

PROCESS SAFETY IN SHELL



Our assets are safe and we know it

Given the nature of the risks involved, ensuring the safety and integrity of our assets is paramount to Shell. For us, process safety means making sure our facilities are well designed, safely operated, and properly inspected and maintained.

We aim to prevent process safety incidents that could place our people, our neighbours, the environment and our facilities at risk. Put simply, we aim to ensure that our assets are safe and we know it.



MANAGING HSSE – A SYSTEMATIC APPROACH

To achieve continuous performance improvement Shell companies manage health, safety, security, environment and social performance in a systematic way.

At Shell, we aim to help meet the energy needs of society in ways that are economically, environmentally and socially responsible. To manage the impact of our operations and projects on the environment and society we have a comprehensive set of business principles and rigorous standards covering health, safety, security, environment (HSSE) and social performance (SP).

Our business principles provide high-level guidance, and the Commitment and Policy on HSSE & SP reflects our aims on how we operate and involve communities close to our operations. Those aims include:

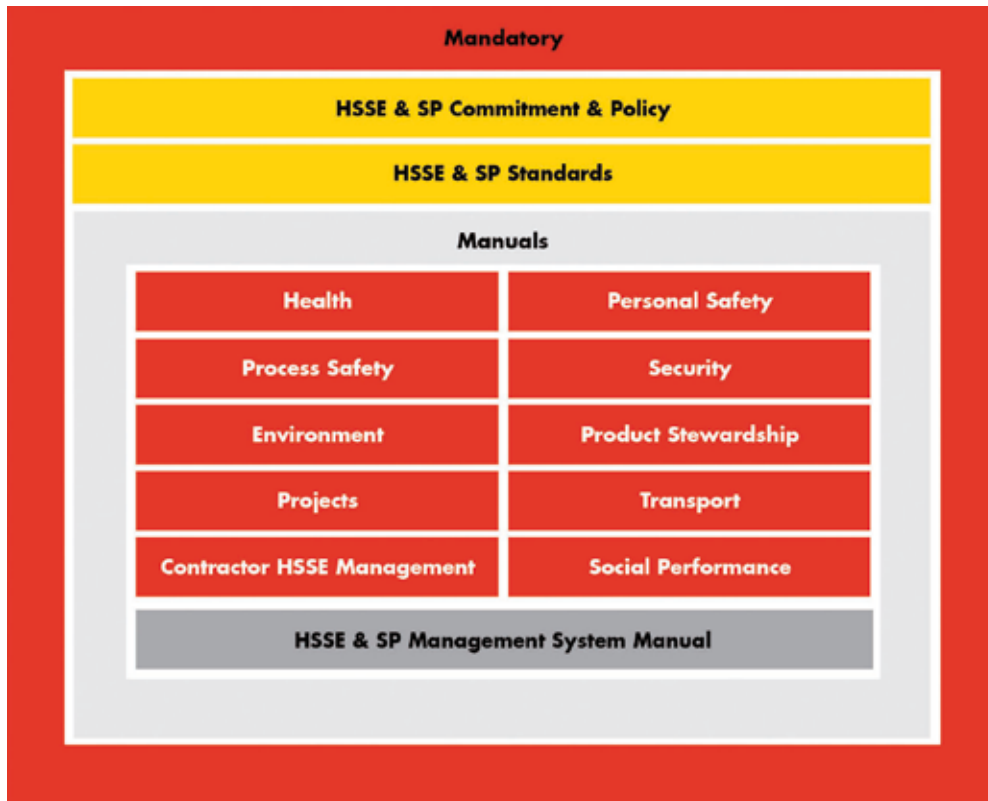
- do no harm to people;
- protect the environment; and
- comply with all HSSE laws and regulations.

All Shell companies, contractors and joint ventures under our operational control must manage HSSE and SP in line with the Commitment and Policy. To help our staff and contractors to put the Commitment and Policy into practice we launched the Shell HSSE & SP Control Framework in 2009. It is a single, mandatory source for rules covering areas such as process and road safety. While the Control Framework was launched in 2009 its standards and manuals include all of the HSSE requirements we have followed in the past, such as our industry-first biodiversity standard.

Our focus on compliance includes tackling the cultural issues that can lead to unsafe behaviour. This includes our efforts to reinforce our mandatory *12 Life-Saving Rules* with all employees and contractors who work for us. We also hold annual global safety days for employees and contractors to reflect on their role in making Shell a safer place to work.

shell.com/standards
shell.com/safety

HSSE & SP control framework



MANAGING PROCESS SAFETY RISK

We identify the HSSE risks associated with our business activities and work to reduce these risks through mitigating controls.

Having strong controls for process safety and asset integrity risks at our facilities is critical.

