Corporate Governance for Process Safety

OECD Guidance for Senior Leaders in High Hazard Industries

OECD

IOMC

CORPORATE GOVERNANCE FOR PROCESS SAFETY

GUIDANCE FOR SENIOR LEADERS IN HIGH HAZARD INDUSTRIES

OECD Environment, Health and Safety

Chemical Accidents Programme

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ABOUT THE OECD

The Organisation for Economic Co-operation and Development (OECD) is an intergovernmental organisation in which representatives of 34 industrialised countries in North and South America, Europe and the Asia and Pacific region, as well as the European Commission, meet to co-ordinate and harmonise policies, discuss issues of mutual concern, and work together to respond to international problems. Most of the OECD's work is carried out by more than 200 specialised committees and working groups composed of member country delegates. Observers from several countries with special status at the OECD, and from interested international organisations, attend many of the OECD's workshops and other meetings. Committees and Working Groups are served by the OECD Secretariat, located in Paris, France, which is organised into directorates and divisions.

The Environment, Health and Safety Division publishes free-of-charge documents in ten different series: **Testing and Assessment; Good Laboratory Practice and Compliance Monitoring; Pesticides and Biocides; Risk Management; Harmonisation of Regulatory Oversight in Biotechnology; Safety of Novel Foods and Feeds; Chemical Accidents; Pollutant Release and Transfer Registers; Emission Scenario Documents; and Safety of Manufactured Nanomaterials.** More information about the Environment, Health and Safety Programme and EHS publications is available on the OECD's World Wide Web site (www.oecd.org/ehs/).

The work of the OECD related to corporate governance for process safety is carried out by the Working Group on Chemical Accidents (WGCA). The Chemical Accidents Programme works in three areas: developing common principles and policy guidance on chemical accident prevention, preparedness and response; analysing issues of mutual concern and making recommendations for best practices; and facilitating the sharing of information and experience between both OECD and non-member countries. It is carried out in co-operation with other international organisations. The Programme helps public authorities, industry, labour and other interested parties prevent chemical accidents and respond appropriately if one occurs.

This publication was developed in the IOMC context. The contents do not necessarily reflect the views or stated policies of individual IOMC Participating Organizations.

The Inter-Organisation Programme for the Sound Management of Chemicals (IOMC) was established in 1995 following recommendations made by the 1992 UN Conference on Environment and Development to strengthen co-operation and increase international co-ordination in the field of chemical safety. The Participating Organisations are FAO, ILO, UNEP, UNIDO, UNITAR, WHO, World Bank and OECD. UNDP is an observer. The purpose of the IOMC is to promote co-ordination of the policies and activities pursued by the Participating Organisations, jointly or separately, to achieve the sound management of chemicals in relation to human health and the environment.

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FOREWORD

Society has come to enjoy and rely upon the vast benefits that the chemicals, oil and gas industries bring to our daily lives. Equally, it is recognised that we do not live in a risk free environment and that sometimes mistakes are made or that the unexpected happens, leading to injuries and deaths, adverse environmental impacts and property damage. Accidents may also have significant impact on the commercial operation of a company due to business interruption or loss of reputation. Lately however, society has become less tolerant of avoidable accidents and especially catastrophic events caused by inadequate attention to risk control. These guidelines therefore aim to strike a balance between risk and benefit by drawing attention of those at the top of industry to the need for high standards of corporate governance in relation to the management of high hazard industries. It is recommended that the simple measures set out in the booklet to every director, CEO and President of a major hazard company and would encourage each to check themselves against the self-assessment questions at the end of the booklet.

Adopting these guidelines and implementing them throughout industry will be a significant demonstration of commitment to high standards of responsibility for process safety corporate governance and lead to long term sustainable development.

About This Publication

This guidance on Corporate Governance for Process Safety has been prepared as part of the OECD Chemical Accidents Programme, and aims to identify the Essential Elements of Corporate Governance for Process Safety. It is compatible with the OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response and the OECD Guidance on Developing Safety Performance Indicators.

This publication is the result of a collaborative effort – under the supervision of the OECD Steering Group on Corporate Leadership – involving a large number of experts from many countries and organisations, in both the public and private sector. Based on the collective experience of this diverse group of international experts, Corporate Governance for Process Safety – Guidance for Senior Leaders in High Hazard Industries seeks to establish "best practice".

