



**COMAH Competent Authority Policy on
Containment of Bulk Hazardous Liquids at COMAH
Establishments**

**Control of Major Accident Hazard (COMAH)
Regulations 1999**

20 February 2008

Foreword

Who we are and why we have developed this policy

We are the COMAH Competent Authority (CA), comprising the Health and Safety Executive, the Environment Agency and the Scottish Environment Protection Agency. We implement the Control of Major Accident Hazards (COMAH) Regulations 1999. Among the sites covered by the Regulations are those with bulk storage of hazardous liquids including fuel storage depots.

Recent major incidents, including the one at the Buncefield fuel storage depot in December 2005, highlighted deficiencies in the way hazardous liquids are stored at many sites and the harm such incidents can cause to the environment, people and property. The incidents also involved significant financial costs to the operators of the sites.

We developed this policy in response to these incidents and the recommendations made by the Buncefield Major Incident Investigation Board in their *Design and Operations* report, published in March 2007. We then carried out a three month public consultation between 27 June and 19 September 2007, after which this policy was finalised.

The policy applies to sites subject to the COMAH Regulations storing hazardous liquids in bulk. Section 1 outlines the policy, the law, application and implementation for bulk storage of hazardous liquids. Section 2 provides an expanded framework for those sites handling petrol (gasoline) and similar petroleum products or other fuels.

The policy and our role in implementing it

In Section 2 we have set out the measures and actions that site operators must take to prevent major accidents, and to protect people and the environment, both on and off site. The measures largely confirm and summarise current good practice for storing and controlling the movement of fuels. The policy applies immediately. Any new sites and new facilities built on existing sites must meet the requirements of this policy.

With regard to existing sites, many were built more than 40 years ago and, while they would have been expected to work to industry good practice, some were brought under COMAH regulation comparatively recently. They now need to upgrade to the new standards outlined in this policy. We recognise that it might take a significant period of time to complete the required upgrading work to existing sites and may involve significant cost. We expect sites posing the highest risk to be upgraded first.

Signed on behalf of the
Health & Safety Executive

Kevin Allars
Head of Hazardous Installations Directorate
Date

Signed on behalf of the Environment Agency

Martin Bigg
Head of Industry Regulation
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Signed on behalf of the
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1. COMAH Competent Authority Policy

Containment of Bulk Hazardous Liquids at COMAH Establishments

Introduction

In response to the Buncefield fuel storage depot incident in December 2005, and other incidents, we (the COMAH Competent Authority) have developed a 'Containment Policy' to set out the key principles relating to the bulk storage of hazardous liquids¹. This policy describes measures to improve the protection of people and the environment, both on and off-site, while also safeguarding the supply of fuels and chemicals to the country as a whole.

This Containment Policy applies to COMAH sites and provides a broad framework within which we intend to drive forward improvements in the storage of bulk hazardous liquids. For specific sectors, the policy framework is expanded, setting out the measures for that sector. The policy framework will be underpinned by technical guidance, much of which already exists. Where needed, we will develop further guidance according to priority, making use of the regulator/industry networks established following the Buncefield incident.

The Containment Policy

This policy applies to the bulk storage of hazardous liquids at sites which are subject to the Control of Major Accident Hazard (COMAH) Regulations 1999, and the expanded framework sets out the measures that industry needs to achieve in order to protect both people and the environment from harm.

Primary containment measures have the highest priority in recognition of their importance in preventing accidents. Secondary containment measures are important in preventing the loss of primary containment escalating into a major accident. Tertiary containment measures are an important means of reducing the off-site consequences of an accident and preventing it escalating to become a major accident to the environment (MATTE). Secondary containment measures may require the longest implementation time in recognition of the scale and costs involved in upgrading existing facilities.

The law

This policy underpins the current COMAH guidance and regulations². These regulations require all COMAH establishments to take all measures necessary

¹ For the purposes of this policy, hazardous liquids are Dangerous Substances as described in Schedule 1 of the COMAH Regulations 1999 that are liquids at standard temperature and pressure.

