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PSR Part B Chapter 25 Construction and Commissioning Approach

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Revision Log

Revision	Description of Changes
0	First Issue to Regulators to support PSR v0
1	Second Issue to Regulators to support PSR v1

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25.1 INTRODUCTION

The Fundamental Purpose of the Generic Design Assessment (GDA) Safety, Security and Environmental Case (SSEC) is to demonstrate that the generic Small Modular Reactor (SMR)-300 can be constructed, commissioned, operated, and decommissioned on a generic site in the UK to fulfil the future Licensee's legal duties to be safe, secure and protect people and the environment, as defined in Part A Chapter 1 [1].

The Fundamental Purpose is achieved through the Fundamental Objective of the Preliminary Safety Report (PSR), which is to summarise the safety standards and criteria, safety management and organisation, claims, arguments and intended evidence to demonstrate that the generic SMR-300 design risks to people are likely to be tolerable and As Low as Reasonably Practicable (ALARP) [1].

Part B Chapter 25 of the PSR presents the Claims, Arguments and intended Evidence (CAE) for the construction and commissioning approach to demonstrate that the generic SMR-300 can be safely constructed and commissioned to ensure that all necessary substantiation evidence can be gathered to support the nuclear safety justification, and that construction and commissioning can be undertaken in a way that safely manages people and plant.

25.1.1 Purpose and Scope

The overarching SSEC claims are presented in Part A Chapter 3 [2].

This chapter (Part B Chapter 25) links to the overarching claim through Claim 2.3:

Claim 2.3: The design and safety assessment of the generic Holtec SMR-300 considers the entire reactor lifecycle.

As set out in PSR Part A Chapter 3 [2], Claim 2.3 is further decomposed across several disciplines which support the development of through-life management arrangements.

This chapter presents the construction and commissioning aspects for the generic SMR-300 and therefore directly supports a claim focused on the appropriate arrangements to safely manage people and plant, Claim 2.3.6.

Claim 2.3.6: Appropriate arrangements are developed to safely manage people and plant during the construction and commissioning of the generic Holtec SMR-300.

Further discussion on how the Level 3 claim is broken down into Level 4 claims and how the Level 4 claims are met is provided in sub-chapter 25.3.

PSR Part B Chapter 25, Construction and Commissioning Approach, presents a discussion of:

- The general approach to construction and commissioning – sub-chapter 25.2.
- The CAE relevant to construction and commissioning – sub-chapter 25.3.
- The codes and standards, regulations and methodologies relevant to construction and commissioning, including Holtec arrangements at the GDA stage – sub-chapter 25.4.
- The constructability of the SMR-300 design, and how risks during construction and commissioning will be shown to be ALARP – sub-chapter 25.5.
- A technical summary of how the overarching claim for the construction and commissioning approach is met, and a summary of the contribution from this chapter to support the demonstration that risks are likely to be tolerable and ALARP for the generic SMR-300 design – sub-chapter 25.6.

A master list of definitions and abbreviations relevant to all PSR Chapters can be found in PSR Part A Chapter 2 [3].

25.1.2 Assumptions

There are no assumptions raised in relation to Part B Chapter 25 that are directly related to the safety assessment presented within this PSR.

25.1.3 Interfaces with Other SSEC Chapters

The Construction and Commissioning approach chapter interfaces with the following PSR chapters.

HI-2240333, Holtec SMR GDA PSR Part A Chapter 2 General Design Aspects and Site Characteristics [3] presents an overall description of the SMR-300 and describes the constructability philosophy. It describes how the Palisades SMR-300 build program will provide valuable Learning from Experience (LfE) to be used in any future UK deployment of the SMR-300 with respect to construction and commissioning.

HI-2240335, Holtec SMR GDA PSR Part A Chapter 4 Lifecycle Management of Safety and Quality Assurance [4] covers design change control, configuration management, lifecycle management of safety, quality assurance and organisational development. Design change control and configuration management will inform the procedure for managing changes in design configurations, as well as during installation, construction, and commissioning phases. Lifecycle management of safety will explain how the SSEC evolves during construction and commissioning phases. Lastly, organisational development interfaces with construction and commissioning as these sections will describe how the design authority, intelligent customer and other key roles are maintained.

Many engineered safety features of the reactor rely on Structures, Systems and Components (SSC) design that will be substantiated by the commissioning programme. It is necessary to interface with HI-2240337, Holtec SMR GDA PSR Part B Chapter 1 Reactor Coolant System and Engineered Safety Features [5] to demonstrate that the plant meets the design intent, as claimed in the overall safety case.

Similarly, the arrangements and requirements for commissioning align with systems, structures and components design requirements, as shown in:

- HI-2240776, Holtec SMR GDA PSR Part B Chapter 2 Reactor Fuel and Core [6].
- HI-2240338, Holtec SMR GDA PSR Part B Chapter 4 Control and Instrumentation Systems [7].
- HI-2240339, Holtec SMR GDA PSR Part B Chapter 6 Electrical Engineering [8].
- HI-2240340, Holtec SMR GDA PSR Part B Chapter 9 Conduct of Operations [9].
- HI-2240344, Holtec SMR GDA PSR Part B Chapter 13 Radioactive Waste Management [10].
- HI-2240356, Holtec SMR GDA PSR Part B Chapter 19 Mechanical Engineering [11].
- HI-2240353, Holtec SMR GDA PSR Part B Chapter 24 Fuel Transport and Storage [12].

The non-radiological safety and conventional fire regulations and Relevant Good Practice (RGP) will be considered in the construction and commissioning programme, as in HI-2240343, Holtec SMR GDA PSR Part B Chapter 12 Nuclear Site Health and Safety and Conventional Fire Safety [13]. In particular, the approach to compliance with the Construction (Design and Management) Regulations 2015 [14] (CDM 2015) are covered there.

The commissioning programme will also substantiate Structural Integrity, Civil Structures and Civil Engineering SSCs, from HI-2240349, Holtec SMR GDA PSR Part B Chapter 18 Structural Integrity [15] and HI-2240357, Holtec SMR GDA PSR Part B Chapter 20 Civil Engineering [16].

Commissioning tests for various discipline-specific SSCs support the Internal Hazards claims, as shown in HI-2240351, Holtec SMR GDA PSR Part B Chapter 22 Internal Hazards [17], through the substantiation of the SSCs.

HI-2240352, Holtec SMR GDA PSR Part B Chapter 23 Reactor Chemistry [18] provides the objectives for commissioning from the chemistry and material aspects. This PSR chapter provides the arrangements and requirements for commissioning according to these objectives.

25.2 OVERVIEW OF CONSTRUCTION AND COMMISSIONING APPROACH

This chapter supports the generic SMR-300 lifecycle claim that the entire reactor lifecycle has been considered in the design and safety assessment. Design and safety decisions that will impact the construction and commissioning stages are being planned now, so that these phases transition smoothly.

The Palisades build program will provide valuable Learning from Experience (LfE) to be used in any future UK deployment of the SMR-300 beyond the GDA process. Information from the Construction Permit Application can be used to inform the UK site-specific design. Construction, commissioning and operational information from the Operating License Application can be used to support the associated site-specific phases. This information flow is captured in PSR Part A Chapter 4 [4].

The maturity and thus focus of PSR Part B Chapter 25 at PSR Revision 1 is limited to demonstration that there are appropriate strategies and activities identified such that the requirements of the SSEC will be demonstrated during construction and commissioning.

