

## **Document Preparation Profile (DPP) Version 0.9, 27 November 2019**

### **1. IDENTIFICATION**

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

**Specific Safety Guide**

**Working ID:** DS520

**Proposed Title:** Hazards associated with external human induced events in site evaluation for nuclear installations

**Proposed Action:** Revision of Safety Guide NS-G-3.1, External Human Induced Events in Site Evaluation for Nuclear Power Plants (2002)

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

**Technical Officer(s):** Ayhan Altinyollar (EESS/NSNI)

### **2. BACKGROUND**

This specific safety guide will supersede the IAEA Safety Guide NS-G-3.1, "External Human Induced Events in Site Evaluation for Nuclear Power Plants" and expand the scope from nuclear power plant (NPP) to all nuclear installations.

NS-G-3.1 was published in 2002 to provide recommendations and guidance for fulfilling the requirements of the Safety Requirements publication 50-C-S, "Code on the Safety of Nuclear Power Plants: Siting" of 1988. In 2003, 50-C-S was superseded by NS-R-3, "Site Evaluation for Nuclear Installations", which was later revised by amendment and published in 2016 as NS-R-3 (Rev.1). NS-R-3 (Rev.1) was superseded by IAEA Specific Safety Requirement SSR-1, "Site Evaluation for Nuclear Installations".

The IAEA Safety Guide NS-G-1.5 for the design of nuclear power plants against external events excluding earthquakes is currently being revised (DS498) and its scope extended to all nuclear installations. The revision of NS-G-3.1 will ensure consistency with DS498 concerning both the contents and the scope of human-induced external hazards.

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

The revision of safety guide will provide guidance to evaluate hazards associated with human induced events. It will directly support Requirement 24 and the related paragraphs 5.33 to 5.37 of SSR-1.

Requirement 24 is reproduced here for convenience:

**"Requirement 24: Evaluation of hazards associated with human induced events**

**The hazards associated with human induced events on the site or in the region shall be evaluated."**

The current safety guide NS-G-3.1 concerning external human induced events covers nuclear power plants only, and a guide for other nuclear installations is missing. While revising this guide, expanding

the scope in this way is more efficient and friendlier to users than developing separate safety guides for nuclear installations other than nuclear power plants. Covering all nuclear installations in the new series of site evaluation guides is the approach taken by other related safety guides, notably SSG-9, SSG-18 and SSG-21 (see section 6 for the titles of safety guides).

The current safety guide NS-G-3.1 issued in 2002 needs an update addressing the following issues:

- Major changes to other documents in the hierarchy (e.g. SSR-1) need to be reflected in NS-G-3.1.
- The gap between current practice in IAEA member states and certain aspects of the guidance set out in the existing publication needs to be addressed.
- Advances in technology and evolution of the techniques for the assessment of external human-induced hazards.

Furthermore, the terminology used needs to be revised and made consistent with the new definitions in the safety requirements and the safety glossary (2018 edition).

The revision will take into consideration feedback from the IAEA technical safety review services and advisory services. Methodologies and practices on evaluation of the external human-induced hazards in nuclear installation site shared during the technical meeting in April 2019 will also be taken into consideration.

#### **4. OBJECTIVE**

The main objective of the revision of the safety guide is to provide recommendations and guidance on how to meet the applicable requirements in SSR-1, SSR-3 and SSR-4. on evaluation of external human induced hazards for nuclear installation site. The second objective is to align the guidance to the current international state of practice consistent with the safety requirements in IAEA Member States. Another objective of the revision of the safety guide is to clarify the technical terms used.

#### **5. SCOPE**

The scope of the facilities covered by the proposed guide will be expanded from NPPs to all nuclear installations in the revision.

The scope of the hazards to be covered by the proposed guide will be updated align with IAEA Member States practices.

The process to evaluate hazards consists of: a) identification of sources, b) identification of potential external events arising from these sources, c) screening of the potential external events, d) evaluation of hazards and e) characterization of loading conditions. The proposed guide will cover the process of site evaluation up to this point. The Draft Safety Guide DS498 (revision of NS-G-1.5) will cover the process of design of nuclear installations against external hazards excluding earthquakes, which includes f) design and evaluation of structures, systems and components and g) performance and assessment of the nuclear installation. The scope includes hazards due to interactions of multiple facilities.

Evaluation of the effects of willful human actions or malicious acts on nuclear installations are not included in the scope of this safety guide. The external human-induced events considered in the proposed guide will be of accidental origin. However, the methods to be described in it have some implications to evaluating impacts (for instance, pressure waves, heat, projectiles) of all external human-induced events.