² See "A guide to the Control of Major Accident Hazards Regulations 1999 (as amended) L111", ISBN 0-7176-6175-X

with regard to the containment of hazardous liquids, to prevent major accidents and limit their consequences to persons and the environment.

Application

This policy will be applied to industry sectors and processes according to the level of risk. It will be implemented on the basis of the hazards of the substances present, taking account of the situation, community and environment where the installations are located. We expect the highest standards where the risks to people and environment are greatest. Elsewhere the measures will be implemented according to the hazard and risk.

The measures apply immediately to new establishments and, following discussions between the operator and the Competent Authority, to any existing establishments where significant changes in inventory or operation are proposed.

Existing establishments will also be upgraded in line with the measures, as far as it is reasonably practicable to do so.

We propose to apply this policy, on the basis of risk, in the following phases:

- (i) Establishments storing petrol (gasoline) and similar petroleum products, or other fuels (which were subject to a three month consultation carried out 27 June-19 September 2007); and
- (ii) Establishments storing flammable and toxic liquids in the chemical manufacturing, storage and distribution industries (which will be subject to a separate consultation in summer 2008).

Implementation at existing establishments

We recognise that upgrading existing establishments is disruptive, and that the cost to industry may be substantial. In order to avoid disrupting operations and supplies, the upgrading work will need to be phased in over a significant period of time – which could be 10 to 20 years in some cases.

To start the upgrading process, operators of existing sites need to review their compliance with the measures set out in this policy and prepare a plan for implementing improvements. This plan will need to be acceptable to us, as the COMAH Competent Authority, and should contain completion dates for each stage of the programme. These dates should be informed by risk, maintenance programmes and site characteristics, so operators can demonstrate their progress towards achieving the measures.

2. COMAH Competent Authority Policy

Containment of Bulk Hazardous Liquids at COMAH Establishments

Expanded framework for handling petrol (gasoline) and similar petroleum products, or other fuels

These measures apply to new establishments and, following discussions between the operator and the Competent Authority, at existing establishments where any significant changes in inventory or operation are proposed. These measures also apply to the upgrading of existing establishments as far as it is reasonably practicable to do so.

Part A: Primary Containment

1. Storage vessels

Above ground storage tanks (ASTs) and underground storage tanks (USTs) shall be:

- designed and constructed to a relevant standard to ensure their mechanical integrity compatible with the chemical and physical properties of the liquids to be contained;
- designed to avoid excessive vapour generation created by the consequences of an overfill of product;
- protected against over- and under-pressurisation and operated within limits established to ensure that this is achieved;
- designed and constructed to withstand impacts on their integrity from normal operations and foreseeable events;
- designed, constructed and installed to prevent failure due to corrosion or chemical interaction;
- installed on appropriate and sound foundations;
- subject to an inspection, testing and maintenance system sufficient to prevent failure.

2. Pipework (on site)

Pipework within the establishment shall be:

- designed and constructed to a relevant standard, to ensure mechanical integrity compatible with the chemical and physical properties of the liquids to be contained;
- designed, constructed and protected to withstand impacts on its integrity from normal operations, thermal expansion and foreseeable events including, where appropriate, fire;

- designed, constructed and installed to prevent failure due to corrosion or chemical interaction;
- subject to an inspection, testing and maintenance system sufficient to prevent failure (above ground installation aids this objective);
- of minimum practicable diameter and length, with joints reduced as far as possible;
- properly supported to suit its intended use and layout. Supports within secondary containment areas shall be fire resistant.

3. Pipelines (inter-site)

- Product transfers between sites shall be subject to confirmation by the receiving site that it can safely receive the product package, before transfer starts.
- Receiving sites shall be able to initiate safe shut down of transfer in an emergency.

