Document Preparation Profile (DPP)

1. IDENTIFICATION

Document Category	**Safety Guide**
Working ID:	**DPP422**
Proposed Title:	**Evaluation of Seismic Hazards for Nuclear Installations**
Proposed Action:	**To revise current NS-G-3.3, (2002).**
Published Title/Date	**Evaluation of Seismic Hazards for Nuclear Power Plants (2002)**
Safety Series No.:	**NS-G-3.3**
SS Committee(s):	**NUSSC and WASSC**
Technical Officer(s):	**A. Godoy**

2. OBJECTIVE

- *The primary objective is to take account of the recently gained seismic hazard knowledge and experience of Member States and to provide updated guidance for site evaluation related to seismic hazards. This update will utilize the insights gained by feedback from Member States, from other Organisations, and from the lessons learned from the IAEA engineering safety review services. In particular, the experience that has been gathered in the recent application of probabilistic seismic hazard analysis (PSHA) will be considered.*
- *The second objective is to update guidance to include recent findings associated with strong motion recordings particularly in the near distance of the epicentre. These recordings come from seismically active and well instrumented parts of the world such as Japan and California.*
- *The third objective is to include the experience gained from some significant recent earthquakes that have also affected nearby nuclear power plants. This will include the case of the Kashiwazaki – Kariwa NPP.*
- *The fourth objective of the new Safety Guide will be to provide clear guidance for the new build projects. Most work on PSHA has involved existing nuclear power plants. For new plants, it is also important to associate probabilistic hazard with reference probabilities of exceedance.*
- *The fifth objective is to provide guidance for existing nuclear power plants to address issues that may be related with the possibility of fault displacement.*
- *The sixth objective is to expand the scope of the safety guide to include nuclear installations other than nuclear power plants using a graded approach.*

3. BACKGROUND

In order to achieve the stated objectives the following modifications are foreseen to be implemented:

- The treatment of uncertainties is a major part of any seismic hazard analysis, both deterministic and probabilistic. In recent years, there is more information on the impact of various uncertainties to the results of the hazard analysis. Furthermore, some uncertainties may be reduced through a more detailed site investigation programme. However, some uncertainties are imported and thus irreducible. These “imported” uncertainties are due to the

lack of earthquake strong ground motion recordings in many countries and regions and therefore their need to use empirical relationships developed for other parts of the world (where the data is available) on the basis of seismotectonic similarity of their site with the regions from which the relationships are imported. These aspects will be addressed more fully in the revision.

- The epistemic uncertainties (i.e. those related to the modelling of phenomena by experts) has been treated to some extent in the present Safety Guide. In the revision, this treatment will cover not only probabilistic analyses but also the deterministic.
- Some recent PSHA studies that were carried out have used very significant human and financial resources. For situations where this is not possible, alternatives can be introduced in which the epistemic uncertainties (that will be lacking if models from a variety of experts are not considered) can be included using a more simplified approach.
- For existing NPPs, and within the scope of seismic re-evaluation, it is sometimes necessary to evaluate the potential for fault displacement in the site vicinity. The deterministic and prescriptive nature of the present guidance is not conducive to a transparent investigation of this potential. The intention is to introduce the possibility of a probabilistic fault displacement hazard assessment only for existing NPPs.
- The present scope of the Safety Guide will be expanded using a graded approach similar to the one already prepared for the Draft Safety Guide DS 383 on the seismic evaluation of existing nuclear facilities.
- PSHA projects may involve a multitude of disciplines and institutions. The organizational aspects including the review process needs particular attention and this will be further emphasized in the future revision.

4. INTERFACES

The new guidance should be consistent with the Fundamental Safety Principles S-F-1, with Safety Requirements for Site Evaluation for Nuclear Installations, NS-R-3, with Safety Requirements NS-R-1: Safety of Nuclear Power Plants: Design (under review process), and with NS-R-2: Safety of Nuclear Power Plants: Operation (under review process). Safety Requirements related to Nuclear Installations, other than NPPs, should also be considered.

The new Safety Guide will have interfaces with and should be consistent with:

- Safety Guide NS-G-1.6 Seismic Design and Qualification of NPPs
- Safety Guide NS-G-3.6 Geotechnical Aspects and Foundations Safety for NPPs
- Safety Guide NS-G-xx Seismic evaluation of existing nuclear installations (DS 383) – Sent to MSs for comments.
- Safety Guide on Level 1 PSA (DSG 394)
- DS284 – Safety Assessment for predisposal of radioactive waste management facilities.

5. OVERVIEW

The content of the new Safety Guide will, to the extent possible, retain the existing structure, modifying them where necessary to enable clear interpretation of the relevant associated Safety

Requirements as applicable to NPPs and other nuclear installations. Care will be taken to ensure full consistency and coordination with other relevant safety standards.

6. PRODUCTION:

Provisional schedule for preparation of the document, outlining expected dates for:

Approval of DPP by the Steering Committee:	January 2008	Done
Approval of DPP by the WASSC/NUSSC:	April/May 2008	Done
Approval of DPP by the CSS:	May 2008	Done

Development of revised document:

CSs to prepare draft:	June 2008
Approval of draft by the Steering Committee:	July 2008
Approval by the NUSSC for submission to MS:	October 2008
Comments received from MS:	April 2009
Third CSs to incorporate MS comments	May 2009
Approval by the NUSSC for submission to the CSS:	October 2009
Endorsement by the CSS:	November 2009
Editing and Submission to the Publications Committee:	December 2009
Target publication date:	February 2010

7. DOCUMENT CONTENTS

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