Senior Leaders

This guidance is aimed at senior leaders within the chemical, petrochemical, petroleum and other high hazard industries. In this publication, senior leaders refers to chief executive officers, presidents, board members (executive and non-executive), directors or other **senior** personnel within an organisation who have the authority to influence the direction and culture of that organisation. The guidance will also be of benefit to other stakeholders in high hazard industries, whether as a shareholder, regulator or other interested party.

High Hazard Industries

Whilst primarily targeted at the chemical, petrochemical and petroleum industries, this guidance will also be useful for any industry or organisation which, due to the nature of their processes or hazardous substances, could cause serious danger to multiple people or the environment, either on or off site.

INTRODUCTION

'If you think safety is expensive, try an accident…' is a familiar adage in the process industries.

Most major hazard businesses are characterised by having the potential for catastrophic accidents involving large scale loss of life, harm to health and extensive environmental damage. The manufacture of chemicals and petrochemicals, oil and gas exploration and downstream production, energy and power generation involves complex processes with in-built intrinsic hazards that need careful management. The measures needed to contain these hazards in a controlled way are equally complex and not always readily understood.

"Effective Process Safety Governance & Culture is not a choice but a must for survival of our industry. The SABIC Leaders are committed to the principles of Process Safety Management to protect our employees, our communities & our assets."

Mohammed Al-Mady, CEO Sabic

Safe operation and sustainable success in business cannot be separated. Failure to manage process safety can never deliver good performance in the long term, and the consequences of getting control of major hazards wrong are extremely costly. In addition, the response to major catastrophic events by society and governments is often to require stricter legislation and standards of control which may apply across whole industry sectors, or even internationally, as is the case with European Directives binding on all member states.

Major accidents may not just impact on your bottom line profitability – they could completely wipe it out. Major incidents in recent years have shown that the consequences for capital costs, income, insurance costs, investment confidence and shareholder value can all be drastically affected. So why take the risk?

However, getting it right pays large dividends.

In 2001, a huge explosion ripped through a fertiliser factory on the outskirts of Toulouse, resulting in 31 fatalities and over 2500 people injured. Around 10000 homes were seriously damaged and 1400 families had to be evacuated. The blast blew out windows in the city centre 3 km away and created a crater more than 50 meters wide and 10 meters deep.

The total damages paid out by insurance companies exceeded 1.5 billion Euros.

And getting it right means starting from the boardroom and leading from the top. Board room decisions have a direct bearing on process safety outcomes and the Board sets the vision and culture for the whole organisation. So, effective governance on process safety is essential for a sustainable business performance. Many companies in high-hazard sectors have made important strides in establishing the necessary corporate culture and leadership to minimise the frequency and severity of process safety incidents.

Ask yourself: Do you know what impact your business decisions have on the level of risk of your site – and not just now, but several years into the future?

The aim of this guidance is to enhance the understanding of process safety management for senior leaders and to highlight the skills and knowledge required to actively manage this critical aspect of business performance. An additional aim of presenting this framework for process safety governance is to encourage its adoption within other global, regional or national sustainability programmes such as Responsible Care©[1].

"This guidance document on process safety governance provides a very concise commentary on the fundamentals of Process Safety Governance. The elements discussed are also consistent with leadership expectations for implementing Responsible Care, which sees the integration of effective process safety management systems into corporate governance processes as critical to business success and sustainability in the chemistry sector."

Paul Timmons, President ERCO Worldwide
(Past Chair of the Chemistry Industry Association of Canada)

[1] Responsible Care is the chemical industry's global voluntary initiative under which companies, through their national associations, work to continuously improve their health, safety and environmental performance, and communicate with stakeholders about their products and processes.

BUSINESS CASE FOR EFFECTIVE PROCESS SAFETY MANAGEMENT

We live in an age of corporate social responsibility. Over the last generation, successive major accidents, from the deadly toxic gas release in Bhopal, India in 1984 to more recent examples including the explosions at BP Texas City, USA and Buncefield, UK in 2005, have raised concerns with the public, stakeholders and regulators. Improvements in technical knowledge and management systems have helped to reduce the risk, but as major accidents continue to happen around the world, the public's expectations of senior leaders are changing.

