# Guidelines on environmental management for facilities storing bulk quantities of petroleum, petroleum products and other fuels

3rd edition

energy institute

# GUIDELINES ON ENVIRONMENTAL MANAGEMENT FOR FACILITIES STORING BULK QUANTITIES OF PETROLEUM, PETROLEUM PRODUCTS AND OTHER FUELS

3rd Edition

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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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# FOREWORD

The need for good environmental management is a requirement for sustainable operation of facilities storing bulk quantities of petroleum, petroleum products and other fuels. Moreover, actions to reduce the release of hydrocarbons to the environment can also lead to improvements in safety performance, working conditions for employees and more cost-effective operations.

EI *Environmental management guidelines for facilities storing bulk quantities of petroleum, petroleum products and other fuels* (3rd edition, 2015) provides guidance on managing environmental issues involved in the design, construction and commissioning, operation and decommissioning of bulk storage facilities. It provides management, technical and operational guidance to minimise the impact of bulk storage facilities on the environment, and in doing so, to help meet regulatory requirements. It promotes environmental management systems and environmental risk assessment, but stresses that good leadership is essential for success.

The 3rd edition usurps EI *Environmental guidelines for petroleum distribution installations* (2nd edition, 2007). It adopts key requirements from publications that have improved knowledge (e.g. HSE *Process Safety Leadership Group (PSLG) – Final report: Safety and environmental standards for fuel storage sites*, which has made further recommendations in respect of environmental compliance; in particular focusing on larger installations) and policy requirements (e.g. COMAH Competent Authority (CA) *Policy on containment of bulk hazardous liquids at COMAH establishments*).

The 3rd edition is restructured to assist the reader by aligning with their different needs, which are primarily driven by:

- Where the facility is in its life cycle (design, construction and commissioning, operation or decommissioning).
- The COMAH tier of the facility (sub-, lower or top- tier).
- The site use (e.g. bulk storage only, bulk storage and rail loading/unloading facility, etc).

Other key changes include addressing:

- inherent environmental protection;
- tertiary containment;
- alternative fuels (e.g. biofuels);
- loading and unloading of rail tankers, and
- human and organisational factors.

This publication is aimed at facility owners/operators, designers, regulators and environmental specialists who are working with bulk stores of petroleum, petroleum products, or other fuels. In addition to covering bulk stores at petroleum distribution installations, the guidance contained in this publication can be used as a basis for environmental management at refinery off-sites, authorised distributor depots and bulk stores of LPG, bitumen, aviation fuels and lubricants. This guidance is intended for international use but, where appropriate, is based on European Community (EC) and GB/UK legislation.

Neither the EI nor any of the contributors shall be liable in any way for any liability, loss, cost or damage incurred as a result of the receipt or use of the information contained herein.

The EI welcomes feedback on its publications. Feedback or suggested revisions should be submitted to:

Technical Department
Energy Institute
61 New Cavendish Street
London, W1G 7AR
e: technical@energyinst.org

# KEY TECHNICAL CHANGES

This section sets out in a generalised form, the key technical changes between the 2nd and 3rd editions of *Guidelines on environmental management for facilities storing bulk quantities of petroleum, petroleum products and other fuels*. Section references are provided where there is a particular location for such information; otherwise, changes are made in numerous locations in the revised publication.

The key technical changes are to:

