

## **Piper Alpha: Lessons Learnt, 2008**

Piper Alpha was a large North Sea oil platform that started production in 1976. It produced oil from 24 wells and in its early life it had also produced gas from two wells. It was connected by an oil pipeline to Flotta and by gas pipelines to two other installations. In 1988, Piper Alpha was operated by Occidental Petroleum (Caledonia) Ltd ("OpCal"), a wholly owned subsidiary of Occidental Petroleum Corporation.

On 6 July 1988, there was a massive leakage of gas condensate on Piper Alpha, which was ignited causing an explosion which led to large oil fires. The heat ruptured the riser of a gas pipeline from another installation. This produced a further massive explosion and fireball that engulfed the Piper Alpha platform. All this took just 22 minutes. The scale of the disaster was enormous. 167 people died, 62 people survived.

It is believed that the leak came from pipe work connected to a condensate pump. A safety valve had been removed from this pipe work for overhaul and maintenance. The pump itself was undergoing maintenance work. When the pipe work from which the safety valve had been removed was pressurised at start-up, it is believed the leak occurred.

### **Initial response from industry**

As details of the causes of the disaster emerged, every offshore Operator carried out immediate wide-ranging assessments of their installations and management systems. These included:

- Improvements to the "permit to work" management systems
- Relocation of some pipeline emergency shutdown valves
- Installation of sub sea pipeline isolation systems
- Mitigation of smoke hazards
- Improvements to evacuation and escape systems
- Initiation of Formal Safety Assessments

The industry invested in the order of £1 billion on these and other safety measures before Lord Cullen's Public Inquiry into the disaster reported.

### **The Cullen Inquiry**

Lord Cullen chaired the official Public Inquiry into the disaster in two parts. The first was to establish the causes of the disaster. The second made recommendations for changes to the safety regime. The inquiry began in November 1988, with Lord Cullen's report being published in November 1990.

UKOOA, the oil and gas production companies' trade association (now Oil & Gas UK), was represented throughout but did not participate in Part I, which was to establish the cause of the disaster. It did, however, play a full role in Part II, which considered measures to prevent future major accidents, and provided 34 expert witnesses.

## **The Cullen Report**

Lord Cullen made 106 recommendations within his report, all of which were accepted by industry, many being a direct result of industry evidence. Responsibilities for implementing them were spread across the regulator and the industry. The Health and Safety Executive (HSE) was to oversee 57. The operators were responsible for 40. Eight were for the whole industry to progress and the last was for the Standby Ship Owners Association.

Industry acted urgently to carry out the 48 recommendations that operators were directly responsible for. By 1993 all had been acted upon and substantially implemented.

At the same time the Health and Safety Executive (HSE) developed and implemented Lord Cullen's key recommendation: the introduction of safety regulations requiring the operator/owner of every fixed and mobile installation operating in UK waters to submit to the HSE, for their acceptance, a safety case.

## **The Safety Case Regulations**

The Offshore Installations (Safety Case) Regulations came into force in 1992. By November 1993 a safety case for every installation had been submitted to the HSE and by November 1995 all had had their safety case accepted by the HSE.

The Safety Case Regulations require the operator/owner (known as the 'duty holder') of every fixed and mobile installation operating in UK waters to submit to the HSE, for their acceptance, a safety case.

The safety case must give full details of the arrangements for managing health and safety and controlling major accident hazards on the installation.

It must demonstrate, for example, that the company has safety management systems in place, has identified risks and reduced them to as low as reasonably practicable, has introduced management controls, provided a temporary safe refuge on the installation and has made provisions for safe evacuation and rescue.

The safety case is a very comprehensive piece of work. Preparing, revising and updating the Safety Case whenever needed throughout the full life cycle of an installation make considerable demands on the duty holder.

The Safety Case Regulations were revised in 2005, in light of 13 years of experience. The objective of the revisions was to improve the effectiveness of the regulations whilst at the same time reducing the burden of three yearly resubmissions.

## Health and safety legislation offshore

In addition to the application of the Health and Safety at Work Act (1974), there may be particular hazards in the offshore environment that need special consideration. There are therefore major sets of UK regulation applicable to the industry's operations.