4. Valves

- All tanks shall be capable of being isolated by suitably located, fire-safe shut-off valves on filling and outlet pipes.
- All isolating valves shall be capable of being closed in an emergency without exposing people to risk.
- Remotely operated shut-off valves shall remain operable in the event of power failure or shall fail-safe.
- All isolation valves shall be periodically tested for continued functionality.

5. Control instrumentation

- Tank gauging systems shall be automated.
- High integrity, high-level alarms shall be installed, and will be set to stop filling operations where the guidance shows this to be necessary.
- For substances which can create a vapour cloud, an independent high integrity, high-high level alarm system shall be provided. This shall be linked to an automatic emergency shut down system or diversion of the flow to a safe place if not promptly acted upon, where the guidance shows this to be necessary.

Part B: Secondary and Tertiary Containment

6. Bunding of above-ground storage tanks (ASTs)

ASTs shall be bunded to provide secondary containment. (A bund being an enclosure designed to contain fluids should they escape from the tank or vessel inside the bund.)

The bunds shall:

- be impermeable;

- have adequate corrosion resistance;
- have adequate strength and durability;
- have the minimum number of tanks within each bund, in line with good practice;
- have incompatible materials stored in separate bunds;
- have sufficient capacity to allow for tank failure and firewater management. This will normally be a minimum capacity of either 110 per cent of the capacity of the largest tank, or 25 per cent of the total capacity of all the tanks within the bund, whichever is the greater;
- have no rainwater drain, otherwise a drain into a contained and enclosed system requiring positive action for operation;
- have no pipework that penetrates through the bund floor;
- have no pipework that penetrates through the bund walls as far as reasonably practicable, otherwise it shall be with adequate sealing and support;
- be subject to periodic inspection and certification by a competent person regarding their condition and performance.

7. Bunding and fire controls

ASTs containing substances that are flammable, highly flammable or extremely flammable shall have additional secondary containment measures to those stated in section 6, these are:

- fire resistant structural integrity, joints and pipework penetrations;
- a means of removing firewater from below the surface of the liquid in the bund (for hazardous substances which are not miscible with water and have a lower density than water).

In addition there should be adequate capacity and design to allow fire fighting measures, for example the application of water and/or foam, to be taken in a combination of secondary and tertiary containment.

8. Underground storage tanks (USTs)

USTs shall comply with the appropriate requirements for ASTs and in addition shall:

- be double-skinned or banded;
- have any access chambers designed to provide secondary containment;
- have a primary containment failure monitoring and alarm system.

9. Underground pipework (on site)

Underground pipework shall comply with all the requirements for above ground pipework and in addition shall:

- have a primary containment failure monitoring and alarm system and either be double-skinned or have secondary containment trenches;
- not be located in the same secondary containment system as pipelines containing incompatible materials;

- have the routes of the pipework or trenches clearly marked.

10. Tertiary containment

Tertiary containment plans shall be prepared for establishments storing or using hazardous liquids, including those establishments which may have firewater containing hazardous substances. The plans will incorporate the ground and location characteristics of the site and are intended to:

- minimise the consequences of a loss of primary containment from equipment that is not provided with secondary containment;
- minimise the consequences of a major incident that causes the failure of, or exceeds the storage capacity of, secondary containment;
- enable additional measures to be deployed in time if an incident escalates.

Part C: Common Issues

11. Facility design

The installation shall have sufficient capacity to hold safely the anticipated or foreseeable volume of hazardous liquids, including firewater, compatible with the intended operational characteristics.

12. Fire fighting

- Fire load risk assessments shall be carried out. This is to determine the best methods and equipment needed to restore control rapidly, and to minimise water/foam application.
- Fire fighting plans, including controlled burn strategies, shall be prepared and shall include multiple tank/bund events.
- Suitable fixed and mobile fire fighting equipment and materials shall be provided or be available rapidly.

13. Maintenance

The establishment shall be managed and operated in accordance with a maintenance, inspection and testing regime which ensures a sufficient standard of operability for equipment and systems.

