Facilitating a safety culture

At the end of April, just ten days after explosion and fire erupted on Deepwater Horizon, President Obama directed the Secretary of the Interior to conduct a thorough review of the event and to report, within 30 days, on what additional precautions and technologies, if any, might be required to improve the safety of oil and gas exploration and production operations on the outer continental shelf. Carol Debell reports.

Mobile offshore drilling unit (MODU) Development Driller III prepares to drill a relief well at the Deepwater Horizon site, as the MODU Q4000 holds position over the damaged BOP. US Coast Guard photo by Petty Officer 3rd Class Patrick Kelley.

This report has now been published and is likely to have significant repercussions for the long-term future of deepsea oil exploration. In the short-term, however, it will have immediate impact on the extensive drilling operations already taking place in the Gulf of Mexico. The report recommends an immediate halt to drilling operations on the 33 permitted wells which are being drilled using floating rigs in the Gulf of Mexico – this does not include the relief wells being drilled by BP. Drilling is to stop as soon as safely practicable for a six-month period.

There is also to be a six-month moratorium on permits for new wells being drilled using floating rigs. This is to allow for the implementation of a number of recommendations outlined in the report and also give time to assess the causes of the what has become known as the "BP Oil Spill" once they have been established.

The report, which has been peer-reviewed by a team of seven experts recommended by the national Academy of Engineering, recommends a number of specific measures in three key areas. These address in particular the need to ensure sufficient redundancy in the blowout preventers (BOPs), how to ensure the integrity of the well and enhance well control, and the need to facilitate a culture of safety through operational and personnel management.

BOPs and related safety equipment

The report recommends mandatory inspection of each BOP to be used on flating drilling operations to ensure that the BOP:

Increased demand in corrosion-free pipes for deluge/sprinklers

To meet continuing high demand for the Elastopipe offshore and marine fire safety prevention system, Trelleborg has invested in increased production capacity.
Output volume has been doubled by building a completely new factory and production line inside its existing premises at Krokstadelva, 50 km/30 miles south of Oslo, Norway.
"Demand for Trelleborg's Elastopipe corrosion-proof seawater deluge system, and its many other applications including hydrocarbons and gas transport, has rocketed despite the recession," commented Thor Hegg Eriksen, President of Trelleborg Offshore Norway AS. "Contractors and operators are realising its minimal maintenance and low lifetime cost benefits, and 80% of our output is now exported."
The new 1,200 sqm/12,917sqft factory and production line took 18 months to build, and was opened in the presence of Trelleborg Group management, local politicians and dignitaries.
"Further potential is huge and in addition to the Norwegian market, Trelleborg has supplied and installed the Elastopipe system in the Netherlands, Denmark, UK, Russia, Qatar, Canada, Singapore, Brunei and Australia," added Eriksen: "New markets are also opening up in Brazil, Malaysia and Indonesia."
The advantages of Elastopipe over conventional rigid steel pipes have already made it an established solution for seawater-based deluge and sprinkler systems due to its corrosion-free and fire resistant performance with lower installation costs and reduced maintenance. Elastopipe achieves 24/7 system availability for seawater fire prevention duties with considerably less need to be offline for testing, and regular planned maintenance. This has a positive impact on safety, reducing down time and improving operating costs.

- meets manufacturer design specifications, taking into account any modifications that have been made;
- is compatible with the specific drilling equipment on the rig it is to be used on, including that the shear ram is compatible with the drill pipe to be used;
- has not been compromised or damaged from previous service;
- is designed to operate at the planned operating depth.

Certification of these requirements would be made publicly available. In addition there is a requirement for new safety features on BOPs and related back-up and safety equipment including:

- a requirement that BOPs have two sets of blind shear rams spaced at least four feet apart to prevent BOP failure if a drill pipe or drill tool is across one set of rams during an emergency;
- requirements for emergency back-up control systems;
- requirements for remote operating vehicle capabilities.

The Department is to develop new surface and subsea testing requirements to verify reliability of these capabilities.

There is also to be an overhaul of the testing, inspection and reporting requirements for BOP and related backup and safety equipment to ensure proper functioning including new means of improving transparency and providing public access to the results of inspections and routine reporting.

Well control systems

There are a number of key recommendations which include the development of enhanced deepwater well-control procedures and the verification of a set of new safeguards that must be in place prior to displacement of kill-weight drilling fluid from the well bore. The report also recommends that new design, installation, testing operations and training requirements should be established relating to casing, cement or other elements that comprise an exploratory well. Plus there is a recommendation that there should be a comprehensive study of methods for more rapid and effective response to deepwater blowouts.

Systems-based approach to safety

In addition to enhanced requirements to improve organisational and safety management for companies operating offshore drilling rigs and new rules requiring offshore operators to have in place a comprehensive, system-based approach to safety and environmental management, the report recommends immediate, enhanced enforcement of current regulations. It says that this should be through verification, within 30 days, of compliance with the April 30, 2010 National Safety Alert.

The report makes it clear that the purpose of the review was to recommend immediate measure to improve safety of offshore drilling activities and that it was undertaken without the benefit of knowing what exactly happened on Deepwater Horizon. When the investigation into the causes of the BP Oil Spill is complete, further recommendations may well be forthcoming.

A safer way to search and recover, by Saab Seaeye MD Dave Grant

In the offshore oil and gas industry remotely operated vehicles (ROVs) are a vital tool for the inspection of a rig structure following a catastrophic fire. Powerful thrusters will hold the vehicle steady in strong cross currents whilst inspection is underway using the ROVs onboard video cameras and lighting. Debris can be cleared using manipulators along with disc and cable cutters. It also plays a key role in diver safety. If it is necessary for a diver to be deployed, the ROV can pinpoint the area of interest and direct the diver to the location, saving dive time and hazardous searches. A watchful eye can be kept over the diver as he works, through the ROV's onboard camera.

In Thailand, divers had the dangerous task of descending into deep tunnels at hydro-electric plants for emergency investigation. Now an ROV can work safely and tirelessly for as long as it takes to complete the task. A key factor for using an ROV is that it can go deeper than a diver, can stay longer underwater and do more. The Saab Seaeye Cougar XTi for instance, can reach depths of 3,000 metres and operate powerful and specialist tools for both delicate and heavy work.

The Russian Navy has in place a rapid response, air transportable rescue system – in particular to assist stricken submariners. They have fitted a Seaeye Panther Plus with an acoustic tracking system, sonar and a full suite of colour and low-light black and white video cameras. Two manipulators are included, together with an eight inch rotary disc cutter and hydraulic guillotine with a capacity to cut up to 38mm wire rope to assist with debris clearance. The ROV can also insert emergency life support stores into a distressed submarine and connect communication systems for the crew whilst awaiting rescue.

Modern ROVs range from compact vehicles that are easily manhandled into the water, to larger, more powerful vehicles capable of heavy-duty work. Although the ROVs come with a range of equipment fitted as standard, such as cameras and manipulators, specialist tooling skids can be easily changed during operations. This is made possible through an intelligent electronics system with a 'plug and go' simplicity that allows up to 128 devices to be added and changed.

Video acquired by a remotely operated vehicle is monitored and recorded onboard the motor vessel Viking Poseidon. The video display shows a small pollution containment chamber, known as the "top hat," being lowered into the Gulf of Mexico by the motor vessel Viking Poseidon, May 11, 2010. The chamber was used in an (unsuccessful) attempt to contain the oil leak that was caused by the Deepwater Horizon explosion. US Coast Guard photo by Petty Officer 3rd Class Patrick Kelley.