

# SWOOSH, BOOM AND RUN AS OIL RIG BLAST DEVASTATES GULF

BY MARK BARRATT-BOYES



A bubble of methane gas that escaped and shot up the drill column triggered the blast that sank the *Deepwater Horizon* oil rig off the coast of Louisiana on April 20 and created what is currently the third-largest marine oil spill in the world.

The gas expanded quickly as it burst through several seals and barriers, including a blowout preventer, before exploding, according to interviews with rig workers.

While the cause of the explosion is still under investigation, the sequence of events provides the most detailed account of the blast, which killed 11 workers and touched off an underwater gusher that has poured at least 3.5 million barrels (556.5 million litres) of crude oil into the Gulf of Mexico. (Note: A 380m TI class supertanker has a cargo capacity of 3.16 million barrels.)

The oil has drifted ashore along many parts of the gulf, devastating coastal ecosystems and killing or crippling sea and marine life. Mexico entered the fray on June 10, saying it expects oil from the well to reach its shores by December. Vast quantities also remain suspended underwater in the thermal incline and could be churned up by a hurricane, with the season already underway, causing more devastation.

Several BP executives were on board the *Deepwater Horizon* rig celebrating the project's safety record, according to the crew transcripts, while far below, the rig was being converted from an exploration well to a production well.

It is believed the drill workers set and then tested a cement seal at the bottom of the well. They reduced the pressure in the drill column and attempted to set a second seal below the sea floor. A chemical reaction caused by the setting cement created heat and the gas bubble which destroyed the seal.

The blowout preventer, a last line of defence, includes a set of rams that can slice through the pipes and cap a blowout. The *Deepwater Horizon* was also equipped with an automated backup system called a Deadman. It should have activated the blowout

preventer even if workers could not. Based on the interviews with the rig workers, none of those safeguards worked.

Up on the rig, the workers noticed the sea water in the drill column suddenly shooting back at them, rocketing 73m into the air. Drill rig labourers call these blowouts "Swoosh, boom, run. The swoosh is the gas, the boom is the explosion and run is what you better be doing."

The first explosion occurred when the gas flooded into an adjoining room with exposed ignition sources. A series of explosions subsequently ignited the oil coming from below.

According to one interview transcript, a gas cloud covered the rig, causing giant engines on the drill floor to run too fast and explode. The engines blew off the rig and set "everything on fire." Another explosion below blew more equipment overboard.

The BP executives were injured but survived, according to one account. Nine rig crew on the rig floor and two engineers died. "The furniture and walls trapped some and broke some bones but they managed to get in the lifeboats with assistance from others."

BP spokesman John Curry would not comment on what caused the accident. "Clearly, what happened on the *Deepwater Horizon* was a tragic accident. We anticipate all the facts will come out in a full investigation."

As of June 10, BP says it is working on improving its sub-sea collection system at the leaking well site. The containment cap installed on June 3 continues to collect oil and gas flowing from the leaking well (which BP prefers to refer to less emotively as the MC252 well) and transport it to the *Discoverer Enterprise* drill ship on the surface, said the website MarineLog.

On June 8, about 15,000 barrels of oil were collected and 832,515cu m of natural gas flared. That's a good amount of oil, but it's easy to see from BP's webcam that essentially the cap is something of a "Rube Goldberg" arrangement and still leaves copious amounts of oil spewing out.

On June 10, US government scientists said they had doubled

their estimate of the amount of oil gushing out, and the flow rate could be from 20,000 barrels to as high as 40,000 barrels, or 6.36 million litres, per day.

Behind the public relations facade, probably no-one is less pleased with the cap than the people who put it together and enhancements are in the works. However, nothing is instant, especially when working in water depths of 1525m, and BP is assembling a fleet of special vessels to deal with the oil and gas when it reaches the surface.

Some of the key vessels in the current fleet include the *Discover Enterprise* drill ship and the 110,000-barrel Moran barge *Massachusetts*, which is lightering fuel from the *Discover Enterprise*.

The first planned addition to the cap system will use the hoses and manifold deployed for the "top kill" operation to take oil and gas from the failed blow-out preventer through a separate riser to the *Q4000* vessel on the surface, in addition to the cap system.

The *Q4000*, which has been involved in the response for some time, is operated by Helix Energy Solutions Group and was delivered in 2002 by the Keppel AmFELS shipyard in Brownsville, Texas. The *Q4000* has a unique column-stabilised semi-submersible design that combines dynamically positioned station-keeping with a large deck space, significant deck load capacity and a high transit speed of 12 knots.

She provides a stable platform for a wide variety of tasks, including sub-sea completion, decommissioning and coiled tubing deployment, and was specifically designed for oil well intervention and construction in deep water.

The second planned addition is intended to provide a more permanent containment cap system by directing the oil and gas to a new free-floating riser ending approximately 90m below sea level. It is then proposed to attach a flexible hose to a containment vessel, the *Toisa Pisces*. This long-term option, which is expected to be operating in early July, is designed to permit more effective disconnection and reconnection of the riser to provide the greatest flexibility for operations during a hurricane.

Oil collected by the *Toisa Pisces*, a well test and servicing vessel, will be transferred to a shuttle tanker, the *Loch Rannoch*, operated by BP. The *Toisa Pisces* was due to arrive at the spill site around June 19 and the *Loch Rannoch* around June 12-15.


As the response to the *Deepwater Horizon* oil spill continues on multiple fronts, BP earlier announced it would commit up to US\$500 million to an open research programme studying the impact of the incident and its associated response on the marine and shoreline environment of the Gulf of Mexico.

Drilling of the first relief well, which began on May 2 continues, as does drilling of a second relief well, begun on May 16. Each of these wells is estimated to take some three months to complete from the commencement of drilling.

Work continues to collect and disperse oil that has reached the surface of the sea. Over 1100 vessels are involved in the response effort, including skimmers, tugs, barges and recovery vessels.

Over 250km of protective booms have been laid to try and prevent oil from reaching the coast and more than 22,000 personnel from BP, other companies and government agencies are involved in the response. Over 23,000 claims have been filed and 9000 already paid.

BP says it has spent about US\$1.43 billion on the spill, including containment, relief well drilling, grants to the states in the Gulf of Mexico, claims paid and federal costs.

"BP has made a commitment to doing everything we can to lessen the impact of this tragic incident," said the chief executive of BP, Tony Hayward. "We must make every effort to understand that impact. This will be a key part of the process of restoration, and for improving the industry response capability for the future." 



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