STAGES OF SAFETY CASE LIFECYCLE

Introduction

Throughout the lifecycle of a facility, from conception through to decommissioning, there are various key stages which require special consideration. The safety case for each stage should demonstrate the safety of that stage before it commences, and should be forward looking to subsequent stages aligned to Office for Nuclear Regulation (*ONR*) guidance (NS-TAST-GD-051). For facilities under design or construction, the safety case at each stage should contain sufficient detail to give confidence that the safety intent will be achieved in subsequent stages.

The principal stages in the lifecycle of a facility and their associated safety cases are shown in Figure 1. The stages listed result from significant steps in facility definition, though a particular facility or operation may not require all safety case stages. This is particularly so for the Early Design stage, which may not require a Preliminary Safety Report (*PSR*), for example for projects with short time scales or of an established design. In some cases, where the installation is complex, the stages identified may not be sufficient and subdivisions would be useful or beneficial such as a number of iterations of the Pre-Construction Safety Report (*PCSR*).

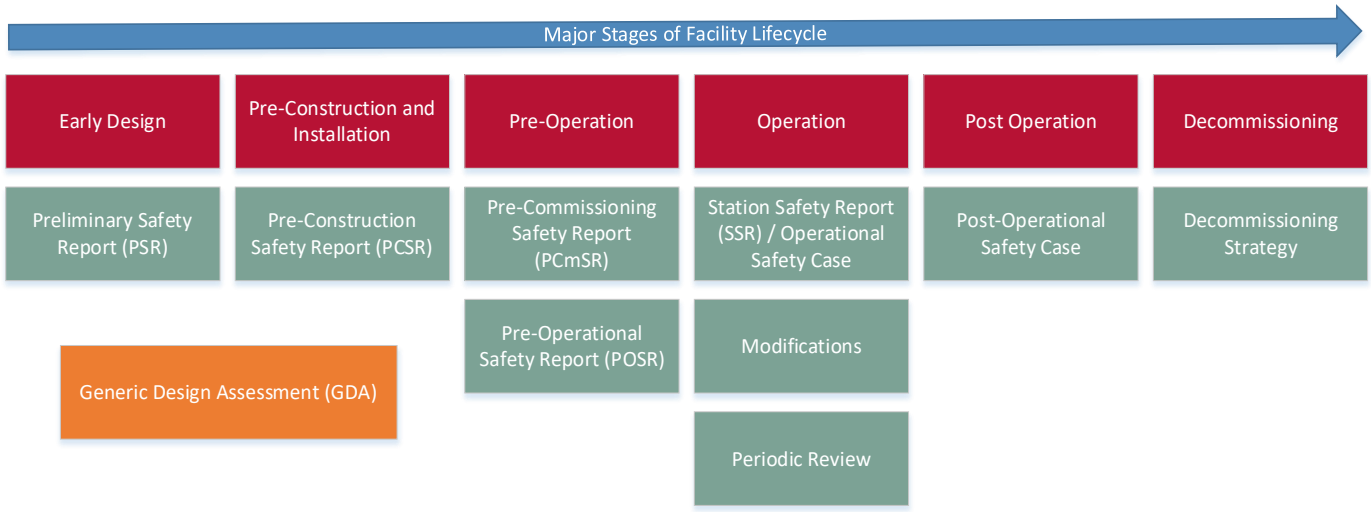

Figure 1: Major stages of facility lifecycle

Development of the design and safety case should be an integrated and iterative process, ensuring that lessons are learned and applied before going forward to the next stage. For new projects, documents should be completed in step with the design. However, to ensure that the engineering proceeds in a manner that provides confidence that the safety requirements will be met, it is important that a satisfactory safety case is achieved prior to certain permission hold points (i.e. design, construction, commissioning, operation, and decommissioning). Some areas will need to progress at an early stage (e.g. human factors) to influence the design. It is important that the whole lifecycle of the facility is taken into consideration in all stages; for example decommissioning feasibility should be taken into account during the design stage.

Also shown on Figure 1 is Generic Design Assessment (GDA). GDA is a regulatory assessment process which is expected to be applied in the early stages of nuclear power plant safety case development, particularly for Advanced Nuclear Technologies (the collective term for Small and Advanced Modular

Reactors). GDA allows the UK's independent nuclear regulators to assess the safety, security, and environmental implications of new reactor designs and to provide the confidence that these new designs are capable of meeting the UK's statutory regulatory requirements. GDA is not a mandatory process, however it is anticipated that GDA will usually be requested for new nuclear power stations intended for construction in Great Britain because of its advantages for both reactor vendors and potential site licensees. The organisation requesting the GDA is referred to as the 'Requesting Party' (RP).

Entry into the GDA process is facilitated by the UK Government Department for Business, Energy and Industrial Strategy (BEIS). The GDA process has 3 steps:

- Step 1: Initiation
- Step 2: Fundamental Assessment
- Step 3: Detailed Assessment

The UK regulators have published their expectations for each stage of the GDA. Generic guidance on how to meet these expectations for GDA Steps 1 and 2 is included in the Safety Case Toolkit. GDA Step 3 is expected to be technology specific, hence no guidance is presented in the Safety Case Toolkit. However, GDA Step 3 is anticipated to be an evolutionary progression from GDA Step 2.

Additional Information & Guidance

- ONR, NS-TAST-GD-051, The Purpose, Scope, and Content of Safety Cases, December 2019.
- BEIS, Entry to Generic Design Assessment for Advanced Nuclear Technologies - Instructions and Guidance for Requesting Parties, May 2021
- ONR, ONR-GDA-GD-006 Revision 0, New Nuclear Power Plants: Generic Design Assessment – Guidance to Requesting Parties, October 2019