Model code of safe practice

Part 2

Guidance on the design, construction and operation of petroleum distribution installations

5th edition

energy institute

EI MODEL CODE OF SAFE PRACTICE

PART 2: GUIDANCE ON THE DESIGN, CONSTRUCTION AND OPERATION OF PETROLEUM DISTRIBUTION INSTALLATIONS

5th edition

May 2019

Published by
Energy Institute, London
The Energy Institute is a professional membership body incorporated by Royal Charter 2003
Registered charity number 1097899

The Energy Institute (EI) is the chartered professional membership body for the energy industry, supporting over 20 000 individuals working in or studying energy and 200 energy companies worldwide. The EI provides learning and networking opportunities to support professional development, as well as professional recognition and technical and scientific knowledge resources on energy in all its forms and applications.

The EI's purpose is to develop and disseminate knowledge, skills and good practice towards a safe, secure and sustainable energy system. In fulfilling this mission, the EI addresses the depth and breadth of the energy sector, from fuels and fuels distribution to health and safety, sustainability and the environment. It also informs policy by providing a platform for debate and scientifically-sound information on energy issues.

The EI is licensed by:
– the Engineering Council to award Chartered, Incorporated and Engineering Technician status, and
– the Society for the Environment to award Chartered Environmentalist status.

It also offers its own Chartered Energy Engineer, Chartered Petroleum Engineer, and Chartered Energy Manager titles.

A registered charity, the EI serves society with independence, professionalism and a wealth of expertise in all energy matters.

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.

For further information, please visit **http://www.energyinst.org**

The EI gratefully acknowledges the financial contributions towards the scientific and technical programme from the following companies:

Andeavor
BP Exploration Operating Co Ltd
BP Oil UK Ltd
Centrica
Chevron North Sea Ltd
Chevron Products Company
Chrysaor
CLH
ConocoPhillips Ltd
DCC Energy
EDF Energy
ENI
E. ON UK
Equinor
ExxonMobil International Ltd
Innogy
Kuwait Petroleum International Ltd
Nexen CNOOC
Ørsted
Perenco
Phillips 66
Qatar Petroleum
Repsol Sinopec
RWE npower
Saudi Aramco
Scottish Power
SGS
Shell UK Oil Products Limited
Shell U.K. Exploration and Production Ltd
SSE
TAQA Bratani
Total E&P UK Limited
Total UK Limited
Tullow Oil
Uniper
Valero
Vattenfall
Vitol Energy
Woodside
World Fuel Services

However, it should be noted that the above organisations have not all been directly involved in the development of this publication, nor do they necessarily endorse its content.

ISBN 978 1 78725 073 4

Published by the Energy Institute

Hard copy and electronic access to EI and IP publications is available via our website, **https://publishing.energyinst.org**.
Documents can be purchased online as downloadable pdfs or on an annual subscription for single users and companies.
For more information, contact the EI Publications Team.
e: **pubs@energyinst.org**

CONTENTS

Contents continued

Contents continued

Contents continued

Contents continued

Contents continued

Contents continued

Contents continued

LIST OF FIGURES AND TABLES

Page

Figures

Tables

FOREWORD

EI *Model Code of Safe Practice Part 2: Guidance on the design, construction and operation of petroleum distribution installations* has been developed to provide generic multidisciplinary guidance and good practice in the layout, design and construction of distribution installations and their equipment. It also provides certain information on the management and operation of such installations but is not intended to be comprehensive in this regard and many topics are supported by the use of cited technical references.

This Model Code provides recommendations for good practice. It is stressed that design and construction of plant and equipment should be carried out by competent people and that, in making provisions for safety, due consideration should be given to the effect of any additional circumstances, where general good practice may not be reasonably practicable. It is not intended that the recommendations in this Model Code should be applied rigidly to existing premises, where for a variety of reasons it may not be practicable to implement them.

It is primarily intended for use by those involved in the layout, design, construction, management and operation of new distribution installations, and those undergoing significant redevelopment.

It is not meant to be a definitive guide to risk assessment techniques which are required throughout the entire life cycle of such installations. It assumes the reader has experience in this area and, when required, should follow up on the references given for risk assessment methodologies in the relevant sections.

Whilst written in the context of the United Kingdom (UK) legislative and regulatory framework, the principles set out in this publication can be similarly applied in other countries, provided national and local statutory requirements are complied with. Where the requirements differ, the more stringent should be adopted. A similar legislative and regulatory framework generally applies throughout in the European Union.