Analysis of past incidents reveals that inadequate leadership and poor organisational culture have been recurrent features, with:

- a failure to recognise things were out of control (or potentially out of control), often due to lack of competence at different levels of the organisation;
- an absence of, or inadequate, information on which to base strategic decisions – including the monitoring of safety performance indicators at Board level;
- a failure to understand the full consequences of changes, including organisational ones;
- a failure to manage process safety effectively and take the necessary actions.

> The fire and explosion at Buncefield in the UK in 2005 is a stark reminder of what can happen when process safety is not given the attention it deserves. Forty three people were injured, there was widespread devastation to the local community, air and road transport was affected due to the smoke plume over southern England, and the environmental impact of the disaster is still evident today. With estimated total costs exceeding 1.25 billion Euros, this remains Britain's most costly industrial disaster.

Leaders need to **understand the risks** posed by their organisation's activities, and balance major accident risks alongside the other business threats. Even though major accidents occur infrequently, the potential consequences are so high that leaders need to recognise:

- major accidents as credible business risks;
- the integrated nature of many major hazard businesses – including the potential for supply chain disruption;
- management of process safety risks should have equal focus with other business processes including financial governance, markets, and investment decisions, etc.

Ask yourself: If an operator had shut your plant with high running costs down, what would your first reaction be?

Good process safety management needs the active involvement of senior leaders, and it is important that they are visible within their organisation, because of the influence they have on the overall safety and organisational culture.

To maintain the right focus on preventing major accidents, leaders also need to recognise the full extent of the impact of these incidents and the potentially devastating consequences for a business, including:

- harm to people, including loss of life and serious injury;
- environmental damage – for example air, water and land contamination;
- the damage to business efficiency from disruption of production, and loss of customers or suppliers;
- the potentially huge costs – both direct (for example asset replacement or repair costs, legal fees and fines) and indirect (for example increased insurance premiums, and loss of shareholder confidence resulting in falling share value);
- negative effects on the local economy;
- long-term damage to an organisation's reputation, from adverse publicity, legal action and harm to the company 'brand', and
- the discontinuation of the company as a viable, ongoing entity in light of the above.

The political impact of major incidents should not be underestimated, particularly when it concerns transboundary environmental pollution. In 2005 the Chinese president had to issue an apology to the President of the Russian Federation following an explosion at the Jilin Petrochemical plant, which led to the release of over 100 tonnes of toxic chemicals into the Songhua river on the border between China and Russia. The chemicals formed an oily slick up to 150 km long, and, as the river provided water for the nearby city, led to 4 million people having no drinking water for 4 days.

However, good corporate governance of process safety is not just about avoiding potential negative effects. There are a number of commercial reasons why good process safety management makes good business sense.

Some of the benefits of well managed assets and processes include:

- less downtime, and higher plant availability;
- maintenance budgets that are easier to forecast;
- plants and equipment which have longer life spans;
- improved efficiency and flexibility;

- enhanced employee, stakeholder and regulator relationships, and
- access to capital and insurance at more attractive rates.

These factors allow production scheduling to run more smoothly and help create a better, more productive business, with a less stressful working environment for managers and employees alike.

"Excellence in process safety is something we strive for every day, and it is critical to success in our industry. One of our most important jobs as leaders to provide our people and our organisations with the resources, context, and boundaries to succeed in keeping our process plant and our people safe, every day."

Gary Haywood
PetroChina-INEOS JV2 CEO

Further information on the commercial benefits is available in 'The Business Case for Process Safety' from the Center for Chemical Process Safety in the US. This guidance also includes a set of seven steps for organisations to follow which will help them to implement an effective process safety management programme.

<u>High reliability organisations (HROs)</u>

A high reliability organisation has been defined as one that produces product relatively error-free over a long period of time. Two key attributes of high reliability organisations are that they:

- Have a chronic sense of unease, i.e. they lack any sense of complacency. For example, they do not assume that because they have not had an incident for ten years, one won't happen imminently.
- Make strong responses to weak signals, i.e. they set their threshold for intervening very low. If something doesn't seem right, they are very likely to stop operations and investigate. This means they accept a much higher level of 'false alarms' than is common in the process industries.

The lessons from past incidents demonstrate that strong process safety leadership is vital in preventing catastrophe, and it is essential that these lessons are learned and adopted across all sectors to prevent the same failings leading to more accidents in the future.