Business managers in Shell are accountable for identifying HSSE hazards, assessing and documenting their potential impact, and reducing or eliminating risks using controls and recovery measures.

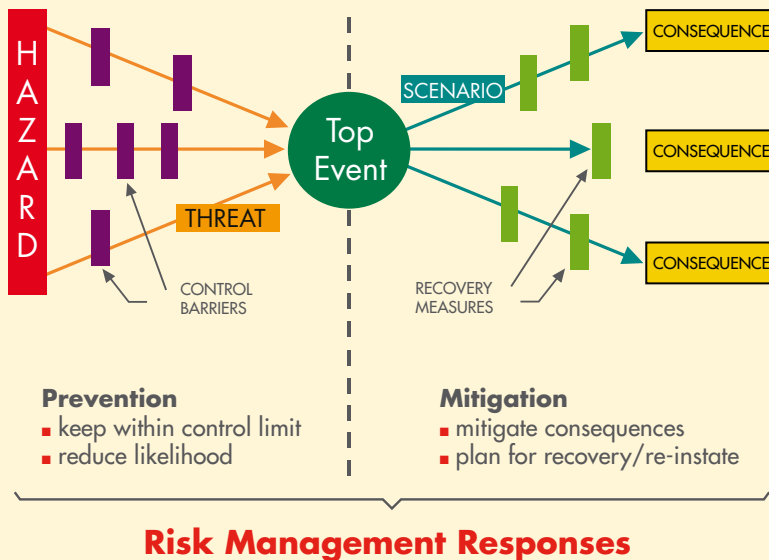
One of the ways we are building a strong safety culture throughout our organisation is by focusing on compliance. With the launch of our HSSE & SP Control Framework in 2009 (see page 2) we released a new Process Safety manual, which builds on our previous standards.

We audit our businesses and seek assurance that process safety requirements have been implemented and are effective. We also have a dedicated team of process safety experts that assist in auditing our operations and facilities. We regularly report on process safety matters to the Board of Royal Dutch Shell plc.

Our process safety performance is continually improving. For example, the number and volume of operational spills have fallen since 1998 through clear procedures and consistent compliance. We have a mandatory process to review and learn from incidents and develop measures to prevent future recurrences.

The 'Bow Tie' Model

The 'Bow Tie' Model illustrates the importance of both preventive and recovery measures in dealing with risk. Risk is defined as the likelihood that a Top Event (hazard release) will occur, combined with the severity of the consequences of the event:



- Hazard:** Potential to cause harm.
- Threat:** A possible cause that will potentially release a hazard and produce a 'Top Event'.
- Control Barriers:** Measure to prevent threats from releasing a hazard.
- Top Event:** The 'release' of the hazard, i.e. the first consequence.
- Recovery Measures:** Limit the consequences arising from Top Event.
- Consequence:** Event(s) that result from the release of a hazard.

DESIGN INTEGRITY

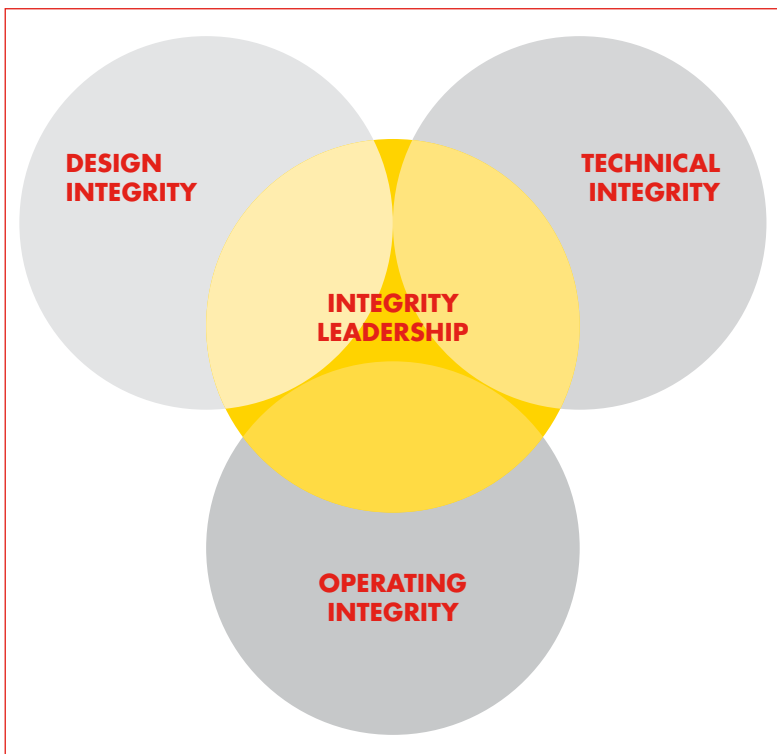
Shell has compiled more than 350 design and engineering practices. These practices reflect the many years of Shell experience applying industry design and engineering standards and design codes in a safe and reliable manner.

