

**SPESS F**  
**Document Preparation Profile (DPP)**  
**Version 11a dated 02-02-2022**

## **1. IDENTIFICATION**

**Document Category or batch of publications to be revised in a concomitant manner**

**Safety Requirements**

**Working ID:** DS532

**Proposed Title:** Safety of Nuclear Power Plants: Commissioning and Operation, SSR-2/2 (Rev. 2)

**Proposed Action:** Revision of a publication

Safety of Nuclear Power Plants: Commissioning and Operation, SSR-2/2 (Rev. 1)

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

**Technical Officer(s):** Simon MORGAN

## **2. BACKGROUND**

IAEA Safety Standards Series No. SSR-2/2 was published in 2011 and many Member States have adopted it as a reference for their national regulations in the area of safety of nuclear power plant commissioning and operations. SSR 2-2 has also been used as an international safety standard reference for conducting Agency Safety Services, particularly the Operational Safety Review Team (OSART) service.

In 2011, the IAEA commenced a review of Safety Requirements publications in the IAEA Safety Standards Series on the basis of information that was available from the accident at the Fukushima Daiichi nuclear power plant. The review included a comprehensive analysis of the findings of this information and the CSS approved, at its meeting in October 2012, a proposal for a revision process by amendment for the following five Safety Requirements publications: Governmental, Legal and Regulatory Framework for Safety (IAEA Safety Standards Series No. GSR Part 1, 2010); Safety Assessment for Facilities and Activities (GSR Part 4, 2009); Safety of Nuclear Power Plants: Design (SSR-2/1, 2012); Safety of Nuclear Power Plants: Commissioning and Operation (SSR-2/2, 2011); and Site Evaluation for Nuclear Installations (NS-R-3, 2003). The revised versions of these Safety Requirements publications were all issued in 2016. The revisions to SSR-2/2 were related to the following main areas:

- Periodic safety review and feedback from operating experience;
- Emergency preparedness;
- Accident management;

- Fire safety;
- Long Term Operation, including ageing management;
- Non-radiation-related safety;

In accordance with the approach set out in SPESS A of reviewing the safety standards every five years, the IAEA conducted a virtual CS meeting in October 2020 to seek further advice for improving and updating the contents of SSR-2/2 (Rev. 1). The CS considered the extent to which the overarching Requirements of SSR-2/2 (Rev. 1) would need to be updated. The results from the CS have been included in the Annex.

### **3. JUSTIFICATION FOR THE PRODUCTION OF THE PUBLICATION**

Since 2011, there have been additional significant safety enhancements in the commissioning and operation of nuclear power plants – which go beyond the amendments made in response to the findings from the Fukushima Daiichi accident, and which are not currently captured within SSR-2/2 (Rev. 1). This has been recognized by Member States and by the Secretariat during safety review missions such as OSART and SALTO, and from direct feedback from Member States and feedback from the October 2020 CS meeting.

The main justifications for the proposed revision are the following:

- SSR-2/2 (Rev. 1) does not adequately cover areas such as: corporate governance and monitoring, independent oversight, risk management, knowledge management, defence in depth during operation, performance improvements, preparations for pandemic situations, control of core cooling and fuel storage cooling. (Further details are set out in the Annex).
- Several IAEA General Safety Requirements publications have been published since 2011 and it is necessary to harmonize SSR-2/2 (Rev. 1) with them, namely GSR Part 2 on Leadership and Management for Safety, GSR Part 3 on Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, and GSR Part 7 on Preparedness and Response for a Nuclear or Radiological Emergency.
- Additional insights and inputs have been gained through the development of international consensus on topics addressed in several recently issued Safety Guides, namely SSG-48 on Ageing Management and Development of a Programme for Long Term Operation for Nuclear Installations, SSG-50 on Operating Experience Feedback for Nuclear Installations, and SSG-54 on Accident Management Programmes for Nuclear Power Plants, as well as several closely related Safety Guides on operation of nuclear power plants (see Annex) which are expected to be published in 2022.
- Organizations such as WANO have updated their Performance Objectives and Criteria in 2013 and 2019. Inputs from WANO and other like-minded organizations should also be taken into account to make sure that the Safety Requirements publication remains relevant to the nuclear industry.
- This DPP proposes a full review of SSR-2/2 (Rev1) and the exact scope of the review will be defined by further consultancies aimed at identifying if there are other commissioning and operational topics in addition to those listed in the Annex, which should be considered as part of this revision. For example, if the current IAEA project on the Applicability of IAEA Safety Standards on small modular reactors identifies commissioning and operational requirements during the drafting of this proposed revised standard, then this would be taken into account.