Detailed evidence is not expected to become available until the Generic Pre-Construction SSEC in preparation for transition to and integration with a site Licensee organisation.

Holtec International is developing a detailed construction and commissioning programme, following a structured format based on the generic SMR-300 plant design and safety requirements. Further to this, any lessons learned from the Palisades programme (see Part A Chapter 2 [3]) will inform the construction and commissioning programme.

25.2.1 Establishment of a Site / Nuclear Site Licensee

The choice of an appropriate UK site for the first deployment of an SMR-300 and an appropriate UK organisation to act as the Licensee is envisaged to occur during the early stages of production of the Generic Pre-Construction Safety Report (PCSR) SSEC. This is considered necessary to minimise uncertainties and allow focused development of the design/SSEC and a controlled transition to the Licensee organisation who will take responsibility for the Pre-Construction Site-Specific SSEC (PC-SS-SSEC) development.

Once established, the Licensee organisation will assume Client responsibilities under CDM 2015 [14] (sub-chapter 25.4.2.4) and will appoint a Principal Designer and Principal Contractor. Holtec will provide technical support as the Designer of the SMR-300, providing knowledge/expertise on the design, construction, operation, maintenance and decommissioning. This involvement will allow Holtec to effectively share knowledge gained/ lessons learnt from construction of other SMR-300 reactors.

The Licensee organisation will be responsible for the delivery and approval of the PC-SS-SSEC. The approval processes will involve governance activities including Independent Peer Review and consideration and advice by the Nuclear Safety Committee (fulfilling the requirements of Licence Condition (LC)13 Nuclear Safety Committee [19] and LC14 Safety Documentation [20]) prior to submission of the PC-SS-SSEC to the regulators in support of the submission seeking approval to construct under LC19 Construction or Installation of New Plant [21].

Prior to seeking approval to construct, all relevant Licensee LC compliance arrangements will need to be demonstrated to be adequate. This is to ensure that suitable controls are in place to safely deliver the manufacture, construction, installation and commissioning activities to the right quality. This is also to ensure control of the reference design during these activities, fulfilling the requirements of LC20 Modification to Design of Plant under Construction [22] for any changes to the detailed design/ SSEC post approval of the PC-SS-SSEC.

25.2.2 SSEC Development in Construction and Commissioning Lifecycle Stages

The Holtec SMR-300 GDA Through-Life Safety, Security and Environmental Case Strategy [23] presents a staged SSEC development strategy where each stage of the SSEC development builds on information from the previous stage and looks forward to subsequent stages. This is broadly consistent with the staged approach to safety case submissions within Office for Nuclear Regulation (ONR) Technical Assessment Guide (TAG)-051 [24].

Following GDA Step 2, the following key stages of SSEC development relevant to construction and commissioning are as follows:

- Generic Pre-Construction SSEC – Following successful completion of the 2-Step GDA, it is envisaged that Holtec will continue developing the design and SSEC.
- PC-SS-SSEC – Once a site has been chosen for the first UK SMR-300, a site-specific SMR-300 design and SSEC will be developed which will meet the specific site characteristics. It is envisaged that this will be concurrent with the development of the Licensee organisation who will take responsibility for and lead the delivery of the SSEC, with Holtec providing support as designer. The completed PC-SS-SSEC will reflect the completed detailed design and agreed operational approach required by the Licensee and provide a robust substantiation of the claims underpinned by a CAE trail. The PC-SS-SSEC will be submitted to the Regulators to seek permission for the construction, manufacture and installation of the SMR-300 at the site.
- Pre-Commissioning SSEC (PCmSSEC) – this will define, and justify, the safety commissioning activities necessary to demonstrate the claims made by within the SSEC by physical testing. This information will add to the evidence from the design phase in order to demonstrate that the operation of the SMR-300 will be safe, secure and protect people and the environment.

The staged SSEC development approach is also illustrated in Figure 1 which shows the Design Reference Points (DRPs), through the SMR-300 lifecycle.

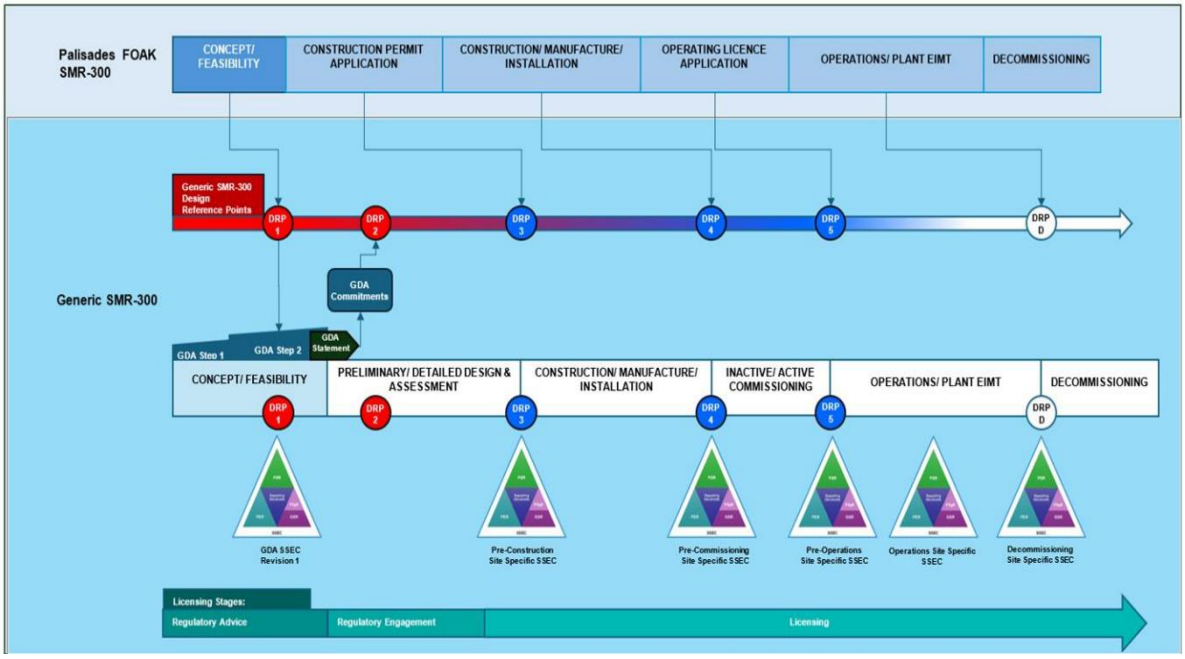

Figure 1: Overview of SSEC Through-Life Strategy

25.3 CONSTRUCTION AND COMMISSIONING CLAIMS, ARGUMENTS AND EVIDENCE

This chapter presents the construction and commissioning aspects focused on demonstrating that the generic SMR-300 design has considered the construction and commissioning stages of the reactor lifecycle, and therefore directly supports Claim 2.3.6.

Claim 2.3.6: Appropriate arrangements are developed to safely manage people and plant during the construction and commissioning of the generic Holtec SMR-300.

Claim 2.3.6 has been further decomposed within PSR Part B Chapter 25 to:

- Provide confidence that the substantiation evidence requirements relevant to safety will be identified at the appropriate lifecycle stage and will be demonstrated and controlled in accordance with appropriate arrangements throughout the conduct of construction and commissioning.
- Show that the generic SMR-300 design is being developed in order to be constructable in a safe manner, and that the approach to construction and commissioning will be undertaken in a manner that reduces risks to ALARP.

