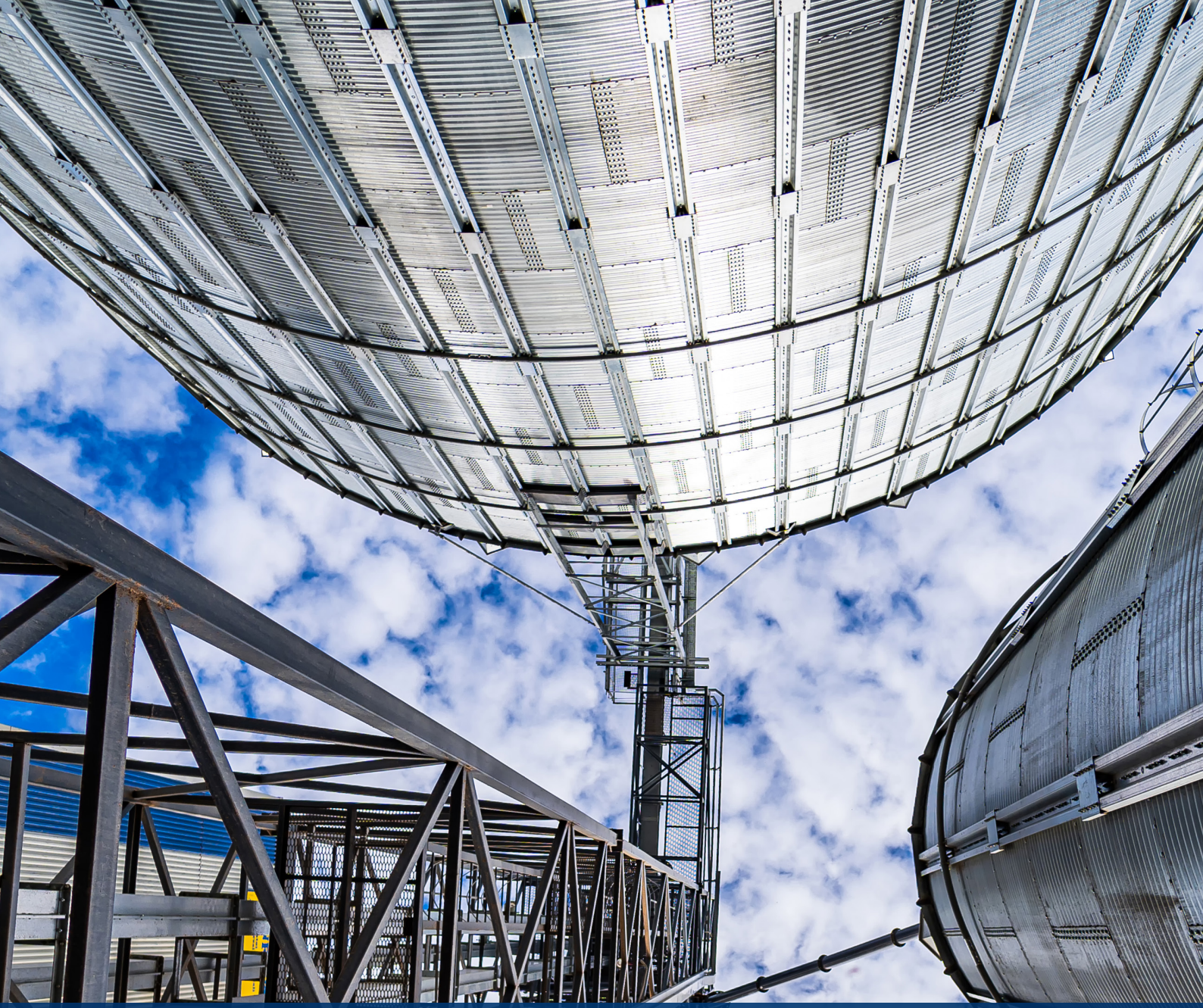


SLR

Containment

Working hard to protect
people and our environment

Introducing SLR

SLR is a global leader in environmental and advisory solutions, with a team of over 1600 professionals delivering advice and support from a network of offices across Europe, North America, Asia-Pacific and Africa. Teams across the business work collaboratively as one so that SLR can offer services to clients irrespective of geographic boundaries.

