSR Part 3 "Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards", 2014
- Highlight the relevance of deterministic safety analysis in safety classification according to SSG-30 on "Safety Classification of Structures, Systems and Components in Nuclear Power Plants", 2014.
- Guidance regarding deterministic safety analysis documentation, review and update will be provided.
- The revised ~~s~~Safety ~~g~~Guide needs to include changes resulting from the revisions of GSR Part 4 and SSR-2/1 on the basis of feedback of experience from the Fukushima accident.

5. PLACE IN THE OVERALL STRUCTURE OF THE RELEVANT SERIES AND INTERFACES WITH EXISTING AND/OR PLANNED PUBLICATIONS

The new version of the Safety Guide will be directly related to SSR-2/1, and will be consistent with definitions and terminology given in GSR Part 4 and GSR Part 3.~~:~~

- ~~Safety Assessment for Facilities and Activities, General Safety Requirements GSR Part 4~~
- ~~Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards GSR Part 3~~

Interfaces with other Safety Guides and Security Guides will also be considered, including the following [the list is not intended to be exhaustive]:

- Format and Content of the Safety Analysis Report for Nuclear Power Plants, GS-G-4.1 (2004), DS449 project.
- Development and Application of Level 1 Probabilistic Safety Assessment for Nuclear Power Plants, SSG-3 (2010)
- Development and Application of Level 2 Probabilistic Safety Assessment for Nuclear Power Plants, SSG-4 (2010)
- Seismic Hazards in Site Evaluation for Nuclear Installations, SSG-9 (2010)
- Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations, SSG-18 (2011)
- Safety Assessment for the Decommissioning of Facilities Using Radioactive Material, WS-G-5.2 (2008)
- Safety Classification of Structures, Systems and Components in Nuclear Power Plants, SSG-30 (2014).
- Modifications to Nuclear Power Plants, NS-G-2.3 (2001)
- Periodic Safety Review for Nuclear Power Plants, SSG-25 (2013)
- Seismic design and qualification of Nuclear Power Plants, NS-G-1.6 (2003), under review as DS490.
- The Management System for Facilities and Activities, GS-R-3 (2006), under review as DS456 for "Leadership and Management for Safety"
- Engineering Safety Aspects of the Protection of Nuclear Power Plants against Sabotage, NSS-4 (2007)
- Identification of Vital Areas at Nuclear Facilities, NSS-16 (2012)

6. OVERVIEW

The revised Safety Guide should have a structure in line with the current format and content of Specific Safety Guides and a scope consistent with the relevant safety requirements of SSR 2/1. It is planned that the document will include the following main contents (given for illustration):

1. INTRODUCTION

2. BASIS FOR ESTABLISHING DETERMINISTIC SAFETY ANALYSIS

3. IDENTIFICATION AND CATEGORIZATION OF POSTULATED INITIATING EVENTS AND ASSOCIATED TRANSIENTS RELATING TO PLANT STATES

4. APPROACHES FOR DETERMINISTIC SAFETY ANALYSIS. ACCEPTANCE CRITERIA

5. IMPLEMENTATION OF DETERMINISTIC SAFETY ANALYSIS
4.1 DETERMINISTIC SAFETY ANALYSIS FOR NORMAL OPERATION
4.2 DETERMINISTIC SAFETY ANALYSIS FOR ANTICIPATED OPERATIONAL OCCURRENCES
4.3 DETERMINISTIC SAFETY ANALYSIS FOR DESIGN BASIS ACCIDENTS
4.4 DETERMINISTIC SAFETY ANALYSIS FOR DESIGN EXTENSION CONDITIONS

6. VERIFICATION AND VALIDATION OF COMPUTER CODES

7. ~~RELATION~~ INTERFACES OF DETERMINISTIC SAFETY ANALYSIS TO ENGINEERING ASPECTS OF SAFETY AND PROBABILISTIC SAFETY ANALYSIS

8. APPLICATION OF DETERMINISTIC SAFETY ANALYSIS

9. SOURCE TERM EVALUATION FOR OPERATIONAL STATES AND ACCIDENT CONDITIONS

10. DOCUMENTATION, REVIEW AND UPDATE OF DETERMINISTIC SAFETY ANALYSIS

REFERENCES

ANNEX 1. SAFETY MARGINS

CONTRIBUTORS TO DRAFTING AND REVIEW

BODIES FOR THE ENDORSEMENT OF IAEA SAFETY STANDARDS

7. PRODUCTION SCHEDULE: Provisional schedule for preparation of the document:

STEP 1: Preparing a DPP	DONE
STEP 2: Approval of DPP by the Coordination Committee	September 2014
STEP 3: Approval of DPP by the relevant review Committees	November 2014
STEP 4: Approval of DPP by the CSS	2Q – 2015
STEP 5: Preparing the draft	July 2016
STEP 6: Approval of draft by the Coordination Committee	September 2016
STEP 7: Approval by the relevant review Committees for submission to Member States for comments	4Q 2016
STEP 8: Soliciting comments by Member States	2Q 2017
STEP 9: Addressing comments by Member States	3Q 2017

STEP 10: Approval of the revised draft by the Coordination Committee. Review in NS-SSCS	4Q 2017
STEP 11: Approval by the relevant review Committees	1Q 2018
STEP 12: Endorsement by the CSS	2Q 2018
STEP 13: Establishment by the Publications Committee	3Q 2018
STEP 14: Target publication date	4Q 2018

8. RESOURCES

It is envisaged that the development of the document will entail the organization of three consultancy meetings and one Technical Meeting for the production of the draft and two further consultancy meetings for addressing comments from MSs, NUSSC, RASSC, WASSC and CSS

ANNEX 1

NUSSC agreed in the 37th meeting that it is necessary to revise the Safety Guide SSG-2 and requested the Secretariat to initiate a DPP for this purpose. NUSSC also requested the Secretariat to present a proposal for covering the *engineering aspects important to safety* initially included in NS-G-1.2 "Safety Assessment and Verification for Nuclear Power Plants", 2001, which are not included in the existing guidance. Account was taken in this decision of the elements ~~provided~~ presented by the Secretariat in that meeting ~~the following presentation:~~