GUIDANCE ON CONCEPTUAL DESIGN, SELECTION AND LIFE CYCLE ASSURANCE OF PRODUCTS INTENDED TO IMPROVE INTEGRITY OF BASES OF ABOVE-GROUND STORAGE TANKS HOLDING PETROLEUM, PETROLEUM PRODUCTS OR OTHER FUELS

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This publication has been produced as a result of work carried out within the Technical Team of the EI, funded by the EI's Technical Partners. The EI's Technical Work Programme provides industry with cost-effective, value-adding knowledge on key current and future issues affecting those operating in the energy sector, both in the UK and internationally.

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1 INTRODUCTION

1.1 INTRODUCTION

In GB, bulk liquid hazardous product storage sites in the scope of the Control of major accident hazards (COMAH) regulations must comply with COMAH CA *Policy on containment of bulk hazardous liquids at COMAH establishments* ('*Containment policy*'): this applies primarily to new build installations and new facilities built on existing sites, but it also seeks improvements to existing installations on a risk-based prioritised approach.

The guidance contained in this publication follows the HSE *Process Safety Leadership Group (PSLG) Final report: Safety and environmental standards for fuel storage sites* and complements the EI *Guidance on conceptual design, selection and life cycle assurance of liners intended to improve integrity of bunds to above-ground storage tanks for bulk storage of petroleum, petroleum products or other fuels,* which focuses on bund floor and wall liners, rather than those situated beneath AST.

This publication is intended to build on a shortfall in knowledge regarding options for improving the integrity of ASTs, or tanks hereafter, and their application, which was identified in HSE *PSLG Final report*.

A base system, as referred to throughout this publication, consists of several components: the foundation, below tank secondary containment and a LDS, where installed. These are illustrated in Figure 1.