- Define the intended audience (industry sector/operations/products/etc.) See 1.1 and 1.2.
- Clarify the industry sector through the variety in size of storage facilities. See 1.1 – 1.4.
- Provide a flowchart to help guide users through the publication. See 1.4.
- Clarify which materials are covered (petroleum, petroleum products, alternative fuels and additives).
- Provide guidance on the site use (e.g. bulk storage only, bulk storage and rail loading/ unloading facility, etc).
- Provide guidance for lower-tier and sub-COMAH facilities.
- Provide additional information for top-tier COMAH sites, which are provided using boxes setting out additional guidance. See 2.2, 2.3.5 and 2.4.1.
- Update guidance with current regulations, policies and publications.
- Use more consistent terminology.
- Provide requirements of COMAH CA Containment policy and of related implementation guidelines. See 2.2 and 3.4.2.1.
- Provide guidance on risk assessment approaches which highlight common methodologies that are used (e.g. hazard and operability studies (HAZOP) source-pathway-receptor (S-P-R) approach and prevention-control-mitigation measures). See 2.3.
- Provide guidance on inherent environmental protection. See 2.3.3.
- Provide environmental guidance on the different phases of the facility (design, construction and commissioning, operation and decommissioning). Sections 3 – 6.
- Provide guidance on human and organisational factors. See 3.2 and 5.2.
- Provide guidance on storage tank control measures to reduce incident scenarios like overfills. See 3.4.1.
- Enhance guidance on tertiary containment, e.g. for firewater retention. See 3.4.2.
- Provide guidance on different requirements for alternative fuels (e.g. ethanol) and additives vs. conventional fuels. See 3.5.
- Provide guidance on loading and unloading of rail tankers at bulk storage facilities. Section 5.

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| Tammy Brantley | GB Oils |
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# 1 INTRODUCTION

## 1.1 INTRODUCTION

The need for good environmental performance has always been a requirement within the bulk fuel storage sector of the industry. Moreover, actions to minimise the release of fuels to the environment can also lead to improvements in safety performance, healthier working conditions for employees and more cost-effective operations.

This publication usurps the *Environmental guidelines for petroleum distribution installations* first produced in 1996 and revised in 2007. This revision has been produced to take account of new guidance and standards released since the publication of the 2nd edition in 2007 including the HSE *Process safety leadership group (PSLG) final report: safety and environmental standards for fuel storage sites* (2009) and CDOIF guidance: *Environmental risk tolerability for COMAH establishments* (2013).

The guidance within this publication is intended to be used as a basis for managing the potential environmental impact of a wide range of facilities storing bulk quantities of petroleum, petroleum products (e.g. biodiesels) and other fuels (new fuels and additives), as summarised in Table 1.

**Table 1: Applicability of publication for oil storage and distribution facilities**

| Facility | Applicability |
|---|---|
| Top-tier Control of Major Accident Hazards (COMAH) | Applicable but complementary for existing guidance. Where there are key additional requirements for top-tier COMAH facilities, these are highlighted in the publication in boxed sections. |
| Lower-tier COMAH | Applicable |
| Other facilities | The guidance provided may also be useful to facilities that contain other products, including those within the scope of the COMAH Competent Authority (CA) *Containment policy*. It also includes facilities that fall within and outside of the remit of the *Oil storage regulations* (applicable in England and Scotland). |

The intended publication audience includes facility owners, designers, operators and environmental specialists, who may be involved throughout the facility life cycle through:

– engineering design, construction and commissioning;
– operational management of those facilities;
– inspection and maintenance, and
– decommissioning.

Users of this publication should note that other guidance is available from the Environment Agency (EA), Natural Resources Wales (NRW), Scottish Environment Protection Agency (SEPA), Northern Ireland Environment Agency (NIEA), Health and Safety Executive (HSE) etc. It is noted that like this publication, all these sources emphasise that risk assessment is a key

tool in environmental management. Further information on these sources of guidance is presented in Annex A, Tables A1 and A2. A reference list is included in the Reference section, Annex C. It should be noted that legislation and guidance are always being updated and users should consult the pertinent organisations for details of the latest versions or progress of new guidance (for example, at the time of publication the United Nations Economic Commission for Europe (UNECE) is consulting on *Safety guidelines and good industry practice for oil terminals*).

Operating companies may need to comply with several other legislative frameworks. It is for them to demonstrate compliance with the requirements of pertinent legislation.

