

LESSONS FROM THE DEEPWATER HORIZON AND MONTARA DISASTERS



Chris Spencer: Director of Loss Prevention
Telephone: +44 20 3320 8807
E-mail: chris.spencer@ctcplc.com

Fundamental safety lessons for the offshore and shipping industries can be learned by looking at the government reports that were issued after the *Macondo* well and *Montara* oil platform disasters. The Gulf of Mexico *Macondo* tragedy in April 2010 cost the lives of 11 people, and 5m barrels (bbls) of oil flowed into the waters off the US coast. The *Montara* spill in the Timor Sea in August 2009 thankfully involved no loss of life, but was a significant casualty, as the wreck removal costs of the *West Atlas* alone were estimated at more than \$140m.

The semi-submersible rig *Deepwater Horizon*, drilling at the *Macondo* prospect, blew out 30 years after the *Alexander L Kielland* floating hotel for rig workers collapsed in the North Sea, with 123 lives lost. That 1980 tragedy was a grim lesson in how not understanding the risk and not fully appreciating the role of shore management can inflict a major catastrophe. Excluding the technical aspects of the disasters, the similarities with regard to management failures are striking. It is dispiriting that 30 years on, the same factors are being cited as causes of major accidents.

DEEPWATER HORIZON

US President Obama created a National Oil Spill Commission to seek the root causes of the *Deepwater Horizon* disaster. Its report and the Chief Counsel's Report are essential reading for anyone wanting to avoid a repeat of that tragedy.

The investigation makes clear that management failures, not mechanical failings, were the ultimate source of the disaster. The report lays out in detail that the following factors led to the tragedy:

- confusion
- lack of communication
- disorganisation
- inattention to crucial safety issues and test results

At the Standard Club, we have been focusing on the human element as a loss prevention area that can lead to improvements. During our condition surveys and when carrying out reviews of the safety management systems of new members, we consider these human element factors. The oil spill commission clearly thought that failures do not simply start with a rig (or ship), but relate to the practice of management ashore.

The *Macondo* disaster was not the result of a coincidental alignment of technical failures as many have suggested. Although many technical errors contributed to the blowout, the commission found that all could be traced back to management failures. The report identified the management failures associated with each technical failure.



^ *Deepwater Horizon*

The Chief Counsel's report noted the following management failures:

- ineffective leadership at critical times
- ineffective communication and 'silencing' of information
- lack of timely procedures
- poor training and supervision of employees
- ineffective management of, and oversight of, contractors
- inadequate use of technology and instrumentation
- failure to analyse and appreciate risk
- focus on time and costs rather than control of major accident risks

According to the commission, most of the events and mishaps related to the *Deepwater Horizon* disaster could be traced back to an overreaching failure of management and communication.

Documents available to the commission indicated that these areas of management were in fact considered important by BP, and the first principle of the *Macondo* operation was leadership, but the Chief Counsel's team observed conflict between managers and confusion about who was accountable for critical decisions.

In the context of leadership, the commission declared pointedly: "*Though it is understandable that no one would wish to take ownership of the well after the blowout, the Chief Counsel's team found many instances in which nobody was taking ownership before the blowout.*"

COMMUNICATION

Good management, it is said, is all about communication.

The commission said that inadequate communication and excessive compartmentalisation of information contributed to the blowout. Breakdown in the flow of communication is a contributing factor in most major accidents.

As part of its management review process, the Standard Club looks at the systems within a company that allows an organisation to learn from its mistakes. These can be simple processes such as capturing near misses, learning from effective auditing, having effective safety meetings and promulgating technical and safety notices. The *Macondo* report noted that both BP and rig owner Transocean had failed to communicate lessons learned from other wells that could have assisted decision-makers. In one instance, the rig operator failed to communicate to BP and its rig crew lessons from a similar near miss on one of its rigs in the North Sea four months before the *Macondo* blowout.

Transocean's resulting advisory note setting out anticipated amendments to its well control handbook in light of the North Sea incident was not sent to anyone on the *Deepwater Horizon*. A more extensive advisory note was issued less than a week before the *Macondo* blowout, but this was circulated only to North Sea units. Although Transocean disagreed with the Chief Counsel's assertions, his report stated:

"There is no reason why the lessons learned in the North Sea would not apply to the Gulf of Mexico or non-completion operations. Had Transocean adequately communicated the lessons from the North Sea to the crew of the Deepwater Horizon prior to April 20, events at Macondo may have unfolded differently."

The point is made that learning from our mistakes is a process that should be undertaken vigorously in a formal, structured way and should be at the centre of a company's safety management system.

PROCEDURES

The commission found that BP failed to provide its well-site leaders and the rig crew with clear, detailed and timely procedures. Instead, the evidence shows that BP's onshore *Macondo* team was rushing to design and provide procedures in order to keep up with operations on the rig.

Just three days before the blowout, there was an email exchange between managers complaining about people being upset by many last-minute changes: *"this huge level of paranoia from engineering leadership is driving chaos"* and referring to attempts *"to make sense of all the insanity"*.

According to the Chief Counsel, companies failed to provide the rig crew and well-site leaders with adequate training, information, procedures and the support to do their jobs effectively.

COMPETENCE AND SUPERVISION

The report states that BP did not supervise and support its employees as necessary to ensure safe operations. It does not appear that BP made any significant effort to ensure in managing changeovers, that certain people were qualified for the tasks they would be performing.

Personnel joining rigs or ships for the first time is a risk for organisations and needs to be managed correctly. The club focuses carefully on this type of management, during our condition surveys and management reviews.

TRAINING

The report said that some personnel were inadequately trained, including the well-site leaders when it came to conducting and interpreting a negative pressure test. Nor were crews well trained in how to respond to emergency situations such as those that occurred on the night of 20 April.