- The technology neutrality of the requirements concerning safe commissioning and operation of the nuclear power plants will also be considered during the full review of SSR-2/2.
- There are no short-medium term plans to revise SSR-2/1 (Rev.1), therefore it is not possible to revise SSR-2/1 (Rev.1) and SSR-2/2 (Rev.1) together at this present time. However, this revision of SSR-2/2 (Rev.1) is also expected to provide inputs for the future revision of SSR-2/1 (Rev.1)

Additional inputs to the revision of the SSR-2/2 (Rev. 1) are also expected from Technical Meetings planned to be held in 2022/2023.

The revision to SSR-2/2 (Rev. 1) will be undertaken within the context of the Medium-Term Plan for the safety standards.

#### **4. OBJECTIVE**

The objective of the revision of SSR-2/2 (Rev. 1) will remain almost the same: namely to establish the requirements which in the light of, experience, the present state of technology and new technology developments, need to be met to ensure the safe commissioning and operation of nuclear power plants.

The requirements established in this Safety Requirements publication is intended for use primarily by organizations involved in commissioning and operation of nuclear power plants and regulatory bodies.

#### **5. SCOPE**

The scope of the revision of SSR-2/2 (Rev. 1) will remain the almost same, as shown below. Some of the potential areas to be included in this revision can be found in the annex to this DPP.

The publication deals with the safe commissioning and operation of nuclear power plants. It covers commissioning and operation up to the removal of nuclear fuel from the plant, including maintenance and modifications made throughout the lifetime of the plant. It covers normal operations and operations under anticipated operational occurrences as well as accident conditions and the preparation for decommissioning but not the decommissioning itself.

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

The proposed revision will interface with the following General Safety Requirements and Specific Safety Requirements publications, as well as the relevant Nuclear Security Recommendations:

- GSR Part 1 (Rev. 1) Governmental, Legal and Regulatory Framework for Safety: Published 2016
- GSR Part 2 Leadership and Management for Safety: Published 2016
- GSR Part 3 Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards: Published 2014
- GSR Part 4 (Rev. 1) Safety Assessment for Facilities and Activities: Published 2016
- GSR Part 5: Predisposal Management of Radioactive Waste: Published 2009
- GSR Part 6 Decommissioning of Facilities: Published 2014
- GSR Part 7 Preparedness and Response for a Nuclear or Radiological Emergency: Published 2015
- SSR-1 Site Evaluation for Nuclear Installations: Published 2019
- SSR-2/1 (Rev. 1) Safety of Nuclear Power Plants: Design: Published 2016
- NSS 13, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities: Published 2010

The relevant Sections within the following Divisions and the IEC will be consulted in the drafting process:

- Division of Nuclear Installation Safety
- Division of Nuclear Security
- Division of Radiation, Transport & Waste Safety
- Incident and Emergency Centre
- Division of Nuclear Fuel Cycle & Waste Technology
- Division of Nuclear Power
- Division of Planning, Information & Knowledge Management

## 7. OVERVIEW

The main structure and contents of the existing publication, as set out here below, are not expected to change significantly.

### 1. INTRODUCTION

Background  
Objective  
Scope  
Structure

### 2. SAFETY OBJECTIVE AND SAFETY PRINCIPLES

### 3. MANAGEMENT AND ORGANIZATIONAL STRUCTURE OF THE OPERATING ORGANIZATION

### 4. MANAGEMENT OF OPERATIONAL SAFETY

### 5. OPERATIONAL SAFETY PROGRAMMES

### 6. PLANT COMMISSIONING

### 7. PLANT OPERATIONS

### 8. MAINTENANCE, TESTING, SURVEILLANCE AND INSPECTION

### 9. PREPARATION FOR DECOMMISSIONING

### REFERENCES

The probable impact of the revisions on the various overarching Requirements of SSR-2/2 (Rev. 1) are shown in the Annex.

The publication is not expected to be co-sponsored but inputs from industry organizations such as WANO, Electric Power Research Institute (EPRI) will be taken into account in the course of drafting.

