Main page Contents Featured content Current events Random article Donate to Wikipedia Wikipedia store

Interaction

Help About Wikipedia Community portal Recent changes Contact page

Tools

What links here Related changes Upload file Special pages Permanent link Page information Wikidata item Cite this page

Print/export

Download as PDF Printable version

In other projects

Wikimedia Commons Wikinews

Languages العرسة

Ö

Azərbaycanca Български Català

Čeština

Deutsch

Eesti Español

Euskara

فارسى Français

Galego 한국어

Bahasa Indonesia Íslenska

Italiano

עברית

Bahasa Melayu Nederlands

Norsk

Polski

Português

Русский

Slovenčina

Svenska

Türkçe

Tiếng Việt

Æ Edit links

Article Talk

# Deepwater Horizon

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(1) (1)

Coordinates: 28.736667°N 88.386944°W

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This article is about the drilling rig. For the explosion, see Deepwater Horizon explosion. For the oil spill, see Deepwater Horizon oil spill. For the 2016 film, see Deepwater Horizon (film). For other related articles, see Deepwater Horizon (disambiguation).

Deepwater Horizon was an ultra-deepwater, dynamically positioned, semisubmersible offshore drilling rig<sup>[8]</sup> owned by Transocean. Built in 2001 in South Korea by Hyundai Heavy Industries, [9] the rig was commissioned by R&B Falcon (a later asset of Transocean),[10] registered in Majuro, and leased to BP from 2001 until September 2013.[11] In September 2009, the rig drilled the deepest oil well in history at a vertical depth of 35,050 ft (10,683 m) and measured depth of 35,055 ft (10,685 m)<sup>[12]</sup> in the Tiber Oil Field at Keathley Canyon block 102, approximately 250 miles (400 km) southeast of Houston, in 4,132 feet (1,259 m)

On 20 April 2010, while drilling at the Macondo Prospect, an uncontrollable blowout caused an explosion on the rig that killed 11 crewmen and ignited a fireball visible from 40 miles (64 km) away. [14] The fire was inextinguishable and, two days later, on 22 April, the Horizon sank, leaving the well gushing at the seabed and causing the largest oil spill in U.S. waters.[15]

#### Contents [hide]

- 1 Design
- 2 History
  - 2.1 Construction and ownership
  - 2.2 Drilling operations
  - 2.3 Regulation, safety, and inspection
- 3 Explosion and oil spill
- 4 Aftermath
- 5 In popular culture
- 6 See also
- 7 References
- 8 External links

## Design [edit]



The Deepwater Nautilus, sister rig to  $^{f \Box}$ the Deenwater Horizon being transported aboard a heavy-lift ship

Deepwater Horizon was a fifthgeneration, RBS-8D design (i.e. model type), deepwater, dynamically positioned, column-stabilized,[3] semi-submersible mobile offshore drilling unit, designed to drill subsea wells for oil exploration and production using an 18.75 in (476 mm), 15,000 psi (100,000 kPa) blowout preventer, and a 21 in (530 mm) outside diameter marine riser.[6]

Deepwater Horizon was the second

semi-submersible rig constructed of a class of two, although *Deepwater Nautilus*, its predecessor, is not dynamically positioned. The rig was 396 by 256 ft (121 by 78 m) and capable of operating in waters up to 8,000 feet (2,400 m) deep, to a maximum drill depth of 30,000 ft (9,100 m). [6] In 2010 it was one of approximately 200 deepwater offshore rigs capable of drilling in waters deeper than 5,000 ft (1,500 m).[16] Its American Bureau of Shipping (ABS) class notations were "A1, Column Stabilized Drilling Unit, AMS, ACCU, DPS-3".[3]

In 2002, the rig was upgraded with "e-drill", a drill monitoring system whereby technical personnel based in Houston, Texas, received real-time drilling data from the rig and transmitted maintenance and troubleshooting information.<sup>[17]</sup>

Advanced systems played a key role in the rig's operation, from pressure and drill monitoring technology, to automated shutoff systems<sup>[18]</sup> and modelling systems for cementing. The OptiCem cement modelling system, used by Halliburton in April 2010, played a crucial part in cement slurry mix and support decisions. These decisions became a focus for investigations into the explosion



#### History

Name: Deepwater Horizon

Transocean's Triton Asset Leasing Owner:

GmbH<sup>[1]</sup>

Operator: Transocean

Panama (23 February 2001 – 28 Port of

registry: December 2004)

