



Chapter 3 | Background on the Macondo Well, the *Deepwater Horizon*, and the Companies Involved

The Macondo Well

Well Location

In February 2009, BP filed an exploration plan with the United States Minerals Management Service (MMS) indicating its intention to drill two exploration wells in Mississippi Canyon Block 252 (MC 252). Both wells were located 48 miles from shore in 4,992 feet of water, and both would be drilled to a total depth of 20,600 feet below sea level.¹ BP planned to drill both using a semi-submersible drilling rig. BP stated that it would take 100 days to drill each well and that it would begin the first well on April 15, 2009, and the second well one year later on April 15, 2010.

MMS approved BP's Exploration Plan in early April 2009. BP later revised the plan slightly in mid-April 2009 to include a larger anchor pattern for its rig, and MMS approved the revised plan on April 21, 2009. MMS approved BP's application for permit to drill (APD) the first of the two wells, the "A" location, on May 22, 2009.²

BP would drill the well in order to reach the Macondo prospect. The name "Macondo" was the result of a charitable donation. BP had donated naming rights to the United Way, which in turn auctioned the rights to a Colombian-American group. That group chose the name of the fictional Colombian village in Gabriel García Márquez's novel *One Hundred Years of Solitude*.³

The Geology and Exploration Objectives

BP had decided to drill at Macondo after examining 3-D seismic data, offset well data, and other information about the area. The 3-D data had included a prominent "amplitude anomaly" that suggested the presence of hydrocarbon-bearing sands. This information, combined with offset well data and knowledge of the overall geological structure of the area, strongly suggested to BP that it might find hydrocarbon-bearing sands.⁴

BP defined its primary geologic objectives as mid-Miocene age turbidite sands buried 13,000 to 15,000 feet beneath the seafloor—18,000 to 20,000 feet below sea level. These sands were deposited on the ancient seabed some 12 million to 15 million years ago. BP's plan called for drilling the well to a total depth of 20,600 feet to penetrate this primary objective interval. From the beginning, BP planned to use the well as a long-term production well if it penetrated the objective sands.

Operators are not required to include pre-drilling estimates of potential oil and gas reservoirs. However, during the containment efforts following the blowout of the Macondo well, BP estimated the volume of oil at Macondo to be 110 million barrels.⁵

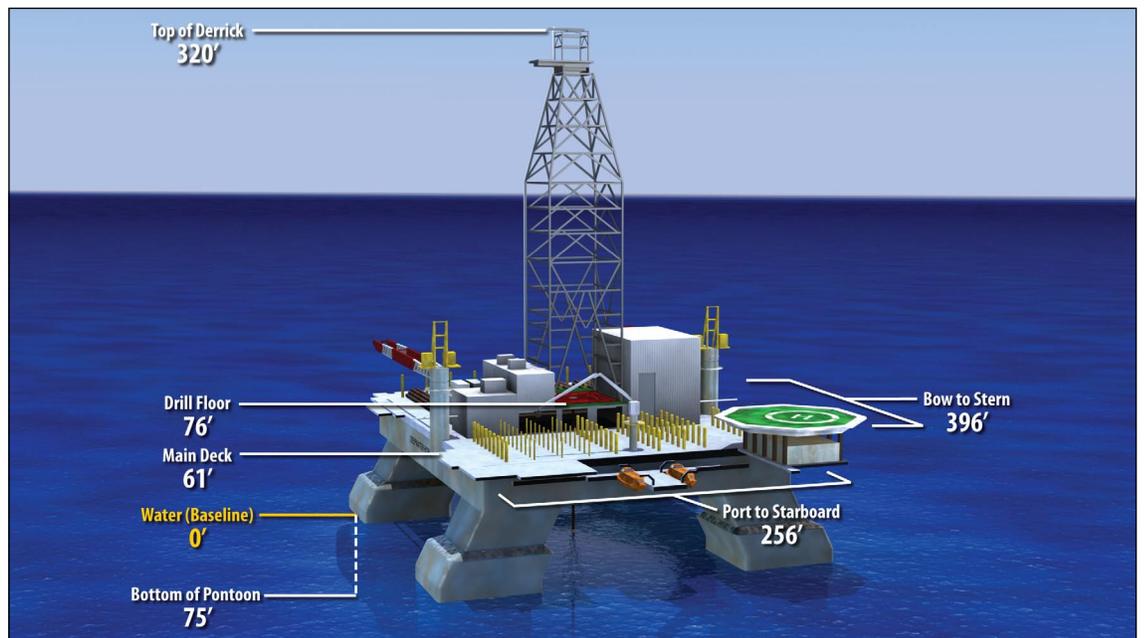
The *Deepwater Horizon*

BP had intended to use Transocean's *Marianas* to drill the entire Macondo well. The *Marianas* spudded the Macondo well on October 6, 2009. The crew of the *Marianas* drilled and set casing for the first 9,090 feet of the Macondo well but were forced to leave after the rig sustained damage from Hurricane Ida on November 9, 2009. The *Deepwater Horizon* took over and resumed drilling operations at Macondo in February 2010.