## 1.2 SCOPE

This publication is intended primarily for use by those working with bulk stores of petroleum, petroleum products, or other fuels. Bulk stores are considered to be storage tanks, rather than drums or intermediate bulk containers (IBCs). It provides guidance on how to optimise environmental performance at relevant facilities, in particular the prevention of leaks and spills that may adversely affect all environmental media – air, surface water, land and groundwater.

Whilst the focus of this publication is bulk storage facilities, the information provided here may also provide a useful reference for facilities holding smaller quantities of such products. In applying the guidance to these smaller facilities, different emphasis may need to be placed on some of the issues considered in the risk assessment process.

The main objective of this publication is to provide readers with practical information and good practice guidance on the assessment and minimisation of environmental impact, employing a risk based approach to environmental management.

Whilst the intent of this publication is to better protect environmental receptors from losses of containment of liquids from storage tanks and containment systems, the risk assessment also considers impacts to people, e.g. offsite populations. However, this publication purposefully does not provide a methodology for human health risk assessment.

The publication purposefully does not provide information on:

– The control of vapour emissions: the control of vapours is already mandated by the EU 'Stage I (PVRI)' directive and specific guidance on this issue is provided in the EI Guidelines for the design and operation of gasoline vapour emission controls at distribution terminals (2008). It is assumed that these will be controlled as mandated by the EU VOC directive and related national regulations.
– Managing oil spills onto surface water: specific guidance on this topic is available where complex considerations are required as a consequence of the site-specific setting of such spills, see EI/EA Inland waters oil spill response: a guidance document incorporating the strategies and techniques for responding to inland surface water oil spills in the UK and EI Operational guidelines on the use of oil spill dispersants at sea. Further guidance is also available in MCA Contingency planning for marine pollution preparedness and response: guidelines for ports.

## 1.3 APPLICATION

In line with recent UK, European and international legislation, this publication is not intended to be prescriptive in terms of what environmental management should or should not be

applied at an individual facility or by an individual operating company. The publication has been developed to give a process through which companies can understand the good practice options available for their bulk storage facility.

This publication is based primarily on GB legislation, publications and good practice; however, in developing it account also has been taken of international legislation, publications and good practice. The guidance in this publication should be universally applicable provided it is read, interpreted and applied in conjunction with relevant national and local statutory legislation and publications. Where the requirements differ, the more stringent should be applied.