Our commitment to technical excellence is reflected in our multidisciplinary team of consultants who have first-hand experience in addressing some of the most complex challenges facing industry today. We offer over 30 technical services and our professionals offer a blend of experience incorporating engineers of all disciplines, supported by risk assessment experts and other key specialists including hydrologists, geologists, hydrogeologists, ecologists, remediation specialists, and environmental scientists.

With over 20 years of specialist process safety knowledge and experience, we provide a unique blend of leadership, management, consulting, engineering and training services, that makes us the natural partner of choice for businesses of all sizes across the process industries, including those in the oil and gas, chemicals, polymer, pharmaceutical, healthcare, waste, energy and allied industries.

Our work starts with an understanding of risk

All European health, safety and environmental legislation requires a risk assessment to be undertaken. The output of the risk assessment is decision based – are we doing enough, or do we need to do something more?

In lots of cases, adherence to the requirements of accepted good practice is sufficient to make this decision. In a sense, the risk assessment has already been undertaken by others by determining what risk reduction measures are necessary and including them in the guidance.

However, for some situations, particularly where the hazard or risk is significant, further measures above and beyond those stipulated in the guidance are necessary to manage the risk.

There are many tools available, but the underlying methodology is identical in all cases. The tool used needs to be appropriate and proportionate.

We can undertake a full range of studies including:

- Inherent safety reviews of processes and processing equipment
- Process hazard analysis
- LOPA and SIL Determination
- Human Factors Assessments
- Hazardous area classification
- Flood hazard identification studies (FHIS) and flood risk assessments
- Environmental risk assessments
- Quantified risk assessment
- Gap analysis studies against standards and guidance for measures in place, including secondary and tertiary containment systems

Where necessary, we use a range of specialist software systems for assessing the extent of releases of energy and hazardous substances, including firewater. This information is used to determine if the risks to people or the environment are as low as reasonably practicable (ALARP).

Hierarchy of Controls

Duty holders should consider the hierarchy of controls and where possible look to eliminate or reduce hazards at source before considering the use of engineering controls, administrative controls or personal protective equipment. This requires an understanding of the process chemistry, processing routes and manufacturing methods available to ensure all options have been adequately assessed.

Trusted by key industry stakeholders to deliver training on application of the Chemical and Downstream Oil Industries Forum (CDOIF) guidance for determining the tolerability of environmental risk at COMAH Establishments.

We understand the regulatory framework

Put simply, compliance with risk-based process safety legislation requires application of management systems to the identification, understanding, and control of process hazards to prevent process-related injuries and incidents.

Sites intending to hold quantities of hazardous substances above defined limits must obtain hazardous substance consent. This is an important first step in the overall control of major accident hazards under the Control of Major Accident Hazards (COMAH) Regulations. We can provide guidance and support to help determine whether sites fall in scope and where they do, we can help with all aspects of the planning process.

20-year track record

We have been providing support to more than 25% of the UK's upper tier COMAH sites across all sectors, including those in oil and gas, chemicals, pharmaceuticals, warehousing, energy and defence for over 20 years.

4,000+

We have trained over 4,000 executives and senior managers in the principles of process safety leadership and good governance of process safety.

Planning Consent

UK planning authorities will seek to reduce hazards at source through the Planning (Hazardous Substances) Regulations 2015, the Town and Country Planning (Hazardous Substances) (Scotland) Regulations 2015 and the Planning (Hazardous Substances) (Wales) Regulations 2015.

COMAH Regulations

The UK's primary process safety legislation is the Control of Major Accident Hazards (COMAH) Regulations. They place a general duty on operators to take all measures necessary to prevent major accidents and limit their consequences to people and the environment.

The Regulations recognise that risks cannot be completely eliminated, and so prevention should be based on the principle of reducing risk to a level that is as low as reasonably practicable (ALARP) for human risks and use of best available techniques (BAT) for environmental risks.

Our work product is necessarily scrutinised by, and finds acceptance with, regulatory subject matter experts as part of the COMAH permissioning process.