The *Deepwater Horizon* was a semi-submersible **mobile offshore drilling unit (MODU)**. Unlike fixed drilling platforms used in shallower water, MODUs can move from one location to another under their own power. Dynamically positioned MODUs utilize **dynamic satellite positioning technology** connected to powerful directional **thrusters** to maintain themselves in place over a subsea wellhead.

The *Deepwater Horizon* entered service in 2001. It was built by Hyundai Heavy Industries and owned by Transocean. It initially sailed under the flag of Panama and later the Marshall Islands. In 1998, BP signed a contract with Transocean securing the services of *Deepwater Horizon* from the time it first left the shipyard for a period of three years.⁶ After the initial three years, BP extended the contract in annual increments.⁷ At the time of the blowout, BP's contract required it to pay \$533,495 per day, but under the contract BP was not obligated to pay for time in excess of 24 hours each month spent on certain equipment repairs.⁸ With additional costs (fuel, expendables, and services), BP was paying approximately \$1 million per day to operate the *Horizon*.⁹

Figure 3.1. *Deepwater Horizon*.



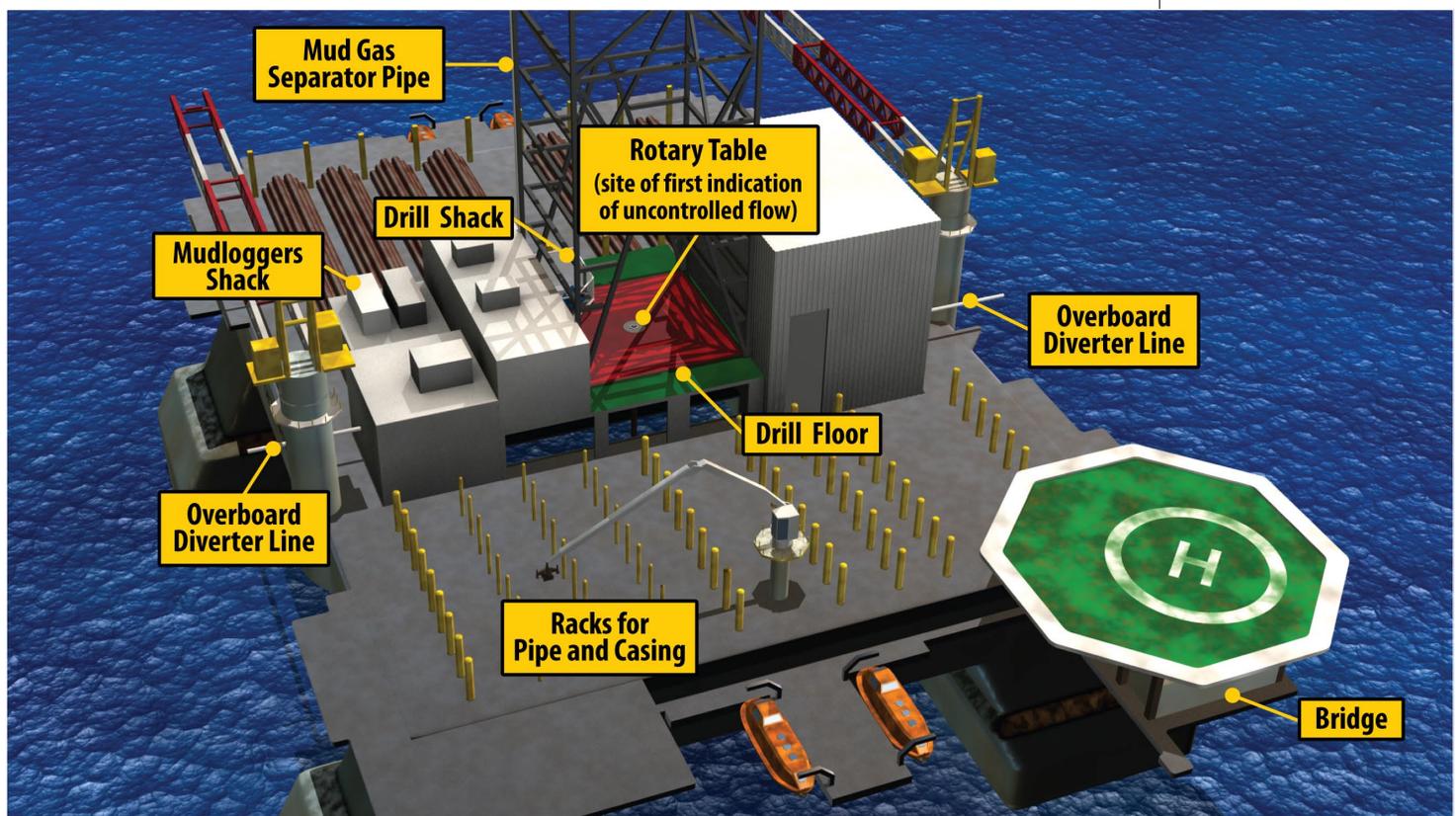
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Figure 3.1 shows the basic dimensions of the *Deepwater Horizon* while drilling. The rig was 256 feet wide (from port to starboard) and 396 feet long (from bow to stern). The **main deck** sat 61 feet above the water's surface while drilling, with the **drill floor** another 15 feet above that. The **derrick** was 244 feet tall, towering a total of 320 feet above the ocean while drilling.