This was symptomatic of a broader inattention to end-of-well and non-drilling activities. For example, the well control manual did not contain a section on monitoring or controlling the well during temporary abandonment. This failure was also relevant to the *Montara* blowout, which occurred after production when casing cement was pumped.

The dynamic positioning officers were not trained in certain emergency procedures, including how to respond to combustible gas alarms or how to instruct the engine room to shut down the engines in those circumstances.

All companies should ensure that their emergency training includes not only the most common emergencies but also events deemed unlikely to occur.

CONTRACTOR CONTROL

When the *Deepwater Horizon* well blew out, only a handful of the 126 people on the rig worked for the operator, BP. The remainder were employed by contractors or subcontractors. Such has been the industry practice for many years. It is not necessarily a problem to use contractors, but this can create an environment where miscommunication and misunderstanding arise. The report noted that BP did not adequately supervise its contractors in several instances and most worrying was the inadequate supervision of cementing.

The report highlights other issues over the alleged quality of the cement work. It was acknowledged that BP's engineers did not review the contractors' cement work line by line and never fully used their in-house expertise. If, for example, the February 2010 test results had been properly examined, it would have been seen that the slurry had failed the foam stability test.



MONTARA

Many of the recommendations relating to the *Deepwater Horizon* casualty are relevant to the *Montara* incident.

On 21 August 2009, the *West Atlas* mobile offshore drilling unit released hydrocarbon liquids and gas from the H1-ST1 well through the *Montara* wellhead platform while carrying out a drilling and completion programme. The unit was 254 km off the northwestern Australian coast in 77 metres of water. Shortly after the initial release, the unit was evacuated. On 14 September, work began on drilling a relief well and, on 1 November, fire broke out on the wellhead platform after a relief well intercepted the leaking well. On 3 November, the fire was extinguished and the oil leak contained, but not before 400 to 1,500 bbls of oil per day had spilled into the Timor Sea. The well's blowout preventer had not yet been installed.

It is fortunate that no one was hurt as a result of the *Montara* incident. Had the blowout ignited immediately, the situation might have resembled the *Deepwater Horizon* incident. The light nature of the hydrocarbon liquids and the remote location of the well allowed the majority of the spill to disperse out to sea, although the Indonesian government has complained about the pollution impact.

Subsequent investigations, including an Australian commission, concluded that the blowout may have started with the cementing of the casing shoe at the bottom of the inner casing. It is likely that the integrity of the cement was never proven and the outcome was a 'wet shoe', with the cement contaminated by drilling or reservoir fluids. Secondary barriers ought to have been in place.

Specialists from the field and the rig operator had received daily reports on the cementing work, including an account that an experienced person could have deduced as meaning that the integrity of the cement shoe was likely to have been compromised.

The operator of the field, the Thailand-based PTTEP, issued a preliminary report that examined the probable causes of the uncontrolled hydrocarbon release. Its comments included:

- company quality assurance procedures were not applied to the procurement of well materials and equipment
- poor application of the mobile unit safety case revisions by crew
- failure to implement risk-assessed changes made to the PTTEP drilling programme
- ineffective communications between PTTEP's well construction personnel onshore and drilling supervisors on the unit, and between drilling supervisors and the operator of the unit

One of the first initiatives recommended by the company was for an independent audit, including an audit of safety-critical components and management of change systems. Within a short period after the incident, PTTEP identified basic deficiencies in its safety management and training system.

— LACK OF ACTIVE SUPERVISION

One of the key failures was neglecting to install a pressure-containing cap followed by a report to onshore management that such a cap had been installed. This raises company cultural issues, including those of supervision of offshore operations.

There was confusion over the role of senior management personnel. The well construction manager told the inquiry that he expected the cap would be reinstalled once cleaning work was completed. However, when he discovered that the cap had not been reinstalled, he did not intervene because he did not want to "teach the rig personnel their jobs".

Some major accidents have laid bare the fact that those with responsibility for process safety are marginalised by company organisational structure.

The situation on the *Montara* field was even less satisfactory in that there was no apparently effective engineering input into well operations and no well integrity assurance function. An attitude of trial and error learning in a hazardous environment such as offshore drilling means that a serious incident is only a matter of time.

The Australian commission found that the field operator had failed to comply with its well construction standards in many areas. Individuals, both offshore and onshore, made poor decisions, which stemmed from a lack of organisational competence and capacity to manage an offshore drilling operation.



CONCLUSION

One of the many dilemmas for insurers is the degree to which they can rely on regulators carrying out their activities in a diligent manner and without fear or favour. Experience shows that this is not always the case. It is becoming evident that there are few jurisdictions or authorities that can be recognised as bodies of quality. It has taken the *Deepwater Horizon* incident to motivate the US administration into bringing its regulatory compliance standards to a level comparable to those governing the North Sea sector. The *Piper Alpha* disaster in 1988 was the wake-up call that the North Sea industry needed, and it is surprising that it appears that authorities and companies in other jurisdiction have not learned from this.

There is a perception that if a problem were developing, there would be clear, obvious warnings. In fact, accidents occur for the most simple of reasons and sometimes warning signs are difficult to see.

There are many conclusions that can there be drawn from these accidents: just because you have not had a major incident does not mean that you will not have one. The following should be kept under constant review:

- the effectiveness of your safety management systems
- your safety culture
- your safety barriers
- your audit systems
- your inspection systems
- your process control systems
- your subcontractor relationships
- employee competence
- employee and contractor training
- effectiveness of that training
- management of communications
- management of change process

A further conclusion is; 'learn from your mistakes, and those of other people'. The *Deepwater Horizon* and *Montara* disasters could have been avoided if lessons had been learned from previous disasters.