This has been undertaken by breaking down Claim 2.3.6 into two further claims:

Claim 2.3.6.1 is an enabling claim to ensure that organisational arrangements will be in place to manage and monitor during construction and commissioning, and that appropriate Management for Safety and Quality Assurance (MSQA) will be in place to ensure that the required SSEC evidence will be generated during construction and commissioning.

Claim 2.3.6.2 is to show that consideration for safe construction is embedded within the design, that the general construction and commissioning approach will aim to minimise radiological risks, and that appropriate activities will be planned to enable the capture of the required evidence in support of the SSEC.

The maturity of the arrangements and evidence supporting these claims will develop beyond GDA and will be reflected in future revisions of the SSEC.

Table 1 shows the breakdown of Claim 2.3.6 and identifies in which chapter of this PSR these claims are demonstrated to be met.

Table 1: Claims Covered by Part B Chapter 25

Claim No.	Claim	Chapter Section
2.3.6.1	The approach to construction and commissioning ensures all required substantiation evidence is generated whilst ensuring nuclear safety-related risks are appropriately controlled.	25.4 Construction and Commissioning Codes and Standards / Methodologies
2.3.6.2	The generic SMR-300 is constructable and the construction and commissioning sequence supports the reduction of risks to ALARP.	25.5 Construction and Commissioning Arrangements

Table 4 in Appendix A provides a full CAE mapping for Part B Chapter 25, which includes any lower-level claims, arguments and evidence needed to support the claims in the table above. This includes identification of evidence available at PSR v1 and aspects for future development of evidence to support these claims beyond PSR v1.

25.4 CONSTRUCTION AND COMMISSIONING CODES AND STANDARDS / METHODOLOGIES

Claim 2.3.6.1: The approach to construction and commissioning ensures all required substantiation evidence is generated whilst ensuring nuclear safety related risks are appropriately controlled.

Claim 2.3.6.1 has been decomposed into two arguments, one addressing the organisational arrangements to manage and monitor the construction and commissioning process, and another demonstrating that there are, or will be, adequate MSQA arrangements in place to ensure that the SSEC substantiation requirements will be evidenced appropriately during construction and commissioning.

Argument 2.3.6.1-A1: The CDM Strategy [25] and the Nuclear Site Safety Management System Report [26] set out the process by which Holtec Britain will discharge their responsibilities as a Duty Holder under CDM 2015. These Step 2 Deliverables also define the evidence (in the form of a Design Risk Register) that will substantiate the discharge of those duties to ensure construction and commissioning risks are mitigated So Far as is Reasonably Practicable.

Sub-chapter 25.4.2.4 outlines that Holtec International/Holtec Britain will discharge the duties of Designer in accordance with CDM 2015. This is supported by:

- PSR Part B Chapter 12 Nuclear Site Health and Safety and Conventional Fire Safety [13].
- Holtec CDM Strategy [25].
- Holtec Nuclear Site Health and Safety (NSHS) Management System Report [26].

This sub-chapter identifies that the Holtec CDM Strategy and NSHS Management System define the roles of the CDM 2015 Duty Holders. The maturity of the evidence supporting this argument will therefore develop in subsequent stages of the SSEC, when the Nuclear Site Licensee is established, and has defined its construction and commissioning arrangements.

Argument 2.3.6.1-A2: MSQA arrangements are in place to ensure that the required SSEC substantiation evidence will be generated during the generic SMR-300 construction and commissioning lifecycle stages.

Sub-chapter 25.4.3 outlines the Holtec MSQA arrangements that are, and will be, in place to support SSEC evidence generation during the construction and commissioning stages.

- PSR Part A Chapter 4 [4].
- Topical Report on the Quality Assurance Program for Holtec International SMR Design and Construction [27].

This sub-chapter identifies that Holtec has appropriate MSQA arrangements to deliver a UK SMR-300, and that it has appropriate arrangements for future lifecycle phases to support the delivery a UK site-specific SMR-300, including arrangements for the development of detailed design and SSEC.

Identification of construction and commissioning requirements throughout the SSEC is part of the Generic Pre-Construction SSEC and is beyond the maturity expected at GDA. The design and substantiation requirements relevant to safety are identified by the generic SMR-300 design and SSEC process, as set out in PSR Part A Chapter 4 [4]. PSR Part A Chapter 4 [4] demonstrates that design analysis, verification and validation arrangements are, or will be, in place to deliver a safe and secure UK SMR-300 at the appropriate lifecycle stage to support the Nuclear Site Licensee. The maturity of the evidence supporting this argument will develop beyond GDA, in subsequent stages of the SSEC.

25.4.1 US Construction and Commissioning Codes and Standards

In the US, the Construction Permit Application (CPA) required under 10 Code of Federal Regulations (CFR) 50 [28] grants permission to construct the reactor if the application is in conformity with and acceptable under the criteria in paragraphs 50.31 through 50.38, and the standards in paragraphs 50.40 through 50.43, as applicable. The acceptable codes and standards for construction of the reactor plant are listed in 10 CFR 50 paragraph 55 ‘Codes and Standards’.

In support of the Palisades Construction Permit Application, a description of the quality assurance program to be applied to the design, fabrication, construction, and testing of the structures, systems, and components of the facility will be provided in accordance with Appendix B to CFR 50 (Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants).

Quality assurance arrangements that are demonstrated to be also applicable against UK regulatory requirements may be used to inform the generic SMR-300 arrangements. Construction, commissioning, and operational information from the Operating License Application may also be used to inform the associated site-specific phases.

25.4.2 UK Construction and Commissioning Codes and Standards

25.4.2.1 UK Regulations

To ensure compliance with relevant applicable UK regulations for nuclear site construction and commissioning activities, several statutory instruments and licence conditions have been identified in Table 2, which represent RGP. This is covered in further detail in PSR Part B Chapter 12 [13].

Table 2: UK Principal Regulations and Guidance for Construction and Commissioning

Label	Title	Revision/ Date
Energy Act, Part 2 Nuclear Regulation [29]		2013
Nuclear Installations Act 1965 [30]		1965
The Health and Safety at Work etc. Act (HSWA74) [31]		1974
The Management of Health and Safety at Work Regulations 1999 (MHSW99) [32]		1999
Construction (Design and Management) Regulations 2015 (CDM 2015) [14]		2015
Pressure Systems Safety Regulations 2000 (PSSR) [33]		2000
L153	Managing Health and Safety in construction [14]	2015
The Confined Spaces Regulations 1997 (CSR97) [34]		1997

Label	Title	Revision/ Date
L101	Safe work in confined spaces [35]	3
Lifting Operations and Lifting Equipment Regulations 1998 (LOLER98) [36]		1998
L113	Safe use of lifting equipment [36]	2
L122	Safety of pressure systems [37]	2014
L5	Control of substances hazardous to health [38]	6
The Building Regulations (with amendments) [39]		2010
Nuclear site commissioning is a key part of the thirty-six Nuclear Site Licence Conditions (LCs). A duty holder/ Licensee must comply with:		
LC6	Documents, records, authorities and certificates [40]	5
LC19	Construction or installation of new plant [41]	7.1
LC20	Modification to design of plant under construction [22]	7.1
LC21	Commissioning [42]	7.1
LC24	Operating Instructions [43]	7
LC28	Examination, Inspection, Maintenance and Testing (EIMT) [44]	9

25.4.2.2 UK Relevant Good Practice

ONR Guidance documents and other sources of RGP, such as the International Atomic Energy Agency (IAEA) and Western European Nuclear Regulators Association (WENRA) will be reviewed and considered in line with ONR Safety Assessment Principle (SAP) and TAG guidance to ensure that the construction and commissioning process will be consistent with UK good practice. These are shown in Table 3.