Figure 3.2 is a close-up of the main deck with pertinent parts labeled in yellow. The **drill floor** was located in the center of the main deck. The crew ran casing, drill pipe, and drilling tools through the **rotary table**, down the riser, and into the well. The **drill shack** was on the drill floor. It was a small windowed room that housed the drillers' and assistant drillers' chairs, along with well monitoring equipment and controls for the blowout preventer. The drillers and assistant drillers drilled and monitored the well from the drill shack.

The **mudloggers shack** was a structure installed on the starboard side of the drill floor. It was owned by Sperry Drilling and housed the mudloggers and their monitoring equipment. The **bridge** was located beneath the helipad on the front port (left) side of the rig. The bridge contained the dynamic satellite positioning system and was the helm of the rig when in transit. It also housed monitors and controls for the alarm systems, a second set of controls for the blowout preventer, and other rig and well monitoring equipment.

Figure 3.2. Main deck.

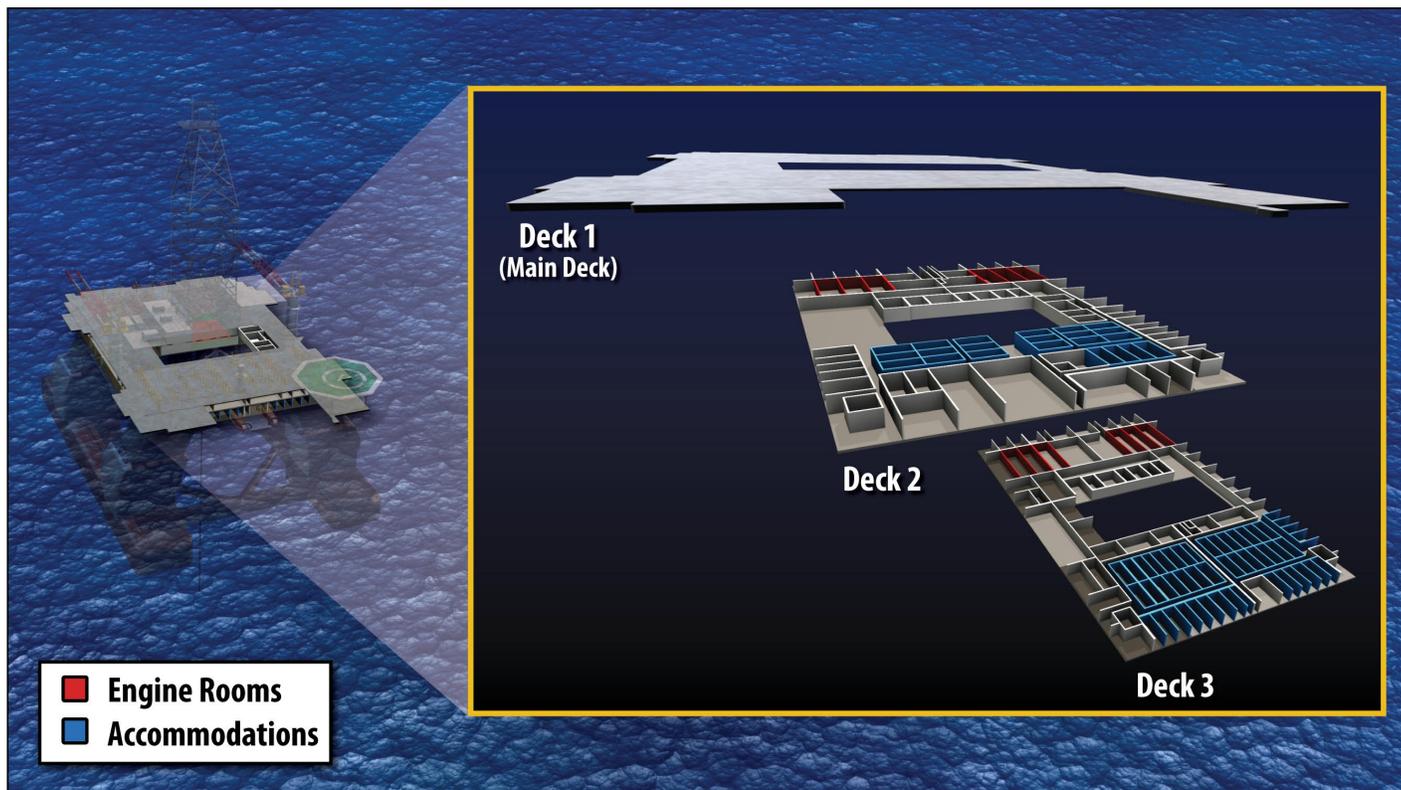


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Two sets of pipes are also shown in Figure 3.2. The first comprises the port and starboard **overboard lines**, through which the rig crew could send fluids flowing up from the well overboard into the ocean. The second is the **mud gas separator pipe**, through which the rig could route mud returning from the well to remove small amounts of hydrocarbon gas before sending the mud on to the **mud pits**. The overboard lines and mud gas separator were part of the rig's **diverter system**, which provided the crew two alternative routes for diverting fluids coming up from the well.