We have mandatory technical standards for design and construction that are used for exploring, drilling, producing, processing, transporting or storing hazardous substances or energy. A rigorous process is in place to monitor and review the acceptability of any deviations from these mandatory technical standards, and to manage change.

Shell also prescribes mandatory technical standards relating to process safety requirements. Our standards are informed by recommendations arising from industry incident investigations, such as the Baker Report on the Texas City incident. This included guidance on safe siting of occupied portable buildings and avoiding liquid release relief to atmosphere.

We perform process safety reviews for new facilities and for modifications of facilities. We also perform regular reviews of existing facilities to assess changes made, including the application of new design and engineering standards, new technology, operational experience and lessons learned from incidents.

Process safety management



ASSET INTEGRITY

We prevent process safety incidents by maintaining our hardware barriers and by working within operational barriers.

Asset integrity and process safety are high priorities for Shell. We aim to operate all assets, regardless of age or location, in a way that meets or exceeds our internal standards and relevant legal and regulatory requirements

Shell continues to invest in maintaining and improving the safety and reliability of our operations. This includes a more than \$5 billion dollar program in our upstream business to improve equipment.

We have detailed maintenance and integrity programmes in place to keep continued focus on the technical integrity of our facilities. This includes making sure pre-defined barriers to prevent incidents are well maintained and controlled.

Our procedures focus on clarity of expectations, transparency and open communication with staff. We ensure our managers and staff know and understand safe operational limits and operating procedures and that we have rigorous asset monitoring protocols.

Shell Eastern Petrochemical Complex (SEPC), Singapore 2010, Separation columns at night



Perdido deep water project, Gulf of Mexico, USA, 2010



INTEGRITY LEADERSHIP

Leaders play an important role in avoiding process safety incidents and must demonstrate visible and felt leadership in the field.

For each life cycle phase of a facility, a Shell manager is accountable for process safety management. All of our managers have the technical and professional qualifications and experience required for such a position. They understand the hazards present in their facilities and the barriers available to reduce process safety risk.

We expect our managers to demonstrate leadership in process safety. They communicate regularly with staff to ensure process safety expectations and accountabilities are clear. They are also responsible for ensuring that incidents are investigated, and for taking corrective action and sharing learnings.

Our managers help ensure that our facilities are safe and fit to operate. For example, a manager will not start or re-start a facility without following a detailed set of safety criteria. This includes making sure employees and contractors are competent and that procedures are in place to operate equipment within defined operational limits.

We have a company-wide approach for engaging local communities near our facilities. We use contributions from community panels and open days to understand their concerns about the safety of our facilities and provide information on the measures in place to prevent incidents.

Air monitoring at the Phenol 3 Unit, Deer Park refinery, Houston, USA 2006



Gas Storage Norg, Netherlands, 2010



Cautionary Note

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate entities. In this publication "Shell", "Shell group" and "Royal Dutch Shell" are sometimes used for convenience where references are made to Royal Dutch Shell plc and its subsidiaries in general. Likewise, the words "we", "us" and "our" are also used to refer to subsidiaries in general or to those who work for them. These expressions are also used where no useful purpose is served by identifying the particular company or companies. "Subsidiaries", "Shell subsidiaries" and "Shell companies" as used in this publication refer to companies in which Royal Dutch Shell either directly or indirectly has control, by having either a majority of the voting rights or the right to exercise a controlling influence. The companies in which Shell has significant influence but not control are referred to as "associated companies" or "associates" and companies in which Shell has joint control are referred to as "jointly controlled entities". In this publication, associates and jointly controlled entities are also referred to as "equity-accounted investments". The term "Shell interest" is used for convenience to indicate the direct and/or indirect (for example, through our 34% shareholding in Woodside Petroleum Ltd.) ownership interest held by Shell in a venture, partnership or company, after exclusion of all third-party interest.

This publication contains forward-looking statements concerning the financial condition, results of operations and businesses of Royal Dutch Shell. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements are statements of future expectations that are based on management's current expectations and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in these statements. Forward-looking statements include, among other things, statements concerning the potential exposure of Royal Dutch Shell to market risks and statements expressing management's expectations, beliefs, estimates, forecasts, projections and assumptions. These forward-looking statements are identified by their use of terms and phrases such as "anticipate", "believe", "could", "estimate", "expect", "intend", "may", "plan", "objectives", "outlook", "probably", "project", "will", "seek", "target", "risks", "goals", "should" and similar terms and phrases. There are a number of factors that could affect the future operations of Royal Dutch Shell and

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