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Deep-water drilling remains a risky business

Donald Boesch argues that the lessons learned from the Deepwater Horizon oil spill should be enshrined in legislation before they fade from memory.

Two years after the blowout of the BP oil well drilled by the Deepwater Horizon rig in the Gulf of Mexico, the United States is largely failing to act on the lessons learned from that experience to ensure that deep-water drilling and production is safe and environmentally compatible. In particular, the US Congress has not enacted any legislation to improve safety and protect the environment. Meanwhile, high oil prices are stimulating the expansion of drilling into ever deeper waters in the Gulf of Mexico, as well as off Brazil, Africa and Europe. Drilling is also proceeding in shallower, but ice-prone, regions of the Arctic, including the Beaufort and Chukchi seas off Alaska.

I am one of two scientists who served on the US president's commission that produced the report *Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling* — the other was Cherry Murray of Harvard University. The commission concluded that the root causes of the blowout and explosion were deficiencies in regulatory oversight and multiple poor decisions made in the absence of a comprehensive risk-management system. Other investigations into the disaster essentially agreed.

We were impressed by the technologies developed to produce hydrocarbons from ever deeper, more highly pressured formations, but surprised by the lack of sophistication in techniques for detecting and controlling risk, containing the flow of hydrocarbons, collecting spilled oil and protecting vulnerable resources. For example, 'down-hole' events — those taking place deep below the seabed — are often inferred from indirect measurements of pressure and volume rather than measured with state-of-the-art *in situ* sensors of the type used in geophysical research and other industries.

Cement formulation, testing and placement — major factors in the blowout — seem to be more of an art than a science. Cementing is also central to debates on the increased recovery of hydrocarbons by hydrofracturing, because it is critical both to limiting fugitive emissions of methane and to preventing contamination of shallower aquifers.

The 2010 accident showed that no operating company in the world had the capacity to rapidly contain a deep-water blowout. It took months of seat-of-the-pants engineering to build and deploy a capping stack that provided effective containment. Confusion reigned over the fate of the oil and gas released 1,500 metres below the surface, largely because of a lack of understanding of the operating environment, including the direction and speed of water currents, and the behaviour of hydrocarbons released at depth.

There have been some positive responses to the Deepwater Horizon experience. The US Department of the Interior (DOI) temporarily suspended deep-water drilling in the Gulf until

new safeguards, including a demonstrated capacity to contain blowouts, were put into place. The DOI also reformed its management and oversight of offshore oil and gas development, separating safety regulation from developmental decision-making, and has established a new safety and environmental management system.

The oil industry, in addition to developing the needed containment capacity, has improved its safety processes. The American Petroleum Institute, the industry body, has created a Center for Offshore Safety and named Charlie Williams, a seasoned and respected scientist from Royal Dutch Shell, to head it. We shall see whether this new centre can develop the planned third-party audit process and if the industry, working with the DOI, will advance cutting-edge research and development (R&D) of safety technology.

BP has funded an independently managed Gulf Research Initiative to support longer-term research on the impacts of the Deepwater Horizon oil spill. Through this, and the natural resources damage assessment being conducted by state and federal agencies, we will learn much about the fate and the effects of the hydrocarbons released during the blowout. And a task force established by President Barack Obama has developed the first phase of a Gulf of Mexico Regional Ecosystem Restoration Strategy to address the long-term degradation of Gulf ecosystems, some of it due to the 60-year history of oil and gas development in the region.

Unfortunately, the US Congress — caught up in partisan rancour, including debates about expanding offshore oil drilling — has failed to adopt legislation to address the lessons learned and the recommendations of the oil-spill commission and others. Such legislation should codify the executive reforms mentioned earlier into law, increase liability limits, and dedicate sustained funding for oil-spill research and environmental assessment and monitoring.

Even in the current constrained fiscal circumstances, improved oversight and essential R&D could be supported by industry fees amounting to pennies per barrel, imperceptible within the daily fluctuations in price on the world market or at the pump.

New laws were passed within a year of the 1989 *Exxon Valdez* spill in Alaska. If important lessons are not to be lost as the events of 2010 fade from memory, there is a pressing need to change the law to make such accidents less likely, and our response more effective. ■

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