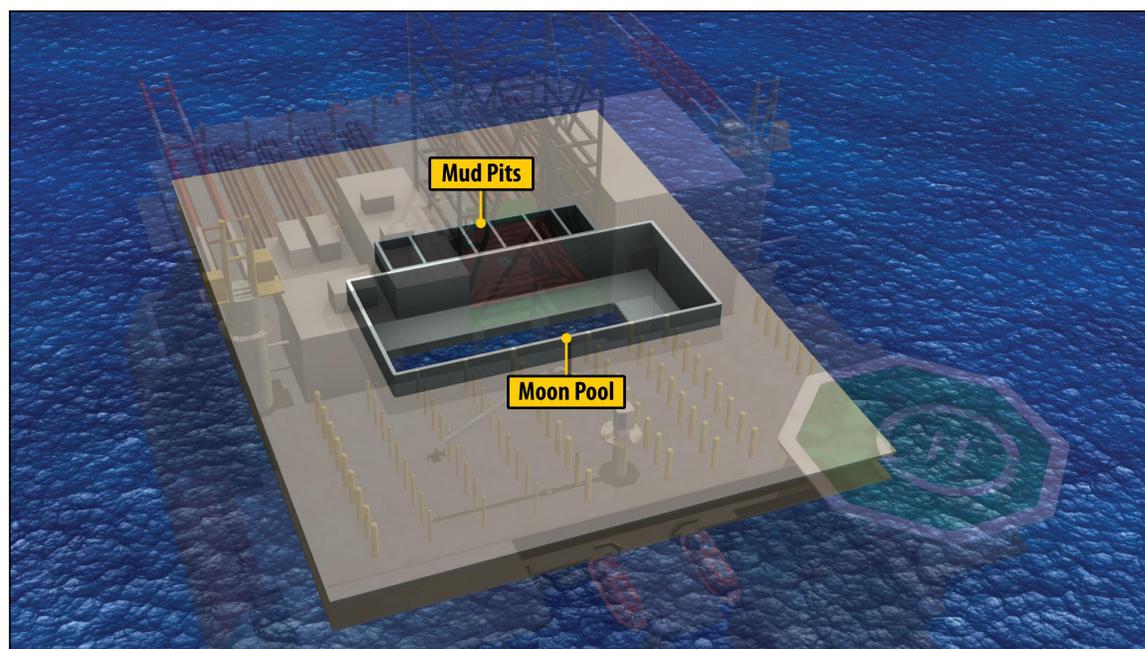
Figure 3.3 shows the *Deepwater Horizon's* three decks. Decks 2 and 3 housed the rig's living quarters, engine rooms, and other work areas, including the mud pits and moon pool shown in Figure 3.4. The *Deepwater Horizon* had 20 **mud pits**, which were tanks for holding drilling fluids such as mud. The **moon pool** was located directly beneath the drill floor. It was a wide opening in the bottom of the rig through which the crew could lower and raise large pieces of equipment to and from the ocean, such as the blowout preventer.

Figure 3.3. Decks.



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Figure 3.4. Mud pits and moon pool.



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Figure 3.5. Subsurface portion of the *Deepwater Horizon*.