For sites in scope, the COMAH Regulations apply at either a lower tier or upper tier level, dependent on the quantities of hazardous substances present. The legislation requires operators to demonstrate that the risks on site are as low as reasonably practicable (ALARP) and for upper tier sites this demonstration must be made in the site's COMAH safety report.

The demonstration process requires answers to three questions:

(1) What can go wrong?
(2) What systems are present to prevent, control and mitigate the things that can go wrong?
(3) How do we know that these systems are effective?

Question (1) can be answered through a robust and proportionate hazard identification (HAZID) study followed by consequence and frequency assessment to determine the attendant risks. This will often require other risk assessment studies such as task analysis and human reliability assessments (HRAs), occupied buildings risk assessment (OBRA), layers of protection analysis (LOPA), ALARP reviews, gap analysis against accepted good practice, environmental risk assessments, and cost benefit analysis.

Question (2) relates to the procedural systems employed to manage the hazards and risks throughout the process safety lifecycle (through design, installation, commissioning, operation, inspection, maintenance, modification, decommissioning and demolition).

Question (3) is concerned with how the organisation learns and continually improves, and so includes accident and near-miss investigation, process safety performance indicators (PSPIs), benchmarking, audits and management review.

SLR personnel have been providing support for compliance with the COMAH Regulations and associated planning regulations from the very beginning. Our experienced team of consultants, scientists and engineers have been successfully preparing hazardous substances planning applications, and writing, maintaining, reviewing, and revising COMAH safety reports for many years.

We have worked with more than 25% of the UK's upper tier COMAH sites and have written more COMAH safety reports for more companies than anyone else. From Government owned facilities to large multinational corporations across all process sectors, including manufacturing and storage, we are trusted with every aspect of the COMAH process.

We know about maintaining containment

Regulatory Containment Policy

Major incidents over the years have 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.

In response, the COMAH Competent Authority developed a containment policy to set out the key principles relating to bulk storage of hazardous liquids.

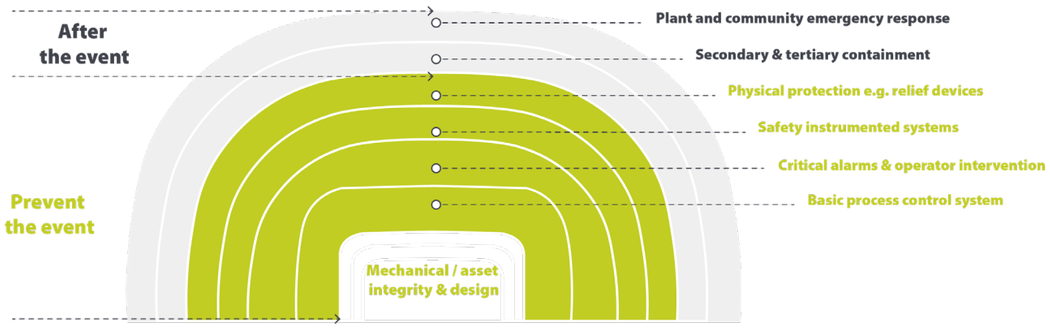
The policy, Containment of Bulk Hazardous Liquids at COMAH Establishments, describes measures to improve the protection of people and the environment, both on and off site.

The Competent Authority's policy on containment calls for increased standards of containment for liquids (particularly flammable liquids and liquids dangerous to the environment).

This includes:

- Primary containment systems including the measures for preventing loss of containment of inventory through overfill, over-pressurisation, and failure
- Secondary containment measures needed to prevent a loss of primary containment escalating into a major accident
- Tertiary containment measures as a means of reducing the off-site consequences of an accident and preventing it escalating to become a major accident to the environment (MATTE)

We can help assess the effectiveness of these lines of defence through appropriate use of hazard identification and risk assessment, together with audit, inspection and review of the measures in place.



Primary containment

SLR's multi-disciplined team of consultants and consulting engineers can undertake design reviews to document the basis of safety (process and engineering) and justifications for the protection measures in place, all in accordance with relevant good practice guidance.