> Marshall Islands, Majuro (29 December 2004 – 20 April 2010)[2]

Route: Gulf of Mexico Ordered: December 1998

Hyundai Heavy Industries<sup>[3]</sup> Builder:

Cost: US\$560 million[4][5]

Way number: 89

Laid down: 21 March 2000

Completed:

Acquired: 23 February 2001

Maiden Ulsan, South Korea - Freeport, Texas

voyage:

Out of service: 20 April 2010

Identification: ABS class no.: 0139290

Call sign: V7HC9 IMO number: 8764597 科 MMSI no.: 538002213

Fate Sank on 22 April 2010 after an

explosion and fire

Notes: Located in the Gulf of Mexico at a depth

of 5,000 ft (1,500 m) at 28.736667°N

#### **General characteristics**

Class and ABS +A1 DPS-3 Column Stabilized MODU type:

Tonnage: 32.588 GT

9,776 NT

Displacement: 52,587 t (51,756 long tons; 57,967 short

Lenath: 112 m (367 ft) 78 m (256 ft) Beam: Height: 97.4 m (320 ft) Draught: 23 m (75 ft) Depth: 41.5 m (136 ft) Deck 34.010 m (111.58 ft)

clearance: Installed 7,000 kW 11,000 volts

power: 6 × Wärtsilä 18V32 9775 hp diesel on the rig that month.[19]

# History [edit]

#### Construction and ownership [edit]

Deepwater Horizon was built for R&B Falcon (which later became part of Transocean)<sup>[20]</sup> by Hyundai Heavy Industries in Ulsan, South Korea.<sup>[3]</sup> Construction started in December 1998, the keel was laid on 21 March 2000,<sup>[7]</sup> and the rig was delivered on 23 February 2001,<sup>[7]</sup> after the acquisition of R&B Falcon by Transocean.<sup>[21]</sup> Until 29 December 2004 the rig was registered in the Republic of Panama.<sup>[2]</sup>

Transocean, through its Steinhausen, Switzerland<sup>[22]</sup> subsidiary<sup>[23]</sup> Triton Asset

Leasing GmbH,<sup>[1][7]</sup> operated the rig under the Marshallese flag of convenience.<sup>[24]</sup> The
rig was leased to BP on a 3-year contract for deployment in the Gulf of Mexico following
construction.<sup>[25]</sup> The lease was renewed in 2004 for a year,<sup>[26]</sup> 2005 for 5 years,<sup>[27]</sup> and
2009 for 3 years covering 2010 to 2013.<sup>[24][28]</sup> The last contract was worth \$544 million,
or \$496,800 a day,<sup>[29]</sup> for a "bare rig",<sup>[30]</sup> with crew, gear and support vessels estimated
to cost the same.<sup>[30]</sup>

According to R&B Falcon's filings to SEC in 2001, the transfer document between R&B Falcon and Transocean was dated 17 August 2001,<sup>[31]</sup> and the rig was specified as "official registration number of 29273-PEXT-1, IMO number of 8764597, with gross tonnage of 32,588 and net tonnage of 9,778"<sup>[31]</sup> and the transfer value as US \$340 million.<sup>[31]</sup> As of 2010, the rig was insured for US \$560 million covering the replacement cost and wreckage removal.<sup>[21]</sup>

engines
6 × ABB AMG 0900xU10 AC generators
Propulsion: 8 × Kamewa 7,375 hp, 360° fixed propeller azimuth thrusters

Speed: 4 knots (7.4 km/h; 4.6 mph)
Capacity: Liquid mud: 705 m³ (24,900 cu ft)
Drill water: 2,078 m³ (73,400 cu ft)
Potable water: 1,185 m³ (41,800 cu ft)
Fuel oil: 4,426 m³ (156,300 cu ft)
Bulk mud: 386 m³ (13,600 cu ft)
Bulk cement: 231 m³ (8,200 cu ft)

[6][7]

Crew:

Notes:

This article is part of a series about the Deepwater Horizon oil spill

V •T•

# **Drilling operations** [edit]

Deepwater Horizon worked on wells in the Atlantis (BP 56%, BHP Billiton 44%) and Thunder Horse (BP 75%, ExxonMobil 25%)<sup>[32]</sup> oil fields. It was described at times as a "lucky" and "celebrated" rig,<sup>[33]</sup> and in 2007 was still described as "one of the most powerful rigs in the world".<sup>[34]</sup> In 2006 it discovered oil in the Kaskida oil field, and in 2009 the "giant" Tiber field.<sup>[35][36]</sup> The well in the Tiber field has a vertical depth of 35,050 ft (10,683 m) and a measured depth of 35,055 ft (10,685 m), below 4,132 ft (1,259 m) of water.<sup>[37]</sup> The well was the deepest oil well in the world, <sup>[36][37][38][39]</sup> and more than 5,000 feet (1,500 m) further below the seabed than the rig's official drilling specification stated on the company's fleet list.<sup>[40]</sup>