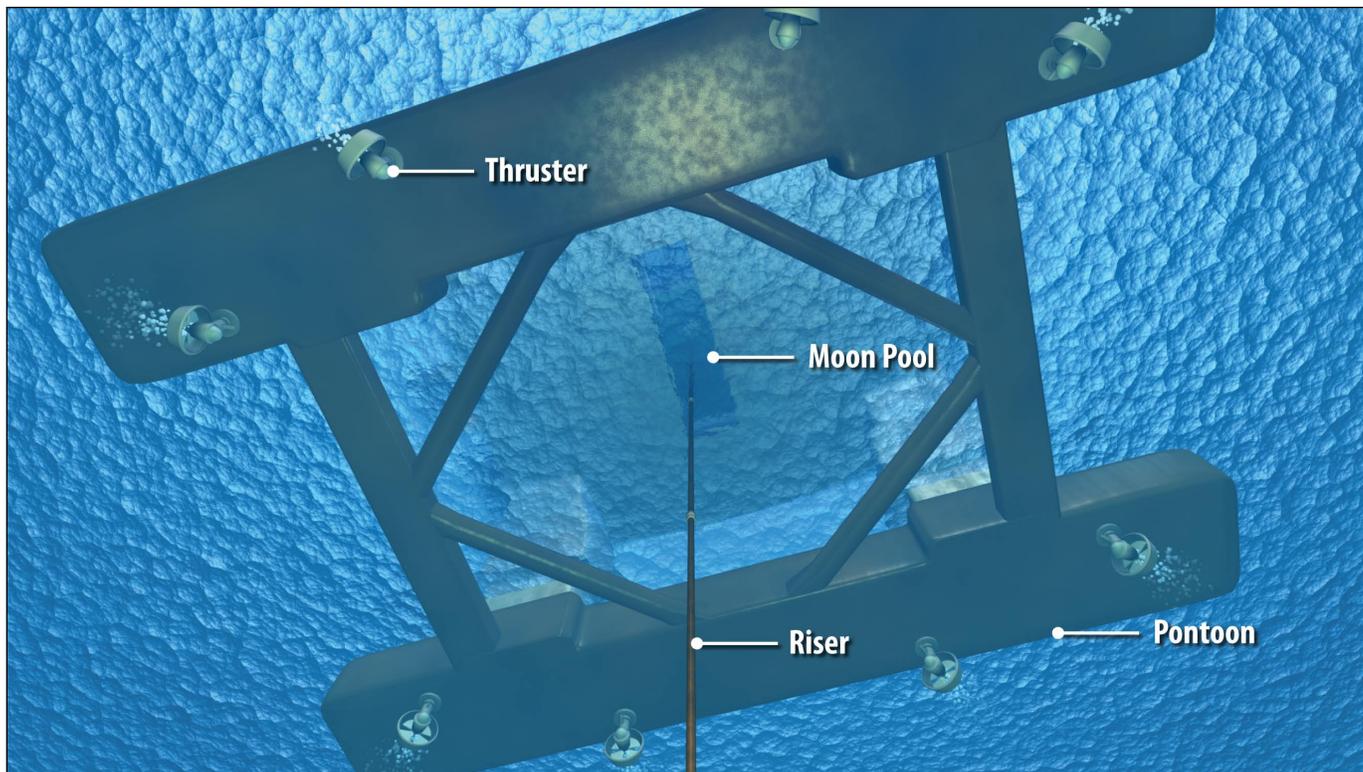
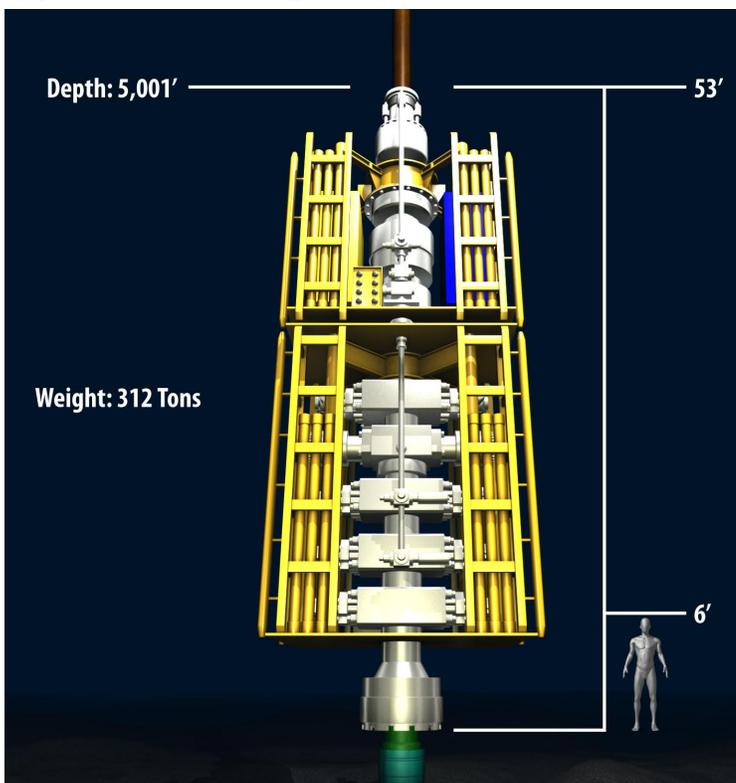


Figure 3.6. Blowout preventer.



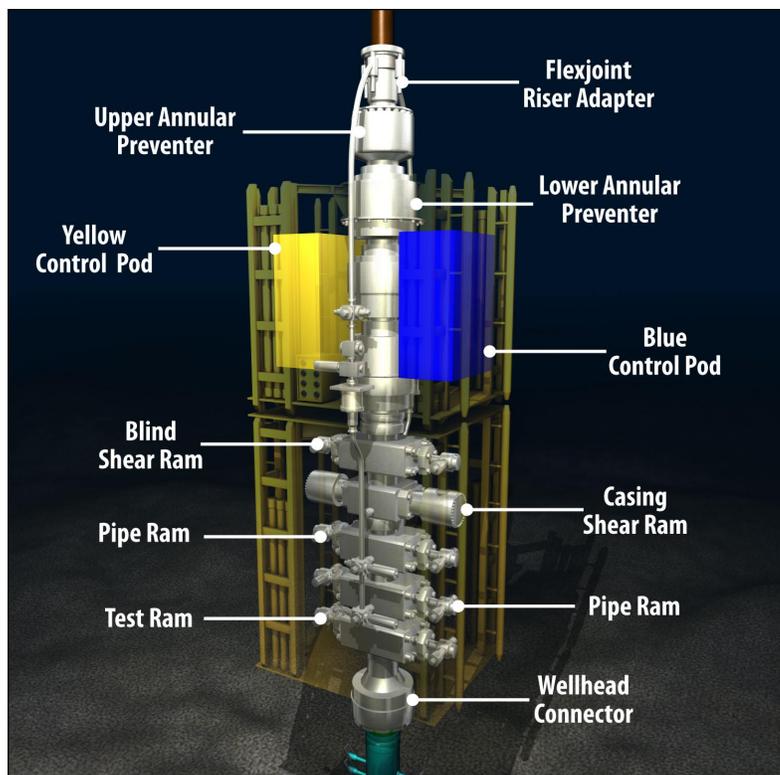
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Figure 3.5 depicts the subsurface portion of the *Deepwater Horizon*. The rig sat atop two enormous **pontoons** extending 30 feet below the ocean’s surface that stabilized the rig and kept it afloat. The rig had eight directional **thrusters** for propulsion and to keep the rig in place over the wellhead. Figure 3.5 also depicts the **riser**, which would have extended from the rotary table on the drill floor through the moon pool and down to the blowout preventer on the ocean floor.*