When the Deepwater Horizon oil rig exploded in 2010, eleven people were killed and there was a devastating oil spill in the Gulf of Mexico. As a result, the BP chief executive faced questioning by US Congress and there was a loss of confidence by shareholders resulting in a large fall in the share price. The company has since restructured its upstream business and changed the way it manages safety and operational risk, so that it is now headed by a member of BP's most senior executive team.

Senior leaders must also be aware of the various regulatory requirements in the countries where they operate. Many countries have legislation which:

- places specific legal duties on boards, organisations and individuals in relation to the prevention of major accidents, and
- incorporates sanctions such as corporate manslaughter when there have been serious management failures leading to a fatality.

Regulators around the world are increasingly focusing on the most senior level in an organisation's hierarchy when trying to determine where the ultimate accountability for an accident should lie.

"For us in the Chemical Industry, safety is key for our 'licence to operate'. At BASF, one of our core values is 'We never compromise on safety'. Process Safety is of particular importance, because of the severe consequences of major incidents. Through strong process safety performance we protect our employees and neighbors, our environment, and our reputation and our business success. We have implemented – and are further strengthening – strong programs to reduce process safety risks, ranging from safety conscious plant design to excellence in safe plant operation."

Kurt Bock, CEO BASF

Key Self-Check Questions

- Do you know what the major accident risks are for your organisation?
- Do you know what your main vulnerabilities are?
- What are you doing about them?
- How concerned are you about the level of risk?
- How confident are you that all the safety systems are performing as they should?
- Do you seek out the 'bad news', as well as the good?
- If there is an incident, who do you blame? Others, or yourself?
- Are you doing all you can to prevent a major accident?

ESSENTIAL ELEMENTS OF CORPORATE GOVERNANCE FOR PROCESS SAFETY

Strong leadership is vital, because it is central to the culture of an organisation, and it is the culture which influences employee behaviour and safety. Process safety tasks may be delegated, but responsibility and accountability will always remain with the senior leaders, so it is essential that they promote an environment which encourages safe behaviour.

"Creating a culture where all employees expect the unexpected and strive for error-free work is absolutely essential for success in process safety. This kind of culture is possible only through demonstrated leadership at all levels of the organisation."

Bob Hansen, CEO Dow Corning

- **LEADERSHIP AND CULTURE:** CEO and leaders create an open environment where they:

- Keep process safety on their agenda, prioritise it strongly and remain **mindful of what can go wrong.**
- **Encourage people to raise process safety concerns,** or bad news to be addressed.
- Take every opportunity to be role models, promoting and discussing process safety.
- Delegate appropriate process safety duties to competent personnel whilst maintaining overall **responsibility and accountability.**
- Are visibly present in their businesses and at their sites, asking appropriate questions and constantly challenging the organisation to find areas of weakness and opportunities for continuous improvement.
- Promote a "safety culture" that is known and accepted throughout the enterprise[2].

- **RISK AWARENESS:** CEO and leaders broadly understand the vulnerabilities and risks and they:

- Know the importance of process safety throughout the life cycle – whether it is the design, operation, and maintenance phases of their manufacturing facilities, or storage, logistics and decommissioning at those locations.
- Understand the critical and different **layers of protection that are in place between a hazard and an accident** and seek to strengthen those layers continually.
- Ensure appropriate and consistent **management systems** for analysing, prioritising and managing the risk, including strong management of change processes for people, technology and facilities.
- Personally involve themselves in risk assessing proposed budget reductions for process safety impacts and provide incentive schemes which don't encourage production at the expense of process safety risk.
- Take responsibility for emergency planning for the range of consequences from a process safety incident including the credible worst case scenario.
- Know the hazards and risks at installations where there are hazardous substances[3].

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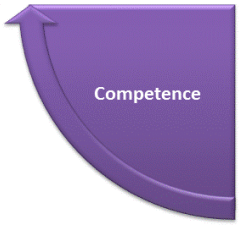
2 See further guidance in chapter 2.a of the OECD *Guiding Principles*

3 See further guidance in chapter 2.b of the OECD *Guiding Principles*

- **INFORMATION:** CEO and leaders ensure data drives process safety programmes, and they:

- Ensure that the organisation analyses audit and assessment results.
- Monitor site and corporate level process safety key performance indicators and near misses.
- Have metrics which help to monitor the **health of the process safety culture and management systems.**
- Actively share experiences and learning within their own organisation and within other high hazard sectors and ensure appropriate, high quality follow up.
- Establish safety management systems and monitor/review their implementation. Seek continuous improvement[4].

