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REVISION HISTORY

Issue	Description	Date
00	First issue (includes technical and co-applicant review comments)	27-04-2008
01	Integration of material from June 08 submission	30-06-2008
02	PCSR June 2009 update including: - Clarification of text - Inclusion of references - Integration of June 2009 submission purpose and content	27-06-2009
03	Consolidated Step 4 PCSR update: - Integration of Consolidated Step 4 submission purpose and consistency with SSER introduction - Section 3.1 "Structure of safety documentation" deleted; historical detail no longer required - Addition of UK EPR design reference (UKEPR-I-002)	25-03-2011
04	Consolidated PCSR update: - References listed under each numbered section or sub-section heading numbered [Ref-1], [Ref-2], [Ref-3], etc - Update for Consolidated GDA submission and consistency with SSER introduction	10-10-2012

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SUB-CHAPTER 1.1 – INTRODUCTION

This sub-chapter describes the overall purpose and scope of the Pre-Construction Safety Report (PCSR), is part of the Safety Security and Environmental Report (SSER), within the scope of the Generic Design Assessment (GDA) process. It also describes the structure and layout of the PCSR, and provides an outline Table of Contents. This PCSR introduction complements the overall introduction to the SSER.

1. PURPOSE OF THE PRE-CONSTRUCTION SAFETY REPORT

Step 2 of the GDA process defined by HSE required the requesting party to submit a Preliminary Safety report providing an outline description of the reactor equipment and structures, the design and safety philosophy, the codes and standards applied in the design and the quality management systems applied by the designers. The aim was to give the HSE confidence that UK safety standards could be met by the proposed reactor design and that the claimed principles and design criteria were likely to be achievable.

Step 3 of the HSE GDA process required the Requesting Parties to provide a more detailed Pre-Construction Safety Report (PCSR) including more detailed descriptions of system architectures, their safety function and reliability and availability requirements, descriptions of the design codes used, and a description of Fault Analysis including DBA analysis, Severe accident analysis and PSA.

Step 4 of the HSE GDA process required the Requesting Parties to provide further detailed information, including arrangements for ensuring construction quality, justification of operating limits, arrangements for developing plant operational, maintenance and testing procedures, and a description of how the design reference configuration would be maintained.

Finally, the closure phase of the HSE GDA process required the Requesting Parties to respond to specific GDA issues, which were identified at the conclusion of Step 4. These GDA issues addressed specific questions in a sub-set of GDA technical areas. Resolution of these issues marks the completion of the GDA process for the UK EPR.

Versions of the PCSR for the UK EPR have been previously issued in the period 2007 to 2011 to address the requirements of the different Steps of GDA.

The objective of this current version of the PCSR is to consolidate changes to the safety case that have been implemented to respond to issues and findings raised by HSE in its GDA assessment up to the end of GDA, and to integrate a small number of design changes submitted over the same period [Ref-1].

2. SCOPE OF THE PRE-CONSTRUCTION SAFETY REPORT

As noted above the Pre-Construction Safety Report is part of the documentation submitted by EDF and AREVA into the Generic Design Assessment (GDA) process for the UK EPR design.

The EPR design is derived from the latest generations of reactors built in France (N4 Reactors) and Germany (KONVOI Reactors) and combines the safety experience and knowledge acquired from operating reactors. The proposed safety options also benefit from the results of research and development, in particular in the area of severe accidents, the main results of which are presented later in this PCSR.

The main safety design features of the EPR were presented to the French and German Safety Authorities and were the subject of detailed technical examinations by their technical support organisations between 1993 and 2000. Examination by the French Safety Authority continued after 2000 and resulted in the formation of a number of Standing Groups of experts on nuclear reactors, which included German participation. In their letter of 28/09/2004 [Ref-1], the French Safety Authority communicated the position of the public authorities by indicating that the safety options adopted for the EPR reactor “totally satisfy the objective set to generally improve safety” subject to certain confirmatory analyses to be carried out through a number of detailed design studies.

The PCSR presents a detailed description of the architecture of the EPR systems, their safety functions and reliability and availability requirements, and an explanation of the design codes and standards that are used in the design. Fault analyses are presented including Design Basis Analyses, Severe Accident Analyses and PSA. The objective of the PCSR is to demonstrate prior to commencement of construction, that sufficient analysis and engineering substantiation has been performed to give high confidence that the declared safety objectives can be met.

This PCSR is intended to justify the safety of the design throughout the plant's life cycle, from construction through operation to decommissioning, including consideration of on-site spent fuel and radioactive waste management issues. An Integrated Waste Strategy (IWS) for managing spent fuel and radioactive waste produced by the plant during its life cycle is presented. Although it is not practicable to present details of all the design solutions for the on-site storage of spent fuel and active waste at this stage of GDA, sufficient information is provided to give confidence that such materials can be safely managed on a long term basis, prior to transfer to national repositories as prescribed by the UK Government.