Figures 3.6 and 3.7 depict the *Deepwater Horizon*’s **blowout preventer (BOP)** sitting atop the wellhead on the ocean floor. As discussed in [Chapter 2](#), the

* Although not separately depicted in Figures 3.5 and 3.6, there are hydraulic, power, and communications lines (cables), as well as the choke, kill, and boost lines (pipes) running from the rig to the blowout preventer.

Figure 3.7. Blowout preventer.

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blowout preventer comprised a set of five vertically stacked **rams** and two vertically stacked **annular preventers** for closing in the well during routine well activities and emergency situations. As shown in Figure 3.6, the blowout preventer was more than five stories tall and weighed more than 300 tons. Figure 3.7 displays the various parts of the blowout preventer, including the blue and yellow **control pods**.

Companies and Individuals Involved in the Macondo Blowout

By purchasing the rights to drill in Block 252, BP became the legal **operator** for any activities on that block. Like most operators, however, BP neither owned the rigs that drilled Macondo nor “operated” them in the normal sense of the word.

Instead, the company’s shore-based engineering team designed the well and specified in detail how it was to be drilled. BP employed a number of contractors to perform the physical work of actually drilling and constructing the well. As a result, on the day of the Macondo blowout, only seven of the 126 individuals on the rig were BP employees.¹⁰ The following sections list the core members of BP’s team as well as the principal contracting companies and their key employees.



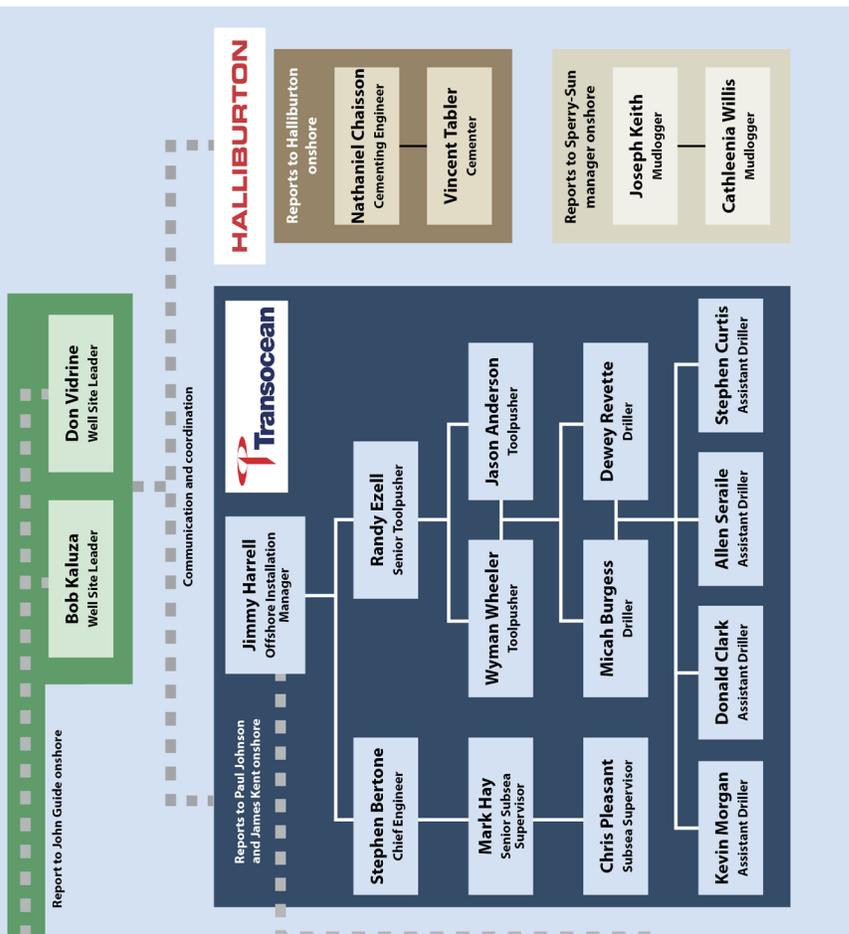
BP is a large oil and gas company headquartered in the United Kingdom. With annual revenues of approximately \$246 billion, BP is the world’s fourth-largest company of any kind.¹¹ It is the world’s third-largest energy company¹² and the largest producer of oil and gas in the Gulf of Mexico.¹³ BP held more than 500 lease blocks in the Gulf of Mexico, and more than 1,600 employees worked for BP in the region.¹⁴

A number of different individuals and groups at BP had a hand in designing and supervising the construction of the Macondo well. The initial design of the Macondo well involved more than 25 professionals, ranging from drilling engineers to regulatory experts.¹⁵ During the drilling of the well, reports about operations on the rig went out to about 80 BP employees and contractors.¹⁶

Daily activity at Macondo centered on a handful of BP employees (see Figure 3.8). BP had two well site leaders on the *Deepwater Horizon* at any given time. In Houston, BP had a wells team leader, an engineering team leader, an operations engineer, and two drilling engineers.