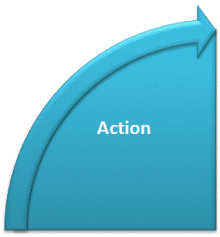
- **COMPETENCE:** CEO and leaders assure their organisation's competence to manage the hazards of its operations, they:



- Understand which questions to ask their people and know which follow up actions are necessary.
- Ensure there are **competent management, engineering, and operational personnel at all levels.**
- Ensure continual development of process safety expertise and learning from new regulation and guidance.
- Provide resource and time for expertise-based hazard and risk analyses, effective training and comprehensive scenario planning for potential accidents.
- Defer to the expertise of personnel, and do not dismiss expert opinions. They provide a process or system to ensure company leaders get expert process safety input as a critical part of the decision making process for commercial projects or activities.
- Ensure that the organisation monitors and reviews the process safety competency of contractors and third parties.
- Are **capable of openly communicating critical aspects of process safety** with all internal and external audiences.

[4] See further guidance in chapters 2.d, f, 14 and 15 of the OECD *Guiding Principles*

- **ACTION -** CEO and leaders engage in articulating and driving active monitoring and plans, they



- Assure **practices are consistent with corporate process safety policies**.
- Safety measures should be incorporated at the earliest conceptual and engineering design stages of an installation to enhance the intrinsic (inherent) safety of the installation wherever practicable[5].
- Incorporate process safety considerations into major capital investments, long range planning and integration of mergers or acquisitions.
- Ensure process safety risk mitigation plans and emergency response plans are developed and maintained for all sites within their business and at an organisation-wide level, with appropriate levels of competent resources available to execute the plans.
- Ensure implementation of process safety risk mitigation plans and reviews of progress versus the plans at site and corporate level.
- Monitor that corrective actions are applied and closed out promptly following audits and after thorough root cause investigations of all incidents or potentially high consequence near misses.

> "At Dow, maintaining a strong commitment to EH&S and Process Safety is our top priority and is essential to business success. Ensuring our ability to produce products without harm while eliminating unplanned process-related incidents is an essential component in meeting Dow's vision and operating discipline. Working in conjunction with industry and associations, OECD can help to further highlight the importance of good process safety practices and leadership to many manufacturers around the globe."
>
> Andrew N. Liveris, Chairman & CEO, The Dow Chemical Company

[5] See further guidance in chapter 2.c.4 of the OECD Guiding Principles

SELF-ASSESSMENT QUESTIONS FOR SENIOR LEADERS

How well are you doing at managing process safety?

The following self-assessment aims to show how well your organisation is managing process safety. In line with the principles of corporate governance of process safety, the questions are intended to be answered by senior leaders: at this stage don't pass the question set to your HSE manager, but answer them yourself as best you can. Once you have done so, you should then discuss with your staff how to address any gaps, get more information, or find out the status of 'work in progress' to address known gaps. The questions are intended to be answered using 'traffic light' scores:

1 = Yes, and I can easily demonstrate this 

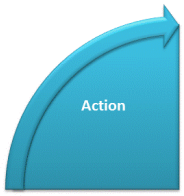
2 = Uncertain, I would need to find out, or this is already work in progress 

3 = No, I think there is a gap 

Leadership and Culture 			
Do you have a policy on corporate governance for process safety which describes the management expectations, required commitment, and corporate activities in relation to process safety?			
Do you include process safety on the agenda for all board meetings?			
Do you have a designated board member responsible for process safety?			
Do you and senior leaders actively work to remove any barriers to the reporting of 'bad news' up the management hierarchy, and promote an open culture for communicating process safety issues (*e.g.* by providing direct communications routes from the shopfloor to senior leaders, or from the national board to overseas HQ)?			
Do you and senior leaders go out on plant visits and conduct safety tours, audits or inspections?			
Do you and your senior leaders have process safety related performance objectives in your personal objectives/performance agreements?			
Do you prioritise long term process safety assurance over and above short term budget restrictions and profitability?			
Do you implement the same safety standards for all parts of the organisation, wherever they are located in the world?			