This includes:

- Inherent safety reviews of processes and processing equipment
- Relief system studies
- Functional safety management
- Hazardous area classification
- Specification, inspection and testing of hazardous area equipment
- Preparation of essential process safety documentation to support ongoing maintenance and modification
- Gap analysis studies against legislation, codes, standards and accepted good practice

Preventing major accidents

Primary containment is the most important means of preventing major accidents involving hazardous substances. Systems include equipment in direct contact with the substances being stored (the inventory) such as tanks, vessels, pipework, valves and pumps. This also includes equipment that prevents the loss of primary containment under abnormal conditions, such as high-level or high-pressure alarms linked to shutdown systems, relief systems, and the associated management and control systems.

Secondary and tertiary containment

On first reading the Competent Authority's policy on containment, duty holders may feel concerned at the potential cost implications for improvement. As an example, ensuring existing tank bunds, including the floors under tanks, are impervious to the liquids stored could prove expensive. But the term 'reasonably practicable' is key here because this is the term used in the legislation to help strike a balance based on risk and cost. It relates to the gross disproportion of the costs and the risk reduction achieved.

We can help develop balanced approaches for improvement through:

- Gap analysis studies to identity shortfalls against standards and good practice
- Topographical surveys to determine secondary containment capacity and where liquids will flow if loss of containment occurs
- Inspection of secondary and tertiary containment systems
- Development of firewater containment strategies
- Facilitation of optioneering workshops to evaluate schemes based on risk
- Promotion of reasonably practicable measures based on cost benefit analysis
- Detailed design of improvement schemes
- Preparation of construction programmes and provision of construction supervision

SLR authored the current CIRIA C736 Guidance on Containment Systems for the Prevention of Pollution.

We can help you to be prepared should things go wrong

Through appropriate and proportionate risk assessment, we can help identify credible loss of containment events and develop emergency response plans to help mitigate the effects to protect people and the environment, all in accordance with accepted good practice guidance.

Specifically, we can help by:

- Defining credible loss of containment scenarios for energy and materials, including firewater
- Assessing potential for harm to surrounding populations and the environment
- Assessing existing plans against identified scenarios
- Developing options for enhanced response
- Identifying safety critical communications
- Developing emergency response plans and procedures
- Specifying equipment necessary for responding to emergencies
- Developing tabletop exercises, practise drills and feedback processes
- Training

We understand the importance of inspection

Over its operating life, plant, equipment and structures may exhibit signs of ageing, which can compromise safety and reliability. Knowing what, when, where and how they should be inspected and maintained is therefore essential for maintaining safe and compliant operations.

Compliance with good practice requires:

- Registration of critical plant, equipment and civil structures, based on hazards and risks
- Assessment of degradation mechanisms
- Inspection, testing and maintenance of critical plant, equipment and civil structures
- Inspection, testing and maintenance of protective devices, e.g. bursting discs, relief valves, etc.
- Testing and calibration of safety-related EC&I equipment
- Management of change

We can help you to identify critical assets, assess the potential for ageing, and develop strategies for on-going inspection, testing and preventive maintenance.

Working in collaboration with the Chemical Industries Association and the Health and Safety Executive, we conducted the first ever UK process industries benchmarking study on Asset Integrity Management on COMAH Sites. We also contributed to the CDOIF Guidance on The Use of External Contractors in the Management of Ageing Plant.

We're on hand to help should the worst happen

Investigation and clean-up of contaminated sites is a speciality. While focusing on the business needs of our clients, we identify contamination and manage it to protect human health and the environment.

We can provide support in several ways, through provision of:

- High level or preliminary assessments to identify or refute potential contamination risks (e.g., Phase I and II Site Assessments)
- Site investigations for all contaminant types (oils, fuels, chemicals, metals, VOCs, etc.) and media (vapours, soil, sediment, surface water, groundwater)
- Risk assessments from screening level through to detailed human health and ecological risk assessments as well as toxicity studies and remediation target derivation studies
- Remediation services for design and implementation of remedial plans, negotiating clean-up standards, risk mitigation, material and waste management, and decommissioning and site closure

Our team includes experts in all applicable fields, covering all sectors:

- Regulatory specialists with detailed knowledge of regulatory requirements both locally and internationally
- Contaminant hydrogeologists, geologists, risk assessors, toxicologists, engineers, biologists and scientists specialising in management of land quality issues
- Professionals with direct experience of contamination issues and solutions across all industry sectors

Find out more about how we can help

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