14. Change management

Change management procedures shall be in place to prevent adverse impact on the operation and the integrity of the installation.

15. Staffing

The establishment shall be managed and operated by sufficient persons who are competent in respect of their responsibilities in connection with the operation of the establishment.

3. Definitions

Primary containment is the most important means of preventing major accidents involving hazardous liquids. It is achieved by the equipment that has direct contact with the substances being stored or transported such as storage vessels, pipework, valves, pumps and associated management and control systems. It also includes equipment that prevents the loss of primary containment under abnormal conditions, such as high-level alarms linked to shut down systems.

Secondary containment minimises the consequences of a failure in the primary containment system by preventing the uncontrolled spread of the hazardous liquid. Secondary containment is achieved by equipment that is external to and independent of the primary containment system, such as concrete or clay bunds around storage tanks. (A bund being an enclosure designed to contain fluids should they escape from the tank or vessel inside the bund.) Secondary containment will also provide limited storage capacity for firewater management.

Tertiary containment minimises the consequences of a failure in the primary and secondary containment systems by providing an additional barrier preventing the uncontrolled spread of hazardous liquid. Tertiary containment is achieved by means external to and independent of the primary and secondary containment systems, such as site drainage and sumps, diversion tanks, impervious liners and/or flexible booms. Tertiary containment will be utilised when there is an event that causes the loss of containment (eg bund joint failure or firewater overflowing from a bund during a prolonged tank fire), and is intended to ensure that loss of control of hazardous materials does not result from such an event.

4. Glossary

AST – above-ground storage tank.

Bund – an enclosure designed to contain fluids should they escape from the tank or vessel inside the bund.

CA – Competent Authority (comprising HSE, SEPA and the Environment Agency).

COMAH Regulations – Control of Major Accident Hazard Regulations.

HSE – Health and Safety Executive.

MATTE – major accident to the environment.

SEPA – Scottish Environment Protection Agency.

UST – underground storage tank.

Health and Safety Executive

Our mission statement is 'to protect people's health and safety by ensuring risks in the changing workplace are properly controlled'.

Our Hazardous Installations Directorate (HID) covers offshore and land installations for gas, oil refining, chemical and plastic production. There are three Divisions covering offshore installations, specialist industries and chemical manufacturing/storage. The long-term aim of the Chemical Industries Division of HID is to secure the health and safety of workers and the public by ensuring that risks in the [onshore chemical manufacture and storage industries](#) are properly controlled. Our main focus is the major hazard issues arising from these industries, much of which is driven by statutory permissioning duties under the [Control of Major Accident Hazards \(COMAH\) Regulations](#).

For more information on us and our programmes visit: <http://www.hse.gov.uk/>

Environment Agency – who we are

The Environment Agency looks after your environment and makes it a better place – for you, and for future generations. With 12,500 members of staff and a budget of around £1 billion, the Environment Agency is the biggest organisation protecting and improving the environment in England and Wales. The Environment Agency – out there, making your environment a better place.

For more information on us and our programmes visit

<http://www.environment-agency.gov.uk>

Scottish Environment Protection Agency – who we are

The Scottish Environment Protection Agency (SEPA) protects the environment and human health by controlling activities that can cause harmful pollution and by monitoring the quality of Scotland's air, land and water. We publish a wide range of environmental information and advise Government, partner bodies, regulated industry and the public on environmental issues. SEPA regulates contaminated land, radioactive substances and nuclear sites, air pollution, water pollution, emissions from major industries, hazardous chemicals, waste water treatment works and landfill sites. We are responsible for flood warnings and flood risk maps in Scotland as well as responding to pollution incidents and major emergencies, administering the Emissions Trading Scheme in Scotland and running the Scottish Radioactive Monitoring Network. All this helps SEPA to provide an efficient and integrated environmental protection system for Scotland, which will both improve the environment and contribute to the Scottish ministers' goals of sustainable development and a greener Scotland.

For more information on us and our programmes visit <http://www.sepa.org.uk/>