Risk Awareness 	1	2	3
Do you and your senior leaders understand the process safety risks associated with your organisation's operations?			
Do you and your senior leaders understand the means of prevention, control and mitigation of major process safety hazards?			
Do you have arrangements in place to ensure safety systems are working effectively, and to seek out areas of weakness (*e.g.* using findings from inspections, trend analysis, process safety performance indicators, etc.)?			
When allocating, or even reducing, budgets, do you and senior leaders consider the requirements of the different plants/sites based on their age, condition, environment, nature of hazard, past performance, incidents, etc?			
Do you have a management of change process to assess changes for process safety impacts arising from modifications, changes to organisational structure or changes to the local environment (*e.g.* following loss of corporate function, new or modified processes, downsizing, changes in the external community such as new hazards or new populations)?			
Do you have due diligence processes for the mergers and acquisitions of major hazard installations?			
Do you and your senior leaders ensure that incentive schemes don't encourage production at the expense of process safety?			
Information 	1	2	3
Do you have a process safety management system (this may be integrated into a broader HSEQ management system)?			
Do you and your senior leaders proactively seek out information relating to process safety on site?			
Are your process safety audits based on ensuring that procedures deliver an effective control of risk, rather than compliance only?			
Do you audit your contractors to ensure they effectively control risk?			
Do you have a full suite of current process safety performance indicators appropriate to the level of risk of your site, including information on the prevalence of deficiencies or dangerous trends which could lead to a major accident?			

Information (continued) 	1	2	3
Are your process safety performance indicators presented to you and senior leaders with their purpose and content explained to provide an indication of how well the organisation is performing?			
Do you participate in external sector level initiatives (*e.g.* those run by trade associations) and understand what role this plays in improving process safety for the industry sector?			
Have you and your senior leaders learned from incidents at other sites, either within your own organisation or externally?			
Where appropriate, have you shared lessons learnt from your organisation's own incidents with others externally?			
Do you publish information on your process safety performance (*e.g.* in your annual report)?			
Competence 	1	2	3
Are the roles and responsibilities for you and senior leaders clearly defined in relation to process safety?			
Do you have effective process safety competency requirements for all personnel with process safety impacts, including you and senior leaders?			
Have you and your senior leaders received training in corporate governance for process safety?			
Do you and your senior leaders spend sufficient time in a position to become competent in process safety governance and to see the longer term outcome of your decisions on process safety performance?			
Do you consider potential process safety risks when making commercial decisions?			
Do you maintain an intelligent customer role on process safety issues when you have contracted out activities to third parties?			
Do you consider the imported risk from contractors, suppliers or customers, particularly when significant parts of the undertaking are contracted out?			

Action 	1	2	3
Do you ensure that activities and practices are consistent with corporate process safety policies and procedures?			
Do you have a prioritised process safety risk mitigation/improvement plan for every part of the organisation?			
Do you ensure that sufficient resources are available and review progress against the process safety risk mitigation/improvement plan at site and corporate level, and expedite activities when appropriate?			
Do you ensure that sufficient resources are available to mitigate the consequences of a major accident?			
Do you have arrangements for identifying process safety gaps and managing historical systems and procedures following a merger or acquisition?			
Do you and your senior leaders review key audit and assessment findings, and expedite actions when appropriate?			
Do you and your senior leaders have accountability for the completion of corrective actions identified in significant audits, inspections, investigations, and management of change assessments, etc.?			

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Center for Chemical Process Safety (2012) *Recognizing Catastrophic Incident Warning Signs* ISBN: 978-0-470-76774-0

Useful Websites

Center for Chemical Process Safety (CCPS) http://www.aiche.org/ccps/

Chemical Institute of Canada's Process Safety Management Division http://www.cheminst.ca

Chemical Industries Association http://www.cia.org.uk

European Process Safety Centre http://www.epsc.org

International Council of Chemical Associations (ICCA) http://www.icca-chem.org/

Responsible Care http://www.icca-chem.org/en/Home/Responsible-care/

Health and Safety Executive (UK) (HSE) http://www.hse.gov.uk/hid/index.htm

Chemical Safety Board (US) (CSB) http://www.chemsafety.gov/