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

The proposed safety guide falls within the thematic area of site evaluation and will interface with the following IAEA Safety Standards and other publications (this is not, and cannot be, regarded as an exclusive or exhaustive list):

- Site Evaluation for Nuclear Installations (SSR-1) (2019)
- Safety of Research Reactors (SSR-3) (2016)
- Safety of Nuclear Fuel Cycle Facilities (SSR-4) (2017)
- Leadership and Management for Safety (GSR Part 2) (2016)
- Safety Assessment for Facilities and Activities (GSR Part 4 (Rev.1)) (2016)
- Seismic Hazards in Site Evaluation for Nuclear Installations (DS507, revision of SSG-9) (2010)
- Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations (SSG-18) (2011)
- Volcanic Hazards in Site Evaluation for Nuclear Installations (SSG-21) (2012)
- Design of Instrumentation and Control Systems for Nuclear Power Plants (SSG-39) (2016)
- Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants (DS440)
- Protection against Internal Hazards in the Design of Nuclear Power Plants (DS494, revision and combination of NS-G-1.7 (2004) and NS-G-1.11) (2004)
- External Events Excluding Earthquakes in the Design of Nuclear Installations (DS498, revision of NS-G-1.5) (2003)
- Protection against Internal and External Hazards in the Operation of Nuclear Power Plants (DS503, revision of NS-G-2.1) (2000)
- Safety Aspects of Nuclear Power Plants in Human Induced External Events: General Considerations (Safety Reports Series No. 86) (2017)
- Safety Aspects of Nuclear Power Plants in Human Induced External Events: Assessment of Structures (Safety Reports Series No. 87) (2018)
- Safety Aspects of Nuclear Power Plants in Human Induced External Events: Margin Assessment (Safety Reports Series No. 88) (2017)

## 7. OVERVIEW

The proposed safety guide will have a structure consisting of general recommendations, recommendations specific to hazards, recommendations for a graded approach and for the application of the management system.

As for general aspects, the proposed safety guide will address or consider the following:

- The existing recommendations of NS-G-3.1 will be revised to ensure consistency with the future Safety Requirements on Site Evaluation for Nuclear Installations, SSR-1;
- Application of the management system in site evaluation.

As for technical aspects, the proposed safety guide will address or consider the following:

- Overall review on the applicability of the flow-chart of the existing safety guide;
- More elaboration of methodologies evaluating some of the hazards;
- Evaluation of external human induced hazards for nuclear installations other than nuclear power plants
- Guidance to determine in a reasonably practicable manner applicable combinations of external (natural and / or human induced) hazards;
- Provisions of monitoring and updating of relevant human activities, industrial activities, infrastructure and provisions of periodic review of hazards;

The contents of the proposed safety guide will be similar to the existing safety guide on external human-induced events in site evaluation for NPPs, with some amendments. The planned table of contents is as follows:

1. Introduction
2. General recommendations
3. Data collection and investigations
4. Source identification, screening and evaluation methods
5. Aircraft crashes
6. Release of hazardous substances
7. External explosions
8. External fire
9. Other external human induced hazards
10. Evaluation of external human induced hazards for nuclear installations other than nuclear power plants
11. Application of the management system

References

## 8. PRODUCTION SCHEDULE:

Provisional schedule for preparation of the document, outlining realistic expected dates for each step

	A*	B*	C*
STEP 1: Preparing a DPP	DONE		
STEP 2: Approval of DPP by the Coordination Committee	Jan. 2019		
STEP 3: Approval of DPP by the relevant review Committees	June 2019		
STEP 4: Approval of DPP by the CSS	Dec. 2019		
STEP 5: Preparing the draft Indicate as to whether a TM is expected to be organized for the preparation of the draft	TM April 2019 Complete Final Draft 1Q 2020		
STEP 6: Approval of draft by the Coordination Committee	2Q 2020		
STEP 7: Approval by the relevant review Committees for submission to Member States for comments	2Q 2020		
STEP 8: Soliciting comments by Member States	3Q 2020		
STEP 9: Addressing comments by Member States	1Q 2021		
STEP 10: Approval of the revised draft by the Coordination Committee	2Q 2021		
STEP 11: Approval by the relevant review Committees	4Q 2021		
STEP 12: Endorsement by the CSS	2Q 2022		
STEP 13: Establishment by the Publications Committee and/or Board of Governors (for SF and SR only))	3Q 2022		
STEP 14: Target publication date	4Q 2022		

- *Column A for Safety Fundamentals, Safety Requirements and Safety Guides.*
- *Column B for Nuclear Security Series publications*
- *Column C for TECDOCs, safety reports and other publications*

## 9. RESOURCES

- 20 Staff-weeks of professional staff,
- Technical Meeting and two consultancy meetings,
- SSAs (Special Services Agreement) for development and review.