

Document Preparation Profile (DPP)

1. IDENTIFICATION

Document Category **Safety Guide**

Working ID: **DS-440**

Proposed Title: **Design of Auxiliary and Supporting Systems in Nuclear Power Plants**

Proposed Action: **new document**

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

Technical Officer(s): **N. Tricot, C. Toth**

2. BACKGROUND/RATIONALE

In the draft of the Safety Requirements for the Design of Nuclear Power Plants (NS-R-1) that has been already commented by the Member States, there is a new separate dedicated section identifying requirements for Auxiliary and Supporting Systems.

In the current set of safety guides under NS-R-1 there is no dedicated safety guide dealing with the auxiliary and supporting systems. Recommendations to meet the current NS-R-1 requirements related to auxiliary and supporting systems, like reactor coolant associated systems, fuel storage and cooling systems and containment systems, are found in different safety guides:

- NS-G-1.3, Instrumentation and Control Systems Important to Safety in Nuclear Power Plants
- NS-G-1.4, Design of Fuel Handling and Storage Systems in Nuclear Power Plants
- NS-G-1.8, Design of Emergency Power Systems for Nuclear Power Plants
- NS-G-1.9 Design of the Reactor Coolant System and Associated Systems in Nuclear Power Plants
- NS-G-1.10 Design of Reactor Containment Systems for Nuclear Power Plants
- NS-G-1.12 Design of the Reactor Core for Nuclear Power Plants
- NS-G-1.7 Protection Against Internal Fires and Explosions in the Design of Nuclear Power Plants
- NS-G-1.11 Protection against Internal Hazards other than Fires and Explosions in the Design of Nuclear Power Plants;

In addition, in the above safety guides not all important Auxiliary and Supporting Systems are included and no definition of Auxiliary and Supporting Systems currently exists in the IAEA glossary.

3. OBJECTIVE

To be more consistent with the content of the revised version of NS-R-1 there is a need to develop a corresponding Safety Guide accordingly and to define “Auxiliary and Supporting Systems” in the IAEA Glossary.

This Safety Guide will not address the Auxiliary and Supporting Systems that are already covered in dedicated Safety Guides; however, it will clearly identify all relevant cross-references to the existing Safety Guides listed in Section 2 and to the corresponding recommendations. An inventory of the

current recommendations in those existing Safety Guides will be made prior to the drafting of the new Safety Guide to identify possible gaps and to avoid duplication of recommendations.

The purpose of this Safety Guide is to provide guidance to meet the requirements for Auxiliary and Supporting Systems listed in the revised Safety Requirements for the Design of Nuclear Power Plants.

In addition, this Safety Guide will also provide guidance to preparing and reviewing the corresponding sections of the Safety Analysis Report related to Auxiliary and Supporting Systems.

This publication is intended for use by organizations designing, manufacturing, constructing, maintaining and operating nuclear power plants, as well as by regulatory bodies for the conduct of the regulatory review and assessment.

4. JUSTIFICATION

To ensure consistency with the revised version of NS-R-1 there is a need to develop a corresponding Safety Guide.

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

The new Safety Guide will be included in the series of the design of NPPs and will mainly interface with the Safety Standards below:

Fundamental Safety Principles (SF-1)

Safety of Nuclear Power Plants: Design-NS-R-1 and the related Safety Guides

Safety of Nuclear Power Plants: Operation Safety Requirements NS-R-2 and the related Safety Guides

Site Evaluation for Nuclear Installations-NS-R-3 and the related Safety Guides

Safety Assessment for Facilities and Activities GS-R-4 and the related Safety Guides

Format and Content of the Safety Analysis Report for Nuclear Power Plants-GS-G-4.1

6. OVERVIEW

The structure of the safety guide will basically follow the structure of the existing safety guides (e.g. NS-G1-9) related to the NS-R-1.

The Safety Guide will provide a detailed list of auxiliary systems, their definitions and descriptions of their functions. According to the structure of revised NS-R-1, the Safety Guide will address the general and specific requirements for the design of these systems giving recommendations to meet the corresponding NS-R-1 requirements.

LIST OF CONTENTS

INTRODUCTION

- Background
- Objective
- Scope
- Structure

EXTENT OF THE AUXILIARY AND SUPPORTING SYSTEMS

- Definition and functions of auxiliary and supporting systems
- List of main auxiliary and supporting systems (consistent with a list of NS-R-1,GS-G-4.1 and with the definition proposed for the IAEA Glossary)
- Other auxiliary and supporting systems

GENERAL CONSIDERATIONS IN DESIGN

This section will be mainly based on the corresponding structure of NS-G-1.9 (Design of the Reactor Coolant System and Associated Systems in Nuclear Power Plants). If applicable, it will provide guidance for all auxiliary and supporting systems that are not already covered by existing safety guides to meet the general requirements of NS-R-1 for following items:

- Design basis of the plant and auxiliary systems
- Objectives of the design (DID...)
- Safety classification
- Qualification
- Reliability
- Postulated initiating events
- Internal, external hazards and human errors
- Interface with other systems
- Considerations for multi-unit nuclear power plants
- Plant design
- System Design and component design
- Safety assessment of auxiliary systems

SPECIFIC CONSIDERATIONS IN DESIGN

- Process and post accident sampling systems
- Auxiliary heat transport systems
- Compressed air systems
- Air conditioning and ventilation systems
- Lifting and handling equipment
- Lighting systems
- Ultimate heat sink
- Condensate storage and transfer systems
- Equipment and floor drainage system
- Communication systems
- Emergency diesel generator auxiliary systems (e.g., fuel oil, cooling water, starting air)
- Other auxiliary and supporting systems

7. PRODUCTION SCHEDULE:

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

Approval of DPP by the Coordination Committee:	December 2009
Approval of DPP by NUSSC:	June 2010
Approval of DPP by the CSS:	October 2010
Approval of draft by the Coordination Committee:	June 2011
Approval by the Safety Standards Committees for submission to Member States for comments:	October 2011
Review in NS-SSCS:	June 2012
Endorsement by the CSS:	October 2012

8. RESOURCES

Estimated resources involved by the Secretariat and the Member States:

Drafting: 3 CSs with 3-4 experts each, 1 Technical Meeting

Resolution of Comments by NUSSC: 1 CS with 3 experts

Resolution of Comments by MS: 1 CS with 3 experts

Finalization of the draft: 1 CS with 3 experts