The Safety Management System Report [26] sets the overall Holtec Britain safety management system. This includes the Office Health and Safety Manual [45] and the Design Safety Management Plan (DSMP). As office safety is out-of-scope for GDA, the Office Health and Safety Manual [45] is referred to externally and the focus of the report is the DSMP. The report lists UK safety RGP along with an outline of the process that will ensure that the relevant requirements will be met at the required lifecycle stage. This is discussed further in PSR Part B Chapter 12 [13].

Table 3: UK RGP for Construction and Commissioning

Label	Title	Revision /Date
IAEA Documentation		
IAEA SSG-28	Commissioning for Nuclear Power Plants, [46]	1
IAEA NP-T-2.10	Nuclear Energy Series: Commissioning Guidelines for Nuclear Power Plants, Reference [47]	1
SSR-2/2	Safety of Nuclear Power Plants: Commissioning and Operation [48]	1
WENRA Guidance		
-	Safety Reference Levels for Existing Reactors [49]	2021
-	Report on Safety of new NPP [50]	2013
-	WENRA Statement on Safety Objectives for New Nuclear Power Plants [51]	2010
TAGs		
NS-TAST-GD-051	The purpose, scope, and content of Nuclear Safety Cases [24]	2022
NS-TAST-GD-057	Design Safety Assurance [52]	2023
NS-TAST-GD-077	Supply Chain Management Arrangements for the Procurement of Nuclear Safety Related Items or Services [53]	2024
NS-TAST-GD-017	Civil Engineering [54]	2022
NS-INSP-GD-021	Commissioning [42]	2021
NS-TAST-GD-098	Asset Management [55]	2022
ONR SAPs [56]		
SAP ECE.25	**Provision for construction** Items important to safety should be designed so that they can be manufactured, constructed, assembled, installed, and erected in accordance with established processes that ensure the achievement of the design specifications and the required level of safety. The effects of construction hazards on any nearby safety related SSCs should be considered.	1
SAP ECS.3	**Codes and Standards** Structures, systems, and components that are important to safety should be designed, manufactured, constructed, installed, commissioned, quality assured, maintained, tested, and inspected to the appropriate codes and standards.	1
SAP EGR.5	**Manufacturing records** A record should be made of the manufacturing case histories.	1
SAP RL.8	**Land Quality Management** Radioactively contaminated land should be remediated and controlled as appropriate before any construction of new facilities upon it.	1
SAP ECE.16	**Materials** The construction materials used should comply with the design methodologies employed and be shown to be suitable for enabling the design to be constructed and then operated, inspected, and maintained throughout the life of the facility.	1
SAP ECE.17	**Provision of defects** The construction should use appropriate materials, proven techniques and a quality management system to minimise defects that might affect the required integrity of structures.	1
SAP ECE.18	**Inspection during construction** Provision should be made for inspection and testing during construction to demonstrate that appropriate standards of workmanship etc, have been achieved.	1
SAP ECE.19	**Non-conformities** Where construction non-conformities are identified, defects are judged to have a significant detrimental effect on integrity, remedial measures should be applied to ensure the original design intent is still achieved.	1
SAP EGR.6	**Location records** A record should be made of the position of individual components in the structure during construction.	1

Label	Title	Revision /Date
SAP ECE.24	**Settlement** There should be arrangements to monitor civil engineering structures during and after construction to check the validity of predictions of performance made during the design and for feedback into design reviews.	1
SAP ECM.1	**Commissioning testing** Before operating any facility or process that may affect safety it should be subject to commissioning tests defined in the safety case. The commissioning tests should: Demonstrate that, as built, the design intent claimed in the safety case has been achieved. Collect baseline data for equipment and systems for future reference. Validate those operating instructions (etc.) for which the commissioning tests. Provide representative activities and/or conditions; and Familiarise the operators with the operation of the facility or process.	1
SAP EPE.5	**Process design and commissioning** The process design and commissioning should provide inputs to operational safety parameters defining limits and conditions necessary in the interests of safety (operating rules).	1
SAP EMT.5	**Procedures** Commissioning and in-service inspection and test procedures should be adopted that ensure initial and continuing quality and reliability.	1

25.4.2.3 The Health and Safety at Work etc. Act 1974

The Health and Safety at Work etc. Act 1974 (HSWA74) section 6 requires that any person who designs, manufactures, imports or supplies any article for use at work:

- Must ensure, so far as is reasonably practicable, that the article is designed and constructed as to be safe and without risk to health when properly used.
- Must carry out or arrange for the carrying out of such testing and examination as may be necessary to comply with the above duty.
- Must provide adequate information about the use for which it is designed and has been tested to ensure that, when used it will be safe and without risk to health.

The HSWA74 defines the general duties of everyone from employers and employees to owners, managers and maintainers of work premises for maintaining health and safety within the workplace. The act itself is a primary piece of legislation set out by the government. Other regulations which implement the requirements of HSWA74 in more detail for certain types of work activities are often known as secondary or delegated legislation. The secondary legislation in respect of construction and commissioning activities is the most relevant to this chapter and is referred to below.

25.4.2.4 The Construction (Design and Management) Regulations 2015

The generic SMR-300 will become a notifiable project under CDM 2015 and, as such, will be legally bound to comply with the relevant parts of those regulations.

The CDM 2015 Regulations cover pre-construction (design), construction, commissioning, operation, maintenance, deconstruction and decommissioning.

The goal of these regulations is to:

- Sensibly plan the work so the risks involved are managed from start to finish.
- Have the right people for the right job at the right time.
- Cooperate and coordinate your work with others.
- Have the right information about the risks and how they are being managed.
- Communicate this information effectively to those who need to know.
- Consult and engage with workers about the risks and how they are being managed.

The Health & Safety Executive (HSE) has produced an approved code of practice (ACOP); L153 [14] which sets out the recommended good practice for the implementation of CDM 2015. This ACOP is integral to the delivery of the UK SMR-300.

As reported in PSR Part B Chapter 12 Nuclear Site Health and Safety and Conventional Fire Safety [13], Holtec's CDM Strategy [25] has been published, along with the NSHS Management System Report [26], which sets out the means by which the CDM Strategy is to be implemented. PSR Part B Chapter 12 identifies a GDA Commitment, C_NSHS_116, to ensure compliance with CDM 2015 Designers' Duties throughout the UK SMR-300 project lifecycle.

The CDM Strategy and NSHS Management System define the roles of the CDM 2015 Duty Holders. Holtec International/Holtec Britain are clear that they will discharge the duties of Designer, and how that will be done is set out in these documents.

A Licence Applicant (LA) wishing to build the UK SMR-300 must be able to demonstrate the ability to understand, monitor and direct the nuclear safety aspects of construction work. In short, the LA must demonstrate Intelligent Customer (IC) capability.

These duties are detailed in Supply Chain Management Arrangements for the Procurement of Nuclear Safety Related Items or Services, NS-TAST-GD-077 [53].