BP was in the process of reorganizing its management structure at the time of the blowout to clarify reporting relationships for engineers. The reorganization complicates the task of identifying the precise lines of authority and areas of responsibility, both at the time of and in the months leading up to the blowout. In addition, because of the reorganization, many of the

Rig Crew Organizational Chart



Onshore Organizational Chart

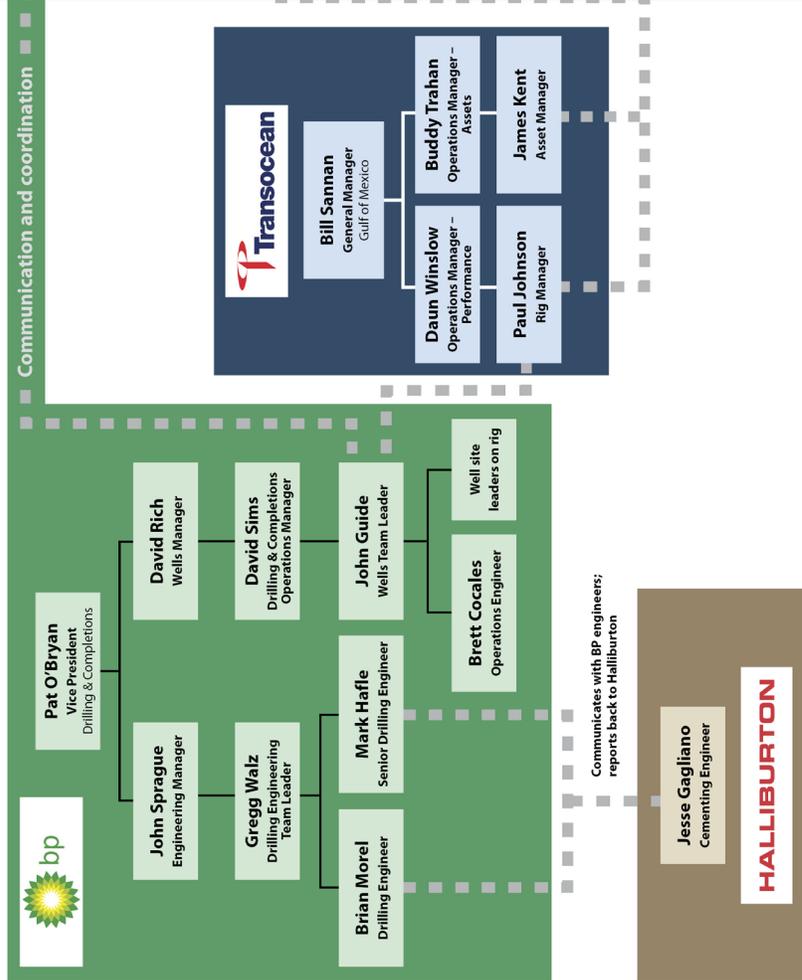


Figure 3.8.
Deepwater Horizon's
organizational structure.

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managers overseeing the Macondo team had only a few months of experience in their respective positions at the time of the blowout.¹⁷

Wells Team Leader

The **wells team leader** is accountable for the safety and operations of the drilling rig.¹⁸ The wells team leader for Macondo was John Guide. He supervised the well site leaders on the rig and an operations engineer in Houston. Ian Little managed John Guide until David Sims took over from Little in March 2010.¹⁹

Well Site Leaders on the Drilling Rig

The top BP employees stationed on the rig were the **well site leaders**. The well site leaders served as the company's eyes and ears, and made important decisions regarding the course of drilling operations. At any given time, two well site leaders served on the rig, splitting responsibility according to 12-hour shifts. The two-man team worked on the rig for several weeks at a time and then returned to shore for a similar period.

At the time of the blowout, Bob Kaluza and Donald Vidrine were BP's two well site leaders on the *Deepwater Horizon*. Lee Lambert, who was in training to become a well site leader, was also present. Kaluza was onboard as a temporary replacement for Ronnie Sepulvado, an experienced well site leader who had worked on the *Deepwater Horizon* since it set sail in 2001 but who had left the rig early to attend a training program. Murry Sepulvado (Ronnie Sepulvado's brother) and Earl Lee were the prior regular BP well site leaders for the *Deepwater Horizon*. They were not on the rig at the time of the blowout.

Engineering Team Leader

The **engineering team leader** is accountable for well design.²⁰ The engineering team leader supervises drilling engineers. David Sims was the engineering team leader until about a month before the blowout.²¹ In March, Sims moved from engineering to an operations role and handed his responsibilities over to Gregg Walz.

Other BP Engineers

Other BP engineers closely involved with the Macondo project included Brian Morel, Mark Hafle, and Brett Cocales. Morel and Hafle were **drilling engineers** who designed wells and shepherded designs through BP's processes, ensuring that they complied with internal guidelines.²² They planned the Macondo casing program and set out the steps to drill the well.²³ Morel and Hafle reported first to Sims, and then to Walz when he took over from Sims in March. Cocales was an operations engineer responsible for planning and preparing *Deepwater Horizon's* future activity. Cocales focused on end-of-well operations and preparations for future work.²⁴ He reported to Guide.