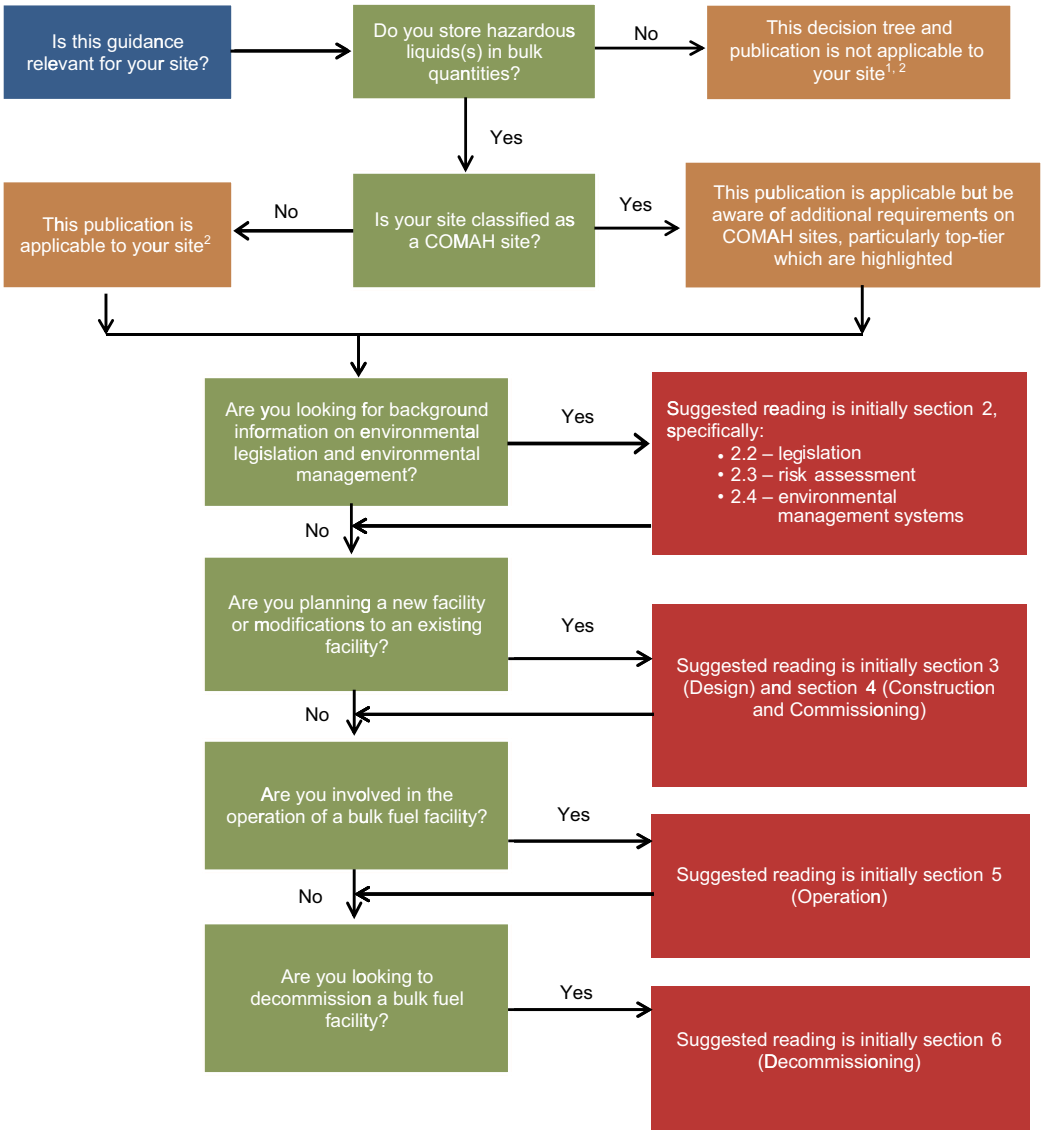
In applying this publication the following general points should be noted:

- The objective of any environmental management system (EMS) is to minimise the impact of an operating company's activities on the environment, i.e. reduce environmental risk. The environmental management process is iterative and based on ongoing review and reassessment.
- The environmental management system will be used to identify and then manage site-specific factors depending on:
  - The nature and volumes of fuels stored.
  - The age, type and construction of the facility.
  - Inspection and maintenance regimes in place.
  - Operating and integrity management practices.
  - The location and environmental setting of the facility (e.g. nature of underlying geology, the depth to groundwater and the proximity of surface water).
  - Pathways to groundwater, surface water, people or property.
  - The sensitivity of potential receptors.
  - Potential effect of a major accident on the surrounding environment.

  It is noted that regulated facilities will have specific management system requirements, as part of their Environmental permitting regulations permit and/or their COMAH major accident prevention policy (MAPP).
- It is the objective of a risk assessment to help identify the level of environmental management that is appropriate for the considered facility taking into account these factors.

## 1.4 NAVIGATING THE GUIDANCE

Recognising that a wide audience will utilise the guidance, a flow chart has been developed to assist readers in navigating through the publication (Figure 1).




1 Whilst the focus of this publication is bulk storage facilities, the information provided here may also provide a useful reference to sites holding smaller quantities of such products.

2 In applying the guidance, different emphasis may need to be placed on some of the issues considered using the risk assessment process to ensure they are proportionate (for example on existing sites where they may be additional constraints not encountered when building from new).

**Figure 1: Navigating the guidance – decision tree**