Once the site is licensed, the Licensee will be expected to manage the site in accordance with its responsibilities as the Design Authority, see TAG 079 [57]. Prior to Licence grant, the LA will have to demonstrate the capability to act in this capacity. It is useful for the Requesting Party (RP) to be able to demonstrate many of the elements of a Design Authority, especially in relation to technical competence and IC capability in respect of suppliers. When a generic SMR-300 design is taken forward for construction on a Great Britain site, the LA will relate to the RP and the "Responsible Designer", see TAG 079, section 2 [57].

25.4.3 Holtec Management for Safety and Quality Assurance

PSR Part A Chapter 4 [4] identifies the Quality Assurance (QA) requirements to be applied to the design, construction and commissioning, procurement, manufacture, operation and testing activities to ensure the safety-related work is performed in accordance with approved QA procedures as described in the Topical Report on the Quality Assurance Program (QAP) [27]

During the design process, measures are in place to manage inputs, outputs, changes, interfaces, and records within Holtec and its suppliers, subject to the provisions of the QAP [27]. These controls ensure that design inputs are accurately translated into design outputs, with the final design output referencing suitable acceptance criteria that allow for verification through inspection and testing as necessary. The QAP manages those design and safety requirements that require demonstration through the construction and commissioning programme.

PSR Part A Chapter 4 [4] demonstrates that Holtec has appropriate MSQA arrangements to deliver a UK SMR-300, and that it will have appropriate arrangements for future lifecycle phases to support the delivery of a UK site-specific SMR-300, including arrangements for the development of detailed design and SSEC.

25.4.4 Generic SMR-300 Design and Substantiation Requirements

The design and substantiation requirements relevant to safety are identified by the generic SMR-300 design and SSEC process, as set out in PSR Part A Chapter 4 [4]. The application of the categorisation and classification methodology is a key determinant step in deriving the design requirements in accordance with nuclear safety. The classification of the SSCs is used to identify which codes and standards are applicable, which in turn determines the applicable QA requirements for construction and commissioning. This will include appropriate QA procedures to ensure that these requirements will be managed accordingly throughout the construction and commissioning process.

Identification of construction and commissioning requirements throughout the SSEC is part of the Generic Pre-Construction SSEC and is beyond the maturity expected at GDA. PSR Part A Chapter 4 [4] demonstrates that design analysis, verification and validation arrangements are, or will be, in place to deliver a safe and secure UK SMR-300 at the appropriate lifecycle stage to support the Nuclear Site Licensee.

25.4.5 CAE Summary

The Holtec CDM Strategy and NSHS Management System defines the roles of the CDM 2015 Duty Holders, and details how Holtec International/Holtec Britain will discharge the duties of Designer. A LA wishing to build the UK SMR-300 must be able to demonstrate the ability to understand, monitor and direct the nuclear safety aspects of construction work. In short, the LA must demonstrate IC capability. The Nuclear Site Licensee will be established beyond GDA.

Holtec has appropriate MSQA arrangements to deliver a UK SMR-300, and it has appropriate arrangements for future lifecycle phases to support the delivery a UK site-specific SMR-300 at the appropriate lifecycle stage to support the Nuclear Site Licensee, including arrangements for the development of detailed design and SSEC.

Identification of construction and commissioning requirements throughout the SSEC is part of the Generic Pre-Construction SSEC and is beyond the maturity expected at GDA.

Claim 2.3.6.1 is considered met with evidence appropriate to the GDA stage, noting that the maturity of the supporting evidence will develop in accordance with the appointment of the Principal Designer and Principal Contractor and establishment of the Nuclear Site Licensee.

25.5 CONSTRUCTION AND COMMISSIONING ARRANGEMENTS

Claim 2.3.6.2: The generic Holtec SMR-300 is constructable, and the construction and commissioning sequence supports the reduction of risks to ALARP.

Claim 2.3.6.2 has been decomposed into three arguments to address the constructability of the generic SMR-300, the approach to minimise radiological risk during construction, commissioning, and demonstration that the planned commissioning activities will deliver the substantiation evidence required by the SSEC.

Argument 2.3.6.2-A1: The generic SMR-300 is designed to enable safe construction.

Sub-chapter 25.5.1 outlines the DSMP that includes a plan for an assessment of the Holtec International Constructability, Operability, Maintainability and Safety (COMS) as part of the DIR. A Design Risk Review process will identify, and address risks related to construction and is supported by the Holtec Britain Nuclear Site Health and Safety Management System Report [26].

Argument 2.3.6.2-A2: The construction and commissioning approach aims to minimise radiological risk.

Sub-chapter 25.5.2 describes how risks during construction and commissioning will be identified and managed with the aim of demonstrating those risks are ALARP.

Argument 2.3.6.2-A3: The commissioning process includes activities that enable the capture of the required substantiation evidence.

Sub-chapter 25.5.3 identifies the key considerations required within the commissioning sequence, to ensure that the planned activities will ensure that the required SSEC evidence is captured.

25.5.1 Constructability in Design

An NSHS GDA Phase 1 Plan of Work has been prepared to address Phase 1 of the CDM Strategy [25]. This is outlined within the Safety Management System Report [26], which sets the overall Holtec Britain safety management system. This includes the Office Health and Safety Manual [45] and the DSMP.

An assessment of the Holtec International Design Control Procedure will be performed, including consideration of COMS, to enable a comparison against UK legal requirements. A recommended course of action will be proposed should any shortfalls be identified.

The DIR will be an integral part of the DSMP and are scheduled as ‘gates’ in the detailed design phase for each design element of the SMR-300. The DIRs are a method of design control to ensure the design follows the design requirements associated with constructability that are set out in the Holtec SMR Top-Level Plant Design Document [58]. PSR Chapter A4 identifies a GDA Commitment, C_MSQA_107, to implement the Holtec Design Control Process, including the further development of design integration reviews.

As stated above, the DSMP is under development. During the development and definition of this process Holtec Britain will work with Holtec International to ensure UK context and regulatory requirements are addressed.

The DSMP will include the Design Risk Review process and associated instructions, trigger question sets, templates, etc. addressing risks associated with construction and commissioning.

Design requirements for constructability and commissioning are included within the Holtec SMR-300 Top-Level Plant Design Requirements [58]. These define Operability and Maintainability requirements, e.g. the need to ensure that the design provides adequate access space for installation, construction fit up, and commissioning of plant SSCs.

25.5.2 Risk Management during Construction and Commissioning

The constructability philosophy outlined in Part A Chapter 2 of the PSR [3] emphasises the approach taken in the design development of the generic SMR-300 to ensure simplicity in plant design and construction which reduces safety risks during construction and commissioning.

Prefabrication, preassembly, and modularisation are used to the maximum extent practicable to reduce construction time. Measures to simplify construction include good crane and material handling access, adequate space and access for construction activities, and provision for temporary construction buildings and equipment.

Examples of approaches to reduce construction risks include:

- Use of Concrete Strengthened Steel Modules (CSSM) which are manufactured offsite and lifted into position onsite to create the chosen structure. This approach eliminates the need for the construction of labour-intensive formwork with its associated risks.
- Use of remote welding machines when joining the empty CSSM modules in order to eliminate the need for manual welding.
- Use of a crane collision avoidance system applied to overlapping crane zones to reduce the risk of collision when using multiple tower cranes in close proximity.

Risk management during construction and commissioning will be based on information gathered from the following design risk reviews:

- CDM reviews of systems and equipment.
- DIR including layout review.
- Hazard and Operability (HAZOP) studies, e.g. Hazards of Construction (HAZCON).

Residual risks from these reviews will be captured in appropriate Risk Registers and provided to the Principal Designer for incorporation into Pre-Construction Information and/or the Health and Safety File.

