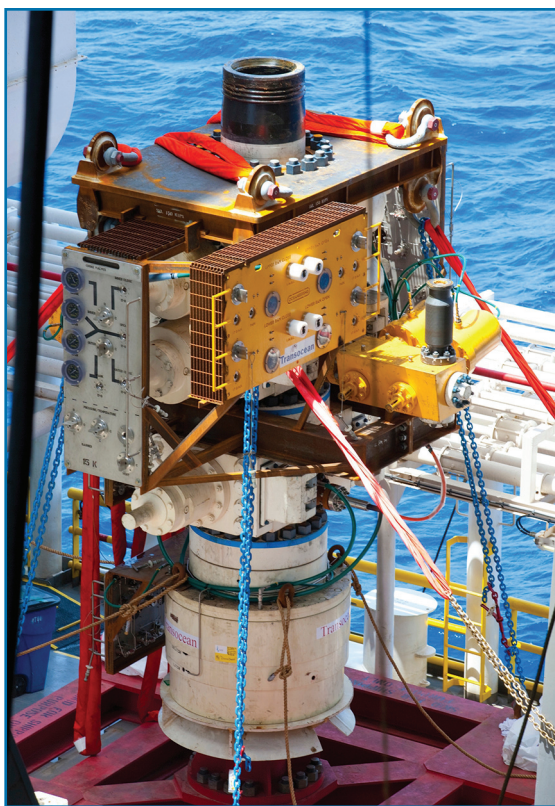


BP's Deepwater Horizon Oil Spill

by Richard Pallardy

The explosion on April 20, 2010, of energy giant BP's Deepwater Horizon oil rig in the Gulf of Mexico, coupled with its sinking on April 22, led to the largest accidental marine oil spill in history. The rig was located about 66 km (41 mi) off the coast of Louisiana. The ecological and economic fallout was immense, with numerous jobs, species of wildlife, and communities affected by the spill.

The Explosion. The Deepwater Horizon rig, owned and operated by offshore-oil-drilling company Transocean and leased by BP, was situated in the Macondo oil prospect in the Mississippi Canyon, a valley in the continental shelf. The oil well over which it was positioned was located on the seabed 1,522 m (4,993 ft) below the surface and extended approximately 5,486 m (18,000 ft) into the rock. On the night of April 20, a surge of natural gas blasted through a cement cap that had recently been installed to seal the well for later use. The gas traveled up the rig's riser to the platform, where it ignited, killing 11 workers and injuring 17. The rig capsized and sank on the morning of April 22, rupturing the riser, through which drilling mud was normally injected in order to counteract the upward pressure of oil and natural gas. Without the opposing force, oil began to discharge into the Gulf. The volume of oil escaping the damaged well—originally estimated by the U.S. Coast Guard at about 1,000 bbl per day—



On July 12, nearly three months after the explosion and sinking of energy giant BP's Deepwater Horizon offshore oil rig in the Gulf of Mexico, this containment cap was lowered to the seabed and installed on the gushing wellhead to finally end the massive crude oil leak.

was thought by U.S. scientists and engineers to have peaked at more than 60,000 bbl per day.

Leaking Oil. Although BP attempted to activate the rig's blowout preventer (BOP), a fail-safe mechanism designed to close the channel through which oil was drawn, the device malfunctioned. Efforts in May to place a containment

dome over the largest leak in the broken riser were thwarted by the buoyant action of gas hydrates—gas molecules trapped in an ice matrix—which formed when natural gas and cold water combined under high pressure. After an attempt to employ a “top kill,” whereby drilling mud was pumped into the well to stanch the flow of oil, also failed, BP turned in early June to an apparatus called a lower marine riser package (LMRP) cap. The damaged riser was shorn from the LMRP—the top segment of the BOP—and the cap was lowered into place. Though fitted loosely over the BOP, allowing some oil to escape, the cap enabled BP to siphon approximately 15,000 bbl per day to a tanker. The addition of an ancillary collection system comprising several devices, also tapped into the BOP, increased the collection rate by approximately 25,000 bbl a day.

In early July the LMRP cap was removed for several days so that a more permanent seal could be installed; this capping stack was in place by July 12. Though the leak had slowed before it was successfully capped, a government-commissioned panel of scientists estimated that 4.9 million bbl had already leaked from the well, of which about 800,000 bbl had been captured. On August 3 BP conducted a “static kill,” a procedure in which drilling mud was pumped into the well through the BOP. Though similar to the failed top kill, mud could be injected at much lower pressures during the static kill because of the stabilizing influence of the capping stack.