This PCSR is intended to provide information necessary to achieve Generic Design Acceptance for construction of an EPR plant in the UK. It does not contain details of operating procedures such as Technical Specifications, accident management procedures, maintenance programmes, emergency planning arrangements, commissioning procedures, radiation protection arrangements for operating staff etc. These operating and commissioning documents will be produced during the plant construction phase and will be presented in a Pre-operational Safety Report, for agreement before the plant is put into service. However, the specific processes by which the documents will be produced have been presented to the UK Regulators in Step 4 of GDA and are discussed within the PCSR.

UK Nuclear Site Licence Conditions (SLCs) do not formally apply to the GDA process. However SLC requirements have been analysed and it is concluded that the UK EPR GDA submission is consistent with a number of requirements stated in the SLCs. Examples of parts of the PCSR that include elements conforming with SLCs that are considered relevant to GDA are given below:

- Chapter 21 (Quality and Project Management) describes arrangements pertinent to SLC 12 (Suitably Qualified and Experienced Persons), SLC 13 (Nuclear Safety Committee), SLC 14 (Safety Documentation), SLC 17 (Quality Assurance) and SLC 20 (Modification to design of plant).

- Chapter 11 (Discharges and Waste) partially addresses requirements of SLC 32.

The EPR design was developed within the framework of French and German safety regulations and to achieve a high level of conformance with international standards such as IAEA safety guidelines, EURs and WENRA reference levels. The design was therefore developed outside the UK framework that resulted in the development of the HSE Safety Assessment Principles (SAPs). Nevertheless, it is the aim of the PCSR to demonstrate that the key nuclear safety requirements embodied in the SAPs are met by the EPR design, and in particular to show that the EPR achieves the fundamental objective that the radiological risk to workers and the public is as low as reasonably practicable, which is the basic legal requirement underpinning UK nuclear safety regulations.

3. STRUCTURE OF THE PCSR

The PCSR presents the EPR design safety approach, and includes an analysis of the design compliance with ALARP principle and the use of Probabilistic Safety Analyses (PSA) at the design stage, as detailed below.

The Pre-Construction Safety Report contains the following elements:

- general description of the nuclear and conventional plant installations and their main features,
- presentation of safety analysis rules and the general bases of design for the structures, equipment and systems,
- analysis of each system, explaining the measures adopted to comply with the stated nuclear safety requirements,
- general description of the operation of the unit,
- principles that will be applied to ensure the quality of the design, construction, operation and decommissioning,
- complete analysis of the accidents considered and an assessment of their potential radiological consequences,
- description of measures taken to mitigate accident situations, including severe accidents, and internal and external hazards,
- a full scope Probabilistic Safety Analysis (PSA),
- a description of the steps taken in the design with regard to radiological protection, including minimisation of collective dose, control of radioactive discharges. Consideration is also given to measures to facilitate the eventual decommissioning of the installation.
- demonstration that the EPR design complies with the ALARP principle.

The table of contents for the PCSR is presented in Sub-Chapter 1.1 - Table 1.

SUB-CHAPTER 1.1 - TABLE 1

TABLE OF CONTENTS OF THE PCSR

Chapter of PCSR	Title
1	Introduction and General Description
2	Generic Site Envelope and Data
3	General Design and Safety Aspects
4	Reactor and Core Design
5	Reactor Coolant System and Associated Systems
6	Containment and Safeguard Systems
7	Instrumentation and Control
8	Electrical Supply and Layout
9	Auxiliary Systems
10	Main Steam and Feedwater Lines
11	Discharges and Waste – Chemical and Radiological
12	Radiological Protection
13	Hazards Protection
14	Design Basis Analysis
15	Probabilistic Safety Analysis
16	Risk Reduction and Severe Accident Analyses
17	Compliance with ALARP Principle
18	Human Factors and Operational aspects
19	Commissioning
20	Design Principles related to Decommissioning
21	Quality and Project Management

SUB-CHAPTER 1.1 – REFERENCES

External references are identified within this sub-chapter by the text [Ref-1], [Ref-2], etc at the appropriate point within the sub-chapter. These references are listed here under the heading of the section or sub-section in which they are quoted.

1. PURPOSE OF THE PRE-CONSTRUCTION SAFETY REPORT

[Ref-1] UK EPR GDA Project - Reference Design Configuration. UKEPR-I-002. EDF/AREVA. (E))

2. SCOPE OF THE PRE-CONSTRUCTION SAFETY REPORT

[Ref-1] Direction Générale de la Sûreté Nucléaire et de la Radioprotection. [General Directorate of Nuclear Safety and Radiation, DGSNR]. Letter DGSNR/SD2/N°0729 / 2004