The Offshore Safety Case Regulations are underpinned by more detailed regulations. These are:

**The Offshore Installation and Pipeline Works (Management and Administration) Regulations 1995** - these set out requirements for the safe management of offshore installations such as the appointment of offshore installation managers (OIMs) and the use of permit-to-work systems;

**The Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 (PFEER)** - these provide for the protection of offshore workers from fire and explosion, and for securing effective emergency response;

**The Offshore Installations and Wells (Design and Construction, etc) Regulations 1996** - these are aimed at ensuring the integrity of installations, the safety of offshore and onshore wells, and the safety of the workplace environment offshore.

There are a wide range of other regulations applicable to the offshore oil and gas industry. These include (but are not limited to):

The Management of Health and Safety at Work Regulations 1992

The Control of Substances Hazardous to Health Regulations updated in 1999

The Noise at Work Regulations 1989

The Health and Safety at Work Act (1974)

The Provision and Use of Work Equipment Regulations (PUWER)

The Lifting Operations and Lifting Equipment Regulations (LOLER)

The Dangerous Substances and Explosive Atmosphere Regulations (DSEAR)

These regulations above are in addition to various regulations dealing with first-aid, safety representatives and safety committees, personal protective equipment (PPE), display screen equipment, manual handling and safety zones.

In the UK, safety legislation is "goal-setting" rather than prescriptive. The legislation sets out the objectives that must be achieved, but allows flexibility in the choice of methods or equipment that may be used by companies to meet their statutory obligations.

## Enforcement and workforce involvement

The Health and Safety Executive's (HSE) Offshore Safety Division employs a team of inspectors who are responsible for enforcing both the offshore specific regulations and the general safety legislation common to all industries. Their work includes regular inspection visits to offshore installations. They will investigate safety incidents, and prosecute if necessary.

The Offshore Installations (Safety Representatives and Safety Committees) Regulations, which came into force in 1989, also provided a voice to the offshore

workforce in the health and safety of their installation. Members of the offshore workforce have the right to elect, by secret ballot every two years, a safety representative to represent them in dealings with the installation management on health and safety and to establish safety committees on each platform.

The Operator has a duty to ensure and pay for the training of the Safety Representatives.

Secondly, the workforce is involved in developing the Safety Case for an installation. The Safety Case Regulations require the operator both to demonstrate they have consulted with the workforce when preparing the Safety Case and to make copies of the accepted Safety Case available to them.

Safety Representatives have made and continue to make a valuable contribution to safety offshore. For example, Safety Representatives from installations across the UKCS are actively engaged with the industry's Step Change in Safety campaign, via the Elected Safety Representative network set up to improve exchange of information and share best practice.

### **Establishment of safety guidelines**

Lord Cullen recommended that the industry specify the standards used to comply with goal-setting regulations. Oil & Gas UK publishes guidelines in accordance with this recommendation which are usually developed with other stakeholders, such as the Health and Safety Executive (HSE) and other industry trade associations. The guidelines are designed to identify and assess key areas of risk and provide guidance on the measures and procedures most suitable for controlling those risks.

The "goal-setting" approach to safety legislation differs from the prescriptive style in that rather than being given a fixed check list of things that must be done to meet a statutory requirement, companies can choose the best methods or equipment available at the time. Oil & Gas UK (formerly UKOOA) guidelines aid this process by promoting best practice across the industry.

### **Impact of the industry's efforts on safety performance**

There has been a significant fall in the Lost Time Injury Frequency Rate for the UK since 1997.

The industry was concerned that its earlier successes were not being sustained and launched the Step Change in Safety ([www.stepchangeinsafety.net](http://www.stepchangeinsafety.net)) initiative in September 1997. The campaign was to refocus the safety effort and set an ambitious target of delivering a 50 per cent improvement in the whole industry's safety performance over the following three years.

The Health and Safety Executive (HSE) publishes all health and safety statistics relating to the UK oil and gas industry on its website at <http://www.hse.gov.uk/offshore/information.htm>

**What is the industry currently doing to improve its safety performance?**

Significant improvements have been made in the UK offshore industry since Piper Alpha. This includes improvements in both the hardware and in the safety culture of the industry. However, we know we cannot be complacent. The launch of Step Change in Safety was designed to continue the post-Piper Alpha improvements and drive greater improvement and workforce involvement.