**8. PRODUCTION SCHEDULE:** Provisional schedule for preparation of the publication, outlining realistic expected dates for each step (*fill the column corresponding to your proposed publication and delete the other columns*):

|  | A*         |
|--|------------|
| STEP 1: Preparing a DPP  | DONE       |
| STEP 2: Internal review of the DPP (Approval by the Coordination Committee)  | Q3 2021    |
| STEP 3: Review of the DPP by the review Committee(s) (Approval by review Committee(s))   | Q4 2021    |
| STEP 4: Review of the DPP by the CSS (approval by CSS) or information of the CSS on the DPP                                      | Q2 2022    |
| STEP 5: Preparing the draft publication  | Q2-Q4 2022 |
| STEP 6: First internal review of the draft publication (Approval by the Coordination Committee)                                  | Q1 2023    |
| STEP 7: First review of the draft publication by the review Committee(s) (Approval for submission to Member States for comments) | Q4 2023    |

|   |              |
|---|--------------|
| STEP 8: Soliciting comments by Member States  | Q4 2023      |
| STEP 9: Addressing comments by Member States  | Q1 – Q3 2024 |
| STEP 10: Second internal review of the draft publication (Approval by the Coordination Committee)   | Q4 2024      |
| STEP 11: Second review of the draft publication by the review Committee(s) (Approval of the draft)  | Q2 2025      |
| STEP 12: (For Safety Standards) Editing of the draft publication in MTCDD and endorsement of the draft publication by the CSS<br>(For nuclear security guidance) DDG's decision on whether additional consultation is needed, establishment by the Publications Committee and editing | Q4 2025      |
| STEP 13: Approval by the Board of Governors (for SF and SR only)  | Q2 2026      |
| STEP 14: Target publication date  | Q3 2026      |

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- Column A for Safety Fundamentals, Safety Requirements and Safety Guides.

## 9. RESOURCES

Staff:

60 staff weeks

Consultants:

2022 – 7 consultant weeks

2023 – 6 consultant weeks

2024 – 6 consultant weeks

## ANNEX

## Probable Impact of Potential Changes to SSR 2/2 (Rev. 1):

| Section        | Potential Changes   |
|----------------|---|
| <b>3</b>       |   |
| Requirement 1  | - include reference to multiple unit plants   |
| Requirement 3  | <ul style="list-style-type: none"> <li>- include reference to safety committees</li> <li>- include paragraph on independent oversight</li> <li>- include reference to design authority</li> <li>- include paragraph on corporate governance and monitoring</li> <li>- include reference to procurement</li> <li>- include paragraph for project management</li> <li>- check consistency between DPP DS532 and DS497C (SSG-72), The Operating Organization for NPPs</li> </ul> |
| Requirement 4  | <ul style="list-style-type: none"> <li>- include reference to psychological evaluation of operating personnel</li> <li>- include reference to knowledge management</li> <li>- additional reference for evaluation of contractors</li> <li>- check consistency between DPP DS532 and DS497C (SSG-72), The Operating Organization for NPPs</li> </ul>   |
| <b>4</b>       |   |
| Requirement 5  | <ul style="list-style-type: none"> <li>- include reference to leadership expectations, observations and coaching</li> <li>- clarify definition of non-radiation-related safety</li> <li>- include a paragraph on fostering safety culture</li> <li>- include reference to timely implementation of reasonably practicable safety improvements</li> </ul>  |
| Requirement 9  | - update requirements on performance improvement  |
| Requirement 6  | <ul style="list-style-type: none"> <li>- include definition of safe state to align with IAEA Glossary definition</li> <li>- check consistency between DPP DS532 and DS497A (SSG-70), Operational Limits and Conditions for NPPs</li> </ul>  |
| Requirement 7  | <ul style="list-style-type: none"> <li>- update requirements regarding systematic approach to training</li> <li>- include paragraph on leadership development and staff appraisals</li> <li>- check consistency between DPP DS532 and DS497F (SSG-75), Recruitment Qualification and Training of Personnel for NPPs</li> </ul>  |
| Requirement 8  | <ul style="list-style-type: none"> <li>- update requirements regarding conservative decision making</li> <li>- update paragraph on use of human error prevention tools</li> <li>- additional requirement for defence in depth during operations</li> </ul>  |
|                | - update requirements for risk management   |
| Requirement 10 | - additional requirement(s) for configuration management  |
| Requirement 11 | <ul style="list-style-type: none"> <li>- check consistency between DPP DS532 and DS497B (SSG-71), Modifications to NPPs</li> <li>- to include consideration of assessment of cumulative effects of modifications and concept of risk-informed approach for modifications</li> </ul>   |
| Requirement 12 | - update periodic safety review (PSR) requirements  |
| Requirement 13 | - additional requirement(s) for equipment qualification deviations  |