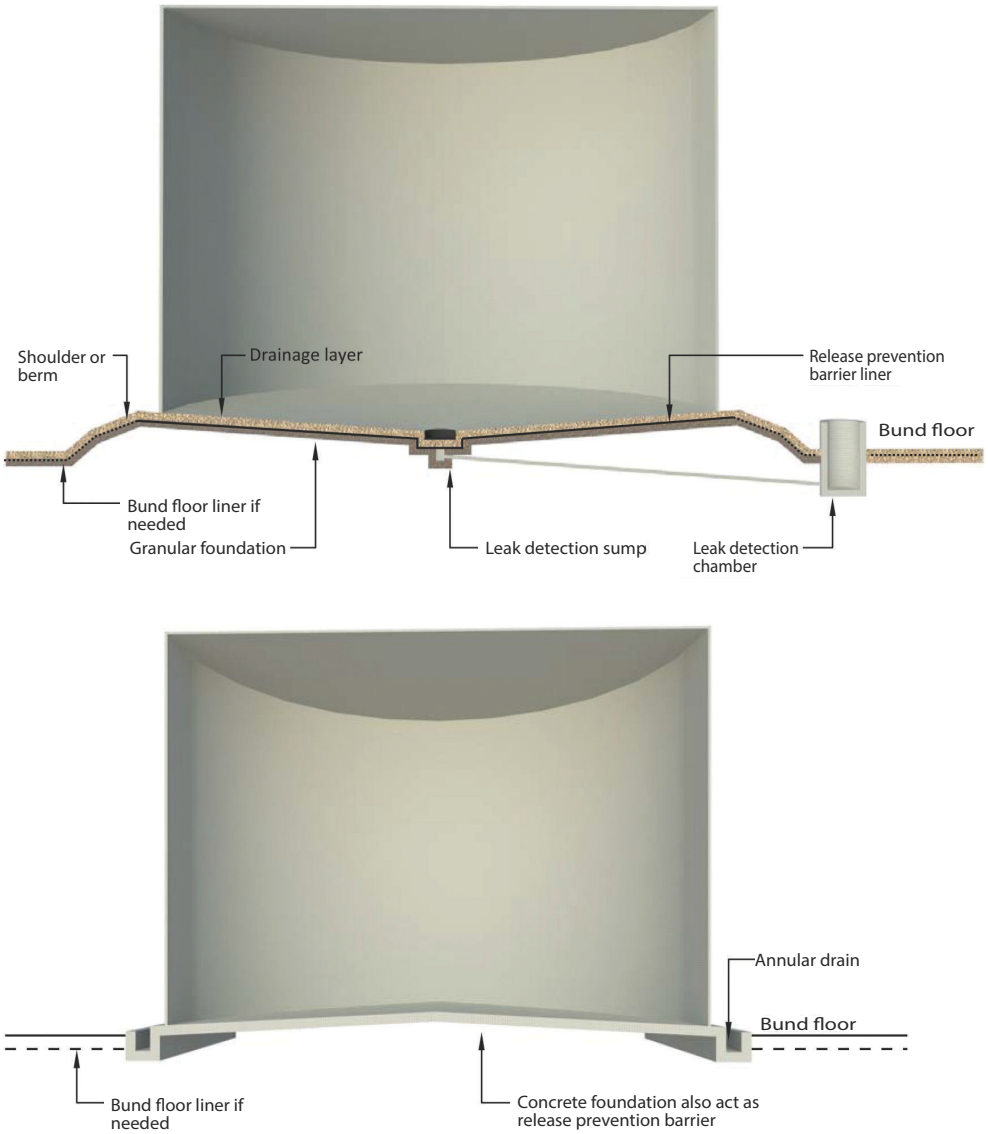

Figure 1: Cone down (top) and cone up (bottom) base systems

The first part of the publication (sections 2–5) provides background information on the current situation, as follows:

– main types of tank bottom failure (section 2);
– main types of tank base construction (section 3);
– main forms of secondary containment, including double bottom tanks and under-tank liners (section 4), and
– main LDSs available (section 5).

The rest of this publication is aligned to the life cycle of the tank base system, from the consideration of the design criteria, construction and installation of under-tank containment systems through to operation, including management and monitoring techniques and, finally, decommissioning. Figure 2 illustrates this tank base system life cycle.

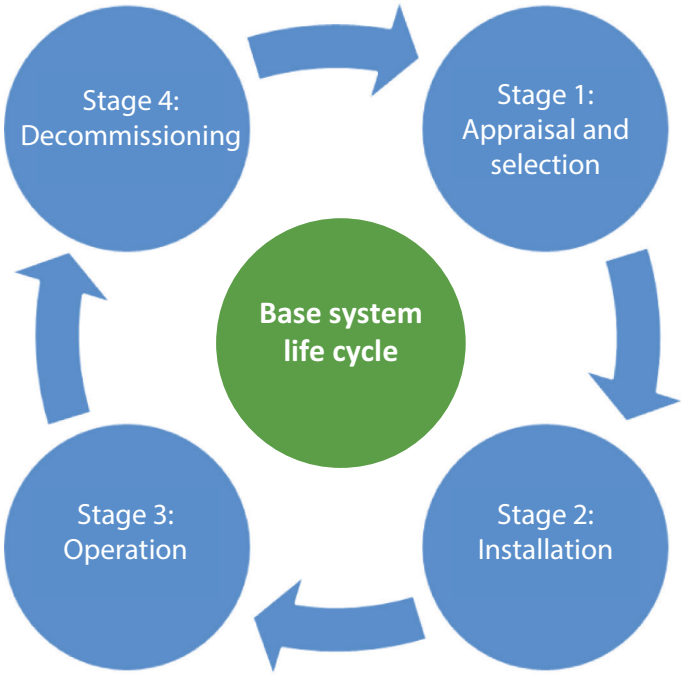

Figure 2: Base system life cycle

The information is provided as:

– Stage 1: Base system appraisal and selection (section 6).
– Stage 2: Installation, including construction (section 7).
– Stage 3: Operation (section 8).
– Stage 4: Decommissioning (section 9).

Consideration of the four-stage tank base life cycle process in this publication should assist operating companies to maximise the performance of their under-tank secondary containment systems at all stages of the process.

The research upon which this publication is based was carried out in the latter part of 2013 and early 2014, and therefore references to current and existing circumstances and issues relate specifically to that time period.

Annex B and Annex D provide summaries of attributes and selection criteria for secondary containment (liner) types and LDSs. Checklists, *aides mémoire* and examples of option appraisals and quality assurance/quality control (QA/QC) procedures are included in additional annexes.

1.2 SCOPE

This publication provides a practical framework and source of information for those involved in the planning, management and operation of bulk storage facilities using AST, where under-tank liners are an important part of the secondary containment design (see Annex B). Whilst