The risk management process during construction and commissioning will be defined in the UK Design Manual which will define the design risk reviews required at each design stage.

A UK Design Manual does not currently exist, but a Commitment has been raised to produce one after GDA, see C_MSQA_108 in sub-chapter 25.6.2.3.

25.5.3 Capturing SSEC Evidence during Commissioning

Commissioning means the process during which plant components and systems, having been constructed, are made operational and verified to be in accordance with design assumptions and to have met the appropriate safety criteria (Licence Condition 1, ONR Licence Condition Handbook [59]).

The objective of the commissioning process is to provide assurance that Holtec's generic SMR-300 has been constructed in accordance with the design, and that systems perform in a consistent, reliable manner. The commissioning phase follows the construction and installation phases. Verification of the construction and installation of components and systems will be performed during construction and installation commissioning.

The full generic SMR-300 commissioning programme is in development and will be refined through detailed design beyond GDA. It will follow IAEA's Commissioning Guidelines, [48], as summarised below:

- Pre-operational tests (also called non-nuclear tests or preliminary tests) are performed before fuel loading, after turnover from construction to commissioning and verification of prerequisite fulfilment of all construction objectives and milestones. They typically include:
    - Individual system tests.
    - Integrated functional system tests in cold conditions (without fuel present within the core), including primary circuit cold hydrostatic test and secondary hydrostatic test.
    - Integrated functional system tests in hot conditions (fuel is present within the core).
- Operational tests (also called nuclear tests), which start with fuel loading, typically include:
    - Core loading tests.
    - Pre-critical tests.
    - First criticality and low-power tests.
    - Power ascension tests ending with full power tests and acceptance tests.

Chemistry control and monitoring systems will be commissioned early in support of the commissioning of other SSCs, and appropriate temporary chemistry control and monitoring systems should be in place before this time.

The SSEC commissioning tests, defined in a Safety Commissioning Schedule, will be produced by competent design, safety, environmental and security personnel and defined to test the functionality/operation of the systems and, where practicable, explicitly demonstrate the safety, environmental and security functions via the definition of clear success criteria. It is envisaged that a commissionable systems strategy will be adopted which will tie into the broader system engineering verification and validation (V&V) approach.

It is envisaged that the success of the inactive commissioning activities will be reported in a series of Inactive Safety Commissioning Reports allowing a phased Licensee approval of the results and release of information to the Regulators.

During commissioning, the Licensee has the responsibility under Licence Condition 21 [42] to 'make and implement adequate arrangements for the commissioning of any plant or process which may affect safety'. These arrangements will apply to the Licensee's processes for the management of commissioning activities rather than the commissioning activities needed for a specific SSC. This includes the management of Unit 1 and Unit 2 being at differing lifecycle stages during the construction and commissioning of the plant.

The Licensee's commissioning activities will include:

1. Verify through commissioning that the as-built installed SSCs operate in accordance with the design intent stated in the SSEC, through all relevant operating modes and operating ranges.
2. Demonstrate which of the commissioning tests provide representative activities and/or conditions, that emergency operating procedures, operating rules, operating instructions, and examination, inspection, maintenance, and testing requirements are validated as claimed in the SSEC.
3. Ensure suitably qualified and experienced station and operations staff are directly involved at all levels and in all areas in the commissioning activities to allow them to gain physical plant experience ahead of the generic SMR-300 operation.
4. Facilitate the collection of baseline data for SSCs for retention by the Responsible Designer and the Licensee for future reference.
5. Implement programme hold points, which will be required to ensure ordered and sequential progress between defined steps within the commissioning programme.
6. Verify main design parameters, including compliance with applicable codes, standards, and the quality assurance requirements.

It is good practice to undertake commissioning in a number of phases, these typically take on the following phases:

- Factory Acceptance Tests (FAT): These are tests undertaken within production of equipment to ensure it meets the requirements specified.
- Site Acceptance Tests (SAT): These tests are undertaken on plant and typically occur when the number of FATs becomes excessively onerous or interactions between equipment is required to be investigated.
- Site supervision: During build phase, site supervision is required for in situ construction processes.

For the above types of tests, the ONR may wish to place a "hold point" on the outcome of these tests, and should the hold point not be satisfied, progression to the next is not allowed, an example of this would be that the ONR specifies that active commissioning should not proceed until ONR consent is given. That consent would be based on the successful outcome of inactive commissioning.

In accordance with LC 20, Modification to Design of Plant under Construction [22], the Licensee is required to ensure that management arrangements are in place to maintain design integrity and to define a baseline statement for the safety of the plant through the remaining life cycle of the facility.

Holtec International/Holtec Britain will ensure that its duties as Designer will support the Nuclear Site Licensee's commissioning arrangements when these arrangements are in place post GDA.

25.5.4 CAE Summary

The generic SMR-300 design constructability will be considered within the design process. The DIRs will be an integral part of the DSMP and are scheduled as 'gates' for each design element of the SMR-300. DIRs are a method of design control to ensure the design follows the design requirements associated with constructability that are set out in the Holtec SMR Top-Level Plant Design Document [58]. A recommended course of action will be proposed should any shortfalls be identified. A Design Risk Review process will identify and address any risks associated with construction and commissioning.

Holtec International/Holtec Britain will ensure that its duties as Designer will support the Nuclear Site Licensee in demonstrating the objectives of construction and commissioning in line with the Licensee's expectations. It is the Licensee who will be responsible for implementing adequate arrangements for the construction and commissioning of the generic SMR-300 plant and all processes and systems that are safety related.

Claim 2.3.6.2 is considered met with evidence appropriate to the GDA stage, noting that the maturity of the supporting evidence will develop in accordance with the establishment of the Nuclear Site Licensee.

25.6 CHAPTER SUMMARY AND CONTRIBUTION TO ALARP

This sub-chapter provides an overall summary and conclusion of the Construction and Commissioning chapter and how this chapter contributes to the overall demonstration of ALARP for the generic SMR-300. PSR Part A Chapter 5 [60] sets out the overall approach for demonstration of ALARP and how contributions from individual chapters are consolidated.

This sub-chapter therefore consists of the following elements:

- Technical Summary.
- ALARP Summary.
  - Demonstration of Relevant RGP.
  - Options Considered to Reduce Risk.
- GDA Commitments.
- Conclusion.

A review against these elements is presented below under the corresponding headings.

25.6.1 Technical Summary

This chapter directly supports Claim 2.3.6.

Claim 2.3.6: Appropriate arrangements are developed to safely manage people and plant during the construction and commissioning of the generic Holtec SMR-300.

Claim 2.3.6 has been decomposed into two further claims:

Claim 2.3.6.1 is an enabling claim to ensure that organisational arrangements will be in place to manage and monitor during construction and commissioning, and that appropriate MSQA will be in place to ensure that the required SSEC evidence will be generated during construction and commissioning.

Claim 2.3.6.2 is to show that consideration for safe construction is embedded within the design. The general construction and commissioning approach will aim to minimise radiological risks, and that appropriate activities will be planned to enable the capture of the required evidence in support of the SSEC.

Claim 2.3.6 is considered met with evidence appropriate to the GDA stage, noting that the maturity of the evidence supporting this PSR Part B Chapter 25 will develop beyond GDA and in accordance with the establishment of the Nuclear Site Licensee.