|   |   |
|---|---|
|   | - check consistency between DPP DS532 and DS514 on equipment qualification  |
| Requirement 14                                | - update requirements on approach and terminology for ageing management and technological obsolescence  |
| Requirement 15                                | - update wording of requirement 4.52 with emphasis on records of operation shall be handled in accordance with their safety significance, and in line with national regulatory requirements.  |
| Requirement 16                                | - update requirements on approach and terminology for long term operations  |
| Requirement 17                                | - review to include if necessary an update on interface between nuclear safety and security   |
| <b>5</b>                                      |   |
| Requirement 17                                | - review wording  |
| Requirement 18                                | - include requirements on emergency response (GSR Part 7)   |
| Requirement 20                                | - include reference to contractors and suppliers  |
| Requirement 22                                | - update requirements for fire safety   |
| Requirement 23                                | - include requirements for preparations for pandemic situations and other foreseeable situations  |
| Requirement 24                                | - update requirements for operational experience feedback   |
| <b>6</b>                                      |   |
| Requirement 25                                | - include review of commissioning requirements  |
| <b>7</b>                                      |   |
| Requirement 27                                | - check consistency between DPP DS532 and DS497G (SSG-76), Conduct of Operations at NPPs  |
| Requirement 30                                | - update requirements for risks associated with low probability, high consequence events causing core damage<br>- to expand requirement to consider safety aspects associated with spent fuel pool accident   |
|   | - update requirements regarding control of core cooling and fuel storage cooling  |
|   | - check consistency between DPP DS532 and DS497D (SSG-73), Core Management and Fuel Handling for NPPs   |
| <b>8</b>                                      |   |
| Requirement 31                                | - check consistency between DPP DS532 and DS497E (SSG-74), Maintenance, Testing, Surveillance and Inspection in NPPs<br>- consider maintenance requirements for mobile safety-related equipment   |
| Requirement 32                                | - update requirements for Outage Management   |
| <b>9</b>                                      |   |
| Requirement 32                                | - update requirements for preparations for decommissioning  |
| <b>Whole Document</b>                         |   |
| Consistency checks between DPP DS532 and..... | - GSR Part 1 (Rev. 1) Governmental, Legal and Regulatory Framework for Safety: Published 2016<br>- GSR Part 2 Leadership and Management for Safety: Published 2016<br>- GSR Part 3 Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards: Published 2014<br>- GSR Part 4 (Rev.1) Safety Assessment for Facilities and Activities: Published 2016 |

|                   |   |
|-------------------|---|
|                   | <ul style="list-style-type: none"> <li>- GSR Part 5: Predisposal Management of Radioactive Waste: Published 2009</li> <li>- GSR Part 6 Decommissioning of Facilities: Published 2014</li> <li>- GSR Part 7 Preparedness and Response for a Nuclear or Radiological Emergency: Published 2015</li> <li>- SSR-1 Site Evaluation for Nuclear Installations: Published 2019</li> <li>- SSR-2/1 (Rev.1) Safety of Nuclear Power Plants: Design: Published 2018</li> <li>- SSG-2 (Rev.1) Deterministic Safety Analysis: Published 2019</li> <li>- SSG-28 Commissioning of nuclear power plants: Published 2014</li> <li>- SSG-48 Ageing management and Long Term Operation: Published 2018</li> <li>- SSG-50 Operating experience of nuclear installations: Published 2018</li> <li>- SSG-54 Accident management: Published 2018</li> <li>- DS497A (SSG-70) Operational Limits and Conditions for NPPs: to be published 2022</li> <li>- DS497B (SSG-71) Modifications to NPPs: to be published 2022</li> <li>- DS497C (SSG-72) The Operating organisation for NPPs: to be published 2022</li> <li>- DS497D (SSG-73) Core Management and Fuel Handling for NPPs: to be published 2022</li> <li>- DS497E (SSG-74) Maintenance, Testing, Surveillance and Inspections at NPPs: to be published 2022</li> <li>- DS497F (SSG-75) Recruitment Qualification and training of Personnel for NPPs: to be published 2022</li> <li>- DS497G (SSG-76) Conduct of Operations at NPPs: to be published 2022</li> <li>- DS503 Protection against Internal and External Hazards in Operation of Nuclear Power Plants: to be published 2023</li> <li>- DS494 (SSG-64) Protection Against Internal Hazards in Design</li> </ul> |
| <b>References</b> |   |
|                   | - update References as appropriate  |