Anadarko and MOEX

Anadarko and MOEX were BP's partners at Macondo. Anadarko Petroleum is an independent oil exploration company and owned a 25% share of the Macondo well.²⁵ MOEX Offshore 2007, an American subsidiary of the Japanese oil company Mitsui Oil Exploration, owned a 10% share of the well.²⁶ The partners shared the costs to drill the well and expected to share profits from production.



Transocean is the world's largest contractor of offshore drilling rigs.²⁷ BP has entered into several contracts with Transocean to secure the long-term services of certain Transocean rigs, including the *Deepwater Horizon*. Transocean crews performed most of the basic work of drilling the Macondo well.

OIM and Master

Two different Transocean employees were in charge of the rig at different times. Captain Curt Kuchta, Transocean's **master**, was in charge when the rig was moving from location to location. Once the rig arrived at a given site and began drilling or drilling-related operations, Jimmy Harrell, Transocean's **offshore installation manager (OIM)**, took over.

Senior Toolpusher and Toolpushers

The **toolpushers** on a Transocean rig are drilling managers who direct and supervise day-to-day drilling operations. The toolpushers stationed on the rig when the well blew out were Jason Anderson and Wyman Wheeler. Anderson was on duty and lost his life. Wheeler was severely injured.

The **senior toolpusher** on a Transocean rig is a senior drilling operations supervisor, second only to the OIM in the chain of command. The senior toolpusher on the rig was Miles "Randy" Ezell.

Rig Floor Personnel

The Transocean employees who served primarily on the rig floor included drillers, assistant drillers, floorhands, and roustabouts. **Drillers** and **assistant drillers** worked in the drill shack and were responsible for operating drilling machinery and monitoring and controlling the well. The drillers stationed on the rig when the well blew out were Dewey Revette and Micah Burgess. Revette was on duty and lost his life. The assistant drillers stationed on the rig when the well blew out were Donald Clark, Stephen Curtis, Patrick Kevin Morgan, and Allen Seraile. Clark and Curtis were on duty. Both lost their lives. **Floorhands** and **roustabouts** are the rig's labor force for drilling operations. Three floorhands lost their lives in the blowout. They were Shane Roshto, Karl Kleppinger, and Adam Weise.

Other Transocean Employees

In all, Transocean had 79 employees onboard the *Deepwater Horizon* when it blew out, including welders, technicians, radio operators, and other specialized personnel. Aaron Burkeen, a crane operator, and Roy Wyatt Kemp, a derrickhand,[†] both lost their lives.

[†] A derrickhand works from the rig's derrick to assist with drilling operations.

HALLIBURTON

Halliburton is one of the world's largest oil field services providers and owns several other oil field services companies, including Baroid and Sperry Drilling. Halliburton designed and pumped the cement for all of the casing strings in the Macondo well.

Jesse Gagliano was Halliburton's lead cementing specialist for the project. Gagliano worked closely with BP and had an office in BP's building near the offices of BP's engineers. Halliburton also sent several individuals to the rig to actually perform cementing work. Those individuals included Nathaniel Chaisson, Vincent Tabler, Christopher Haire, and several foamed cement technicians. Tabler and Haire were on the rig at the time of the blowout.²⁸

Other Important Contractors and Suppliers

Cameron is a Houston-based company that manufactures well drilling equipment and well construction components. Cameron manufactured the *Deepwater Horizon's* blowout preventer.

Dril-Quip is a Houston-based manufacturer of components used in the construction of oil wells. Dril-Quip manufactured the wellhead assembly used at Macondo, including the casing hanger, seal assembly, and lockdown sleeve components. A Dril-Quip technician named Charles Credeur was on the *Deepwater Horizon* when Macondo blew out.

M-I SWACO, a Schlumberger subsidiary, is a Houston-based company that provides drilling fluids and drilling fluid services. M-I SWACO provided drilling mud and spacer used at Macondo, and its personnel operated the *Deepwater Horizon's* mud system. M-I SWACO had five mud engineers on the rig the day it blew out: Gordon Jones, Leo Lindner, Blair Manuel, Greg Meche, and John Quebodeaux. Jones and Manuel lost their lives.

Schlumberger is a multinational company that delivers a variety of oil field services through its own employees and through subsidiaries including M-I SWACO. BP hired Schlumberger to run cement evaluation logs for the primary cement job on the final Macondo production casing. Schlumberger also provided well logging services used in the evaluation of the Macondo well.

Sperry Drilling, a Halliburton subsidiary, delivers oil field services. At Macondo, BP employed Sperry Drilling to collect data from sensors mounted on the rig and to provide trained personnel to monitor and interpret the data, including monitoring the well for kicks. Sperry Drilling had two of these "mudloggers" on the rig the day it blew out: Joseph Keith and Cathleenia Willis.

Weatherford is a Houston-based manufacturer of well construction components. It manufactured float valves and centralizers used at Macondo. Four Weatherford technicians were on the rig the day it blew out. ♠