The roles of the CDM 2015 Duty Holders have been defined, and Holtec International/Holtec Britain will discharge the duties of Designer. A LA wishing to build the UK SMR-300 must be able to demonstrate the ability to understand, monitor and direct the nuclear safety aspects of construction work.

Holtec has appropriate MSQA arrangements to deliver a UK SMR-300. It has appropriate arrangements for future lifecycle phases to support the delivery of a UK site-specific SMR-300 at the appropriate lifecycle stage to support the Nuclear Site Licensee, including arrangements for the development of detailed design and SSEC.

Identification of construction and commissioning requirements throughout the SSEC is part of the Generic Pre-Construction SSEC and is beyond the maturity expected at GDA.

The generic SMR-300 design constructability will be considered within the design control procedure. The DIRs, including COMS, will be an integral part of the DSMP and are scheduled as 'gates' for each design element of the SMR-300. The DIRs are a method of design control to ensure the design follows the design requirements associated with constructability that are set out in the Holtec SMR Top-Level Plant Design Document [58].

Holtec will ensure that in its duties as Designer, it will support the Nuclear Site Licensee in demonstrating the objectives of construction and commissioning in line with the Licensee's expectation. It is the Licensee who will be responsible for implementing adequate arrangements for the construction and commissioning of the generic SMR-300 plant and all processes and systems that are safety related.

25.6.2 ALARP Summary

25.6.2.1 Demonstration of RGP

At this GDA stage, consideration of RGP is focused on ensuring that the design development philosophy has taken due consideration of constructability requirements. Future GDA stages will ensure due cognisance of RGP in the detailed definition of the construction and commissioning process.

Design requirements for constructability and commissioning are included within the Holtec SMR Top-Level Plant Design Document [58]. This will ensure that the design will be constructable, and that provisions will be made within the design to ensure that the evidence required by the SSEC can be delivered by the commissioning process.

The Safety Management System Report [26] sets the overall Holtec Britain safety management system. This includes the Office Health and Safety Manual [45] and the Design Safety Management Plan (DSMP). As office safety is out-of-scope for GDA, the Office Health and Safety Manual [45] is referred to externally and the focus of the report is the DSMP. The report lists UK safety RGP along with an outline of the process that will ensure that the relevant requirements will be met at the required lifecycle stage. This is discussed further in PSR Part B Chapter 12 [13]. More information on the overall ALARP process for the generic SMR-300 can be found in the ALARP Guidance Document [61]. Specific ALARP considerations within this sub-chapter are described in the following sub-chapters.

25.6.2.2 Options Considered to Reduce Risk

The process for the assessment of risk reduction options is presented in Holtec SMR-300 Generic Design Assessment Reference Design Process and GDA Prospective Design Change Register [62]. Part A Chapter 5 [60] considers the holistic risk-reduction process for the Generic SMR-300.

The generic SMR-300 design constructability will be considered within the design process. The DIRs will be an integral part of the DSMP and are scheduled as 'gates' for each design element of the SMR-300. The DIRs are a method of design control to ensure the design follows the design requirements associated with constructability that are set out in the Holtec SMR Top-Level Plant Design Document [58]. A recommended course of action will be

proposed should any shortfalls be identified. A Design Risk Review process will identify and address any risks associated with construction and commissioning.

Optimisation of the construction and commissioning approach will continue beyond the Generic Pre-Construction SSEC, and into the PC-SS-SSEC and PCmSSEC, where detailed optimisation of the commissioning test sequencing can be undertaken to ensure both conventional and radiological risks are reduced to ALARP, and that the potential risk of latent hazards being introduced into SSCs due to failures or errors during construction and commissioning is minimised.

25.6.2.3 GDA Commitments

At Revision 1 there are no GDA Commitments identified for Part B Chapter 25, Construction and Commissioning Approach. However, Commitments raised in Part A Chapter 4 MSQA are relevant to Part B Chapter 25 and are summarised below:

C_MSQA_107: The Design Control Procedure (HPP-8002-1010) and the use of Design Integration Reviews (DIRs) is central to Holtec's control of design development. The implementation of the Design Control Procedure requires further evidencing. A Commitment is raised to evidence the implementation of the Design Control Procedure and DIRs. Target for Resolution - Issue of Pre-Construction SSEC.

C_MSQA_108: Design Manuals and System Engineering Management Plans (SEMP) are considered best practice for the management of design development. These documents have not yet been produced for the UK GDA. A Commitment is made to produce a UK Design Manual and a UK System Engineering Management Plan to support management of future UK SMR-300 design development. The UK Design Manual and UK SEMP will define, amongst other things, technical governance arrangements and division of responsibility between the Licensee and Responsible Designers. Target for Resolution - Issue of Pre-Construction SSEC.

In addition, a Commitment raised in PSR Part B Chapter 12 NSHS and Conventional Fire Safety is relevant to Part B Chapter 25 and is summarised below:

C_NSHS_116: Organisational and procedural arrangements are required for the UK deployment of an SMR-300 to demonstrate compliance with CDM 2015 Designer duties during the Detailed Design phase and subsequent phases. A Commitment is raised to ensure compliance with CDM 2015 Designers' Duties throughout the UK SMR-300 project lifecycle.

GDA Commitments have been formally captured in the Commitments, Assumptions and Requirements process [63]. Further details of this process are provided in PSR Chapter A Part 4 [4].

25.6.3 Conclusion

This chapter summarises the approach for construction and commissioning of the generic SMR-300 in the UK and demonstrates that robust safety management arrangements will be in place during these phases and that health and safety risks will be identified and shown to be ALARP. In addition, it is explained how the commissioning process will demonstrate how the performance requirements of SSCs will meet the safety case requirements of the SSEC.

PSR Part A Chapter 5 Summary of ALARP and SSEC [60], concludes that it can be demonstrated that the generic SMR-300 will reduce risks to ALARP and that the Fundamental Purpose of the SSEC will be fulfilled.

25.7 REFERENCES

[1] Holtec Britain, “HI-2240332, Holtec SMR GDA PSR Part A Chapter 1 Introduction,” Revision 1, July 2025.

[2] Holtec Britain, “HI-2240334, Holtec SMR GDA PSR Part A Chapter 3 Claims, Arguments and Evidence,” Revision 1, July 2025.

[3] Holtec Britain, “HI-2240333, Holtec SMR GDA PSR Part A Chapter 2 General Design Aspects and Site Characteristics,” Revision 1, July 2025.

[4] Holtec Britain, “HI-2240335, Holtec SMR GDA PSR Part A Chapter 4 Lifecycle Management of Safety and Quality Assurance,” Revision 1, July 2025.

[5] Holtec Britain, “HI-2240337, Holtec SMR GDA PSR Part B Chapter 1 Reactor Coolant System and Engineered Safety Features,” Revision 1, July 2025.

[6] Holtec Britain, “HI-2240776, Holtec SMR GDA PSR Part B Chapter 2 Reactor Fuel and Core,” Revision 1, July 2025.

[7] Holtec Britain, “HI-2240338, Holtec SMR GDA PSR Part B Chapter 4 Control and Instrumentation Systems,” Revision 1, July 2025.

[8] Holtec Britain, “HI-2240339, Holtec SMR GDA PSR Part B Chapter 6 Electrical Engineering,” Revision 1, July 2025.

[9] Holtec Britain, “HI-2240340, Holtec SMR GDA PSR Part B Chapter 9 Conduct of Operations,” Revision 1, July 2025.