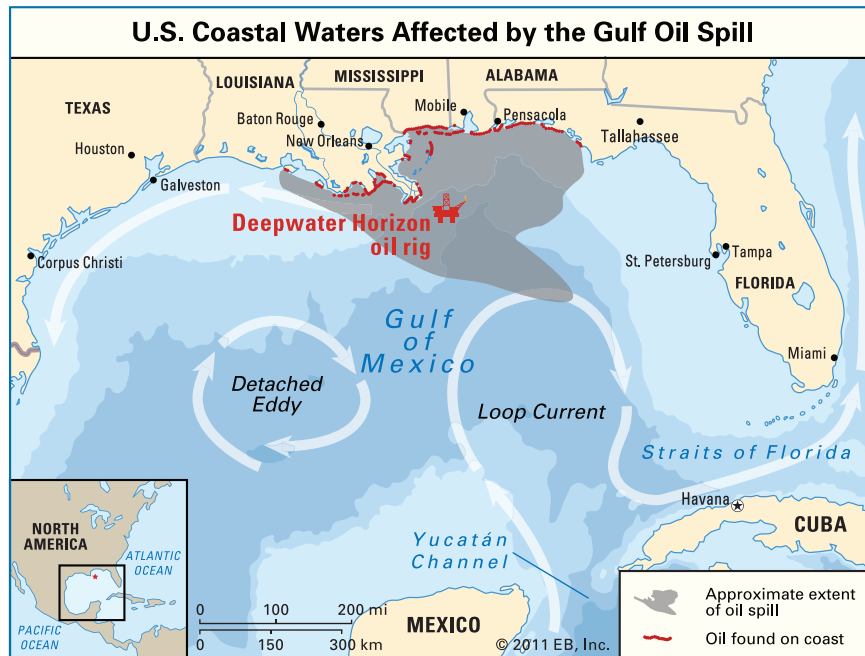
The defective BOP and the capping stack were removed in early September and replaced by a functioning BOP.

The success of these procedures cleared the way for a “bottom kill,” which was considered to be the most likely means of permanently sealing the leak. This entailed pumping cement through a channel—known as a relief well—that paralleled and eventually intersected the original well. Construction of two such wells had begun in May. On September 17 the bottom kill maneuver was successfully executed through the first relief well. The second, intended to serve as a backup, was not completed. Two days later, following a series of pressure tests, it was announced that the well was completely sealed.

In May claims by several research groups that they had detected large subsurface plumes of dispersed microscopic oil droplets were initially dismissed by BP and the National Oceanic and Atmospheric Administration (NOAA). In June, however, it was verified that the plumes existed and had come from the Deepwater spill. Their presence cast doubt on earlier predictions about the speed with which the discharged oil would dissipate.

Cleanup Efforts. The petroleum that had leaked from the well formed a slick extending over thousands of square kilometres of the Gulf of Mexico. To clean oil from the open water, dispersants—substances that emulsified the oil, thereby allowing for easier metabolism by bacteria—were pumped directly into the leaks and applied aerially to the slick. Booms to corral portions of the slick were deployed, and the contained oil was then siphoned off or burned. As oil began to contaminate Louisiana beaches in May, it was manually removed; more difficult to clean were the state’s marshes and estuaries, where the topography was knit together by delicate plant life. By June oil and tar balls had made landfall on beaches of Mississippi, Alabama, and Florida.

Thousands of birds, mammals, and sea turtles were plastered with oil. Birds were particularly vulnerable to the effects; many perished from ingesting oil as they tried to clean themselves or because of the substance’s interference with their ability to regulate their body temperatures. The brown pelican, recently delisted as an endangered species, was among the species most affected. Animals found alive were transported to rehabilitation centres



Scientists noted that the prevailing paths of the Gulf of Mexico’s Loop Current and a detached eddy located to the west kept much of the oil from reaching shore.

and, after they had been cleaned and medically evaluated, were released in oil-free areas. The fragile larvae of the many fish and invertebrates that spawned in the Gulf were also likely to be affected.

The various cleanup efforts were coordinated by the National Response Team, a group of government departments and agencies headed by the Department of Homeland Security. BP, Transocean, and several other companies were held liable for the millions of dollars in costs accrued. The National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, formed by U.S. Pres. Barack Obama in May, faulted the Obama administration’s response to the spill in a report issued in October. In December the Justice Department sued BP, along with other companies involved in the disaster, in New Orleans civil court. The commission’s final report, issued in January 2011, attributed the spill to lack of regulatory oversight by the government and negligence and time-saving measures by BP and its partners.

Human Impacts. Economic prospects in the Gulf Coast states were dire, as the spill affected many of the industries upon which residents depended. More than one-third of federal waters in the Gulf were closed to fishing at the peak of the spill because of fears of con-

tamination. A moratorium on deepwater drilling, enacted by the Obama administration despite a district court reversal, left an estimated 8,000–12,000 people temporarily unemployed. Few travelers were willing to face the prospect of petroleum-sullied beaches, and those who depended on tourism were left struggling to supplement their incomes. Following demands by President Obama, BP created a \$20 billion compensation fund for those affected by the spill.

As oil dispersed, portions of the Gulf began reopening to fishing in July, and by October the majority of the closed areas had been judged safe. The drilling moratorium, initially set to expire in November, was lifted in mid-October.

The emergence of BP’s British chief executive, Tony Hayward, as the public face of the oil giant further inflamed public sentiment against the embattled company. Deemed by one publication “the most hated—and most clueless—man in America,” Hayward was derided for his alternately flippant and obfuscating responses in media interviews related to the spill and while testifying before the U.S. Congress. He was replaced in October by American Robert Dudley.

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