Key technical changes in the fourth and subsequent editions of this Model Code have been made in response to the publication of UK Health and Safety Executive (HSE) *Safety and environmental standards for fuel storage sites*. This was the final report of the Process Safety Leadership Group (PSLG), convened to drive forward standards in process safety leadership and to complete the implementation of the Buncefield Major Incident Investigation Board's (MIIB) recommendations. The main purpose of this report was to specify minimum standards of control which should be in place at all installations storing large volumes of gasoline; however, recommendations can be inferred for the atmospheric storage of Class I, II and III hydrocarbon products. For existing facilities, a review should be undertaken against the guidance in this Model Code for 'in-scope gasoline' tanks.

Numerous research documents continue to highlight areas of uncertainty with respect to large scale evaporating hydrocarbon cascades and the modelling of vapour cloud dispersion and explosions. Reports detailing the findings of such research may provide further guidance; however, no definitive recommendations have been developed to date which can be included in this Model Code.

The guidance in this Model Code should be considered as good practice. Operators of distribution installations should adopt good practice measures so far as is reasonably practicable. The HSE publication *Assessing compliance with the law in individual cases and the use of good practice* states:

'*When reviewing health or safety measures on an existing plant, installation or situation (such as when considering retrofitting, safety reviews or upgrades), duty-holders should compare existing measures against current good practice. The good practice measures set out should be adopted so far as is reasonably practicable. It might not be reasonably practicable to apply retrospectively to existing plant, for example, all the good practice expected for new plant. However, there may still be ways to reduce the risk, e.g. by partial solutions, alternative measures etc.*'

Although it is anticipated that following this publication will assist those involved in the layout, design, construction and operation of petroleum distribution installations, the information contained in this publication is provided as guidance only. While every reasonable care has been taken to ensure the accuracy of its contents, the EI cannot accept any responsibility for any action taken, or not taken, on the basis of this information. The EI shall not be liable to any person for any loss or damage which may arise from the use of any of the information contained in any of its publications.

The above disclaimer is not intended to restrict or exclude liability for death or personal injury caused by own negligence.

Suggested revisions are invited and should be submitted to the Technical Department, Energy Institute, 61 New Cavendish Street, London, W1G 7AR (e: technical@energyinst.org).

ACKNOWLEDGEMENTS

The fifth edition of this Model Code has been reviewed, edited and updated by Peter Hill (Consultant), at the request of the EI's Distribution and Marketing Committee (DMC). It was subsequently reviewed by the DMC before being published.

It was reviewed by members of the DMC, at the time of project initiation comprising:

Christopher Betts	Total Lindsey Oil Refinery Limited
Tony Brown	Federation of Petroleum Suppliers
Ian Goldsworthy	Valero Energy Ltd
Ivan Harling	Phillips 66 Ltd
Matthew Hudson	Shell Ltd
Zaf Iqbal	BP Oil UK Ltd
Toni Needham	Energy Institute
Mark Palmer	ExxonMobil Ltd
Barrie Salmon	Tank Storage Association
Teresa Sayers	Downstream Fuel Association

The EI wishes to record its appreciation of the work carried out by them, and to the other individuals in industry who provided comments and feedback during the update to this guidance.

Technical editing and project coordination were undertaken by Toni Needham, Energy Institute (EI).

1 SCOPE

1.1 OBJECT

The object of this Model Code is to provide guidance on the design, construction, operation, maintenance and decommissioning of facilities at petroleum distribution installations.

It is not intended to preclude the use of alternative designs, materials and methods where these provide equivalent standards of operation.

1.2 INCLUSIONS

This Model Code covers the receipt, storage and handling of petroleum products at all locations and should be read in conjunction with the following HSE publications or their equivalents in other countries:

– HSG51 The storage of flammable liquids in containers;
– HSG176 The storage of flammable liquids in tanks;
– HSG186 The bulk transfer of dangerous liquids and gases between ship and shore, and
– Process Safety Leadership Group (PSLG) Safety and environmental standards for fuel storage sites.

1.3 EXCLUSIONS

This Model Code does not cover retail filling stations, facilities for the storage of liquefied petroleum gas (LPG) and bitumen, systems for the piped distribution and associated storage of heating oil and certain aspects of fuel storage at airports: technical guidance for these facilities/operations is provided in other EI publications (see Annex F).