[10] Holtec Britain, “HI-2240344, Holtec SMR GDA PSR Part B Chapter 13 Radioactive Waste Management,” Revision 1, July 2025.

[11] Holtec Britain, “HI-2240356, Holtec SMR GDA PSR Part B Chapter 19 Mechanical Engineering,” Revision 1, July 2025.

[12] Holtec Britain, “HI-2240353, Holtec SMR GDA PSR Part B Chapter 24 Fuel Transport and Storage,” Revision 1, July 2025.

[13] Holtec Britain, “HI-2240343, Holtec SMR GDA PSR Part B Chapter 12 Nuclear Site Health and Safety and Conventional Fire Safety,” Revision 1, July 2025.

[14] Health and Safety Executive, “Construction (Design and Management) Regulations 2015. Guidance on Regulations,” 2015.

[15] Holtec Britain, "HI-2240349, Holtec SMR GDA PSR Part B Chapter 18 Structural Integrity," Revision 1, July 2025.

[16] Holtec Britain, "HI-2240357, Holtec SMR GDA PSR Part B Chapter 20 Civil Engineering," Revision 1, July 2025.

[17] Holtec Britain, "HI-2240351, Holtec SMR GDA PSR Part B Chapter 22 Internal Hazards," Revision 1, July 2025.

[18] Holtec Britain, "HI-2240352, Holtec SMR GDA PSR Part B Chapter 23 Reactor Chemistry," Revision 1, July 2025.

[19] Office for Nuclear Regulation, "NS-INSP-GD-013, Licence Condition 13 – Nuclear Safety Committee," Revision 6.1, July 2024.

[20] Office for Nuclear Regulation, "NS-INSP-GD-014, LC14 - Safety Documentation," Revision 5, July 2019.

[21] Office for Nuclear Regulation, "NS-INSP-GD-019, LC19 - Construction or Installation of New Plant," Revision 7.1, November 2021.

[22] Office for Nuclear Regulation, NS-INSP-GD-020, LC 20 - Modification to Design of Plant Under Construction, Issue 7.1, November 2021.

[23] Holtec Britain, "HI-2241455, Holtec SMR-300 Through-Life Safety, Security and Environmental Case," Revision 0, December 2024.

[24] Office for Nuclear Regulation, "NS-TAST-GD-051, The Purpose, Scope, and Content of Safety Cases," Revision 7.1, December 2022.

[25] Holtec Britain, "HI-2241088, Holtec Britain CDM Strategy," Revision 0, September 2024.

[26] Holtec Britain, "HI-2241089, Holtec Nuclear Site Health and Safety Management System Report," Revision 0, September 2024.

[27] Holtec International, "HI-2230815, Topical Report on the Quality Assurance Program for Holtec International Small Modular Reactor (SMR) Design and Construction," Revision 0, September 2023.

[28] United States Nuclear Regulatory Commission, "Regulation 10 CFR Part 50 - DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES".

[29] UK Government, "The Energy Act 2013," December 2013.

[30] UK Government, "Nuclear Installations Act 1965," 1995.

[31] Health and Safety Executive, “Health and Safety at Work etc Act,” 1974.

[32] UK Government, “The Management of Health and Safety at Work Regulations 1999,” 1999.

[33] Health and Safety Executive, “Pressure Systems Safety Regulations 2000 (PSSR),” 2000.

[34] UK Government, “The Confined Spaces Regulations 1997”.

[35] Health and Safety Executive, “Confined Spaces Regulations 1997. Approved Code of Practice, Regulations and Guidance, L101,” Revision 2, 2014.

[36] Health and Safety Executive, “Safe Use of Lifting Equipment, Lifting Operations and Lifting Equipment Regulations 1998, Approved Code of Practice and Guidance, L113,” 2nd edition, 2014.

[37] Health and Safety Executive, “Safety of Pressure Systems, Pressure Systems Safety Regulations 2000,” 2014.

[38] Health and Safety Executive, “Control of Substances Hazardous to Health (COSHH),” Revision 6, 2013.

[39] UK Government, “The Building Regulations etc. (Amendment) (England) Regulations 2023”.

[40] Office for Nuclear Regulation, “NS-INSP-GD-006, LC 6 - Documents, records, authorities and certificates,” Revision 5, August 2021.

[41] Office for Nuclear Regulation, “NS-INSP-GD-019, LC 19 - Construction or Installation of New Plant,” Issue 7.1, November 2021.

[42] Office for Nuclear Regulation, “NS-INSP-GD-021, LC 21 - Commissioning,” Issue 7.1, November 2021.

[43] Office for Nuclear Regulation, “NS-INSP-GD-024, LC 24 – Operating Instructions,” Revision 7, May 2024.

[44] Office for Nuclear Regulation, “NS-INSP-GD-028, LC 28 – Examination, Inspection, Maintenance and Testing (EIMT),” Revision 9, July 2024.

[45] Holtec Britain, “CD-46, Holtec Britain Office Health and Safety Manual, Revision 0,” 2024.

[46] International Atomic Energy Agency, “SSG-28 Commissioning for Nuclear Power Plants,” Issue 1, 2014.

[47] International Atomic Energy Agency, “NP-T-2.10 - Commissioning Guidelines for Nuclear Power Plants,” 2018.

[48] International Atomic Energy Agency, “SSR-2/2, Safety of Nuclear Power Plants: Commissioning and Operation,” Rev. 1, 2016.

[49] Western European Nuclear Regulators' Association, “Safety Reference Levels for Existing Reactors,” February 2021.

[50] Western European Nuclear Regulators' Association, “Report on Safety of New NPP Designs,” March 2013.

[51] Western European Nuclear Regulators' Association, “WENRA Statement on Safety Objectives for New Nuclear Power Plants,” November 2010.

[52] Office for Nuclear Regulation, “NS-TAST-GD-057, Design Safety Assurance,” Issue 7, May 2023.

[53] Office for Nuclear Regulation, “NS-TAST-GD-077, Supply chain management arrangements for the procurement of nuclear safety related items or services,” Revision 6.3, July 2024.

[54] Office for Nuclear Regulation, “NS-TAST-GD-017, Civil Engineering,” Issue 4.1, December 2022.

[55] Office for Nuclear Regulation, “NS-TAST-GD-098, Asset Management,” Issue 2.2, October 2024.

[56] Office for Nuclear Regulation, “Safety Assessment Principles For Nuclear Facilities,” Revision 1, January 2020.

[57] Office for Nuclear Regulation, “NS-TAST-GD-079, Design Authority Capability,” Issue 6.3, January 2025.

[58] Holtec International, HI-2240251, Holtec SMR-300 Top-Level Plant Design Requirements, Rev. 3, March 2025.

[59] Office for Nuclear Regulation, “Licence Condition Handbook,” February 2017.

[60] Holtec Britain, “HI-2240336, Holtec SMR GDA PSR Part A Chapter 5 Summary of ALARP and SSEC,” Revision 1, July 2025.

[61] Holtec Britain, “HI-2241304, ALARP Guidance Document,” Revision 0, Nov 2024.

[62] Holtec Britain, “Design Management,” Revision 1, December 2024.

[63] Holtec Britain, “HPP-3295-0013, Holtec SMR-300 Generic Design Assessment Capturing and Managing Commitments, Assumptions and Requirements,” Revision 0, April 2024.

25.8 LIST OF APPENDICES

Appendix A PSR Part B Chapter 25 CAE Route Map

Table 4: PSR Part B Chapter 25 CAE Route Map

[REDACTED]