In February 2010, *Deepwater Horizon* commenced drilling an exploratory well at the Macondo Prospect (Mississippi Canyon Block 252), about 41 miles (66 km) off the southeast coast of Louisiana, at a water depth of approximately 5,000 feet (1,500 m).<sup>[41]</sup> The Macondo prospect exploration rights were acquired by BP in 2009,<sup>[42]</sup> with the prospect jointly owned by BP (65%), Anadarko (25%) and MOEX Offshore 2007 (10%).<sup>[43]</sup> *Deepwater Horizon* was still working on the Macondo site on 20 April 2010, when a violent explosion occurred leading to destruction of the rig and resulting oil spill.<sup>[44][45][46][47]</sup> The well was in the final stages of completion at the time; its cement casing was injected and hardening, and the rig was due to move shortly to its next role as a semi-permanent production platform at the Nile site followed by a return to the Kaskida field; squatting semi-permanently over an oil dome 50 miles off the coast of Louisiana.<sup>[33]</sup> The exploratory work was described as "concluded" and permission had already been requested from MMS to terminate operations at the Macondo site.<sup>[48]</sup>

During its operational lifetime, the rig was actively in operation for 93% of its working life (2,896 of 3,131 days). The remainder partly relates to time spent between sites.<sup>[49]</sup>

### Regulation, safety, and inspection [edit]

The Minerals Management Service (renamed on 18 June 2010 to the Bureau of Ocean Energy Management, Regulation and Enforcement, or Bureau of Ocean Energy (BOE))<sup>[50]</sup> is the regulatory and inspecting body for offshore oil drilling and rigs in the United States of America.<sup>[50]</sup> According to an *Associated Press* investigation, certain safety documentation and emergency procedure information, including documentation for the exact incident that later occurred, was absent.<sup>[49]</sup> The exact number of required monthly inspections performed varied over time; the inspections were carried out as required for the first 40 months, but after that around 25% of inspections were omitted,<sup>[49]</sup> although the investigation notes this is partly expected, since there are circumstances such as weather and movement which preclude an inspection.<sup>[49]</sup> Reports of the last three inspections for 2010 were provided under Freedom of Information legislation. Each of these inspections had taken two hours or less.<sup>[49]</sup>

During its lifetime the rig received 5 citations for non-compliance, 4 of which were in 2002 (safety, including the blowout preventer) and the other in 2003 (pollution). [49] A sixth citation in 2007 related to non-grounded electrical equipment was later withdrawn when the equipment was determined to be compliant with regulations. [49] Overall the *Deepwater Horizon*'s safety record was "strong" according to a drilling consultant reviewing the information. [49] In 2009 the Minerals Management Service "herald[ed] the Deepwater Horizon as an industry model for safety". [49] According to AP's investigation "its record was so exemplary, according to MMS officials, that the rig was never on inspectors' informal 'watch list' for problem rigs". [49]

### Explosion and oil spill [edit]

Main articles: Deepwater Horizon explosion and Deepwater Horizon oil spill



At 9:45 P.M. CDT on 20 April 2010, during the final phases of drilling the exploratory well at Macondo, a geyser of seawater erupted from the





Deepwater Horizon in flames after the explosion

marine riser onto the rig, shooting 240 ft (73 m) into the air. This was soon followed by the eruption of a slushy combination of drilling mud, methane gas, and water. The gas component of the slushy material quickly transitioned into a fully gaseous state and then ignited into a series of explosions and then a firestorm. An attempt was made to activate the blowout preventer, but it



failed. [51] The final defense to prevent an oil spill, a device known as a blind shear ram, was activated but failed to plug the well. [52]

At the time of the explosion, there were 126 crew on board; seven were employees of BP, 79 of Transocean, there were also employees of various other companies involved in the operation of the rig, including Anadarko, Halliburton and M-I SWACO.<sup>[53]</sup> Eleven workers were presumed killed in the initial explosion. The rig was evacuated, with injured workers airlifted to medical facilities. After approximately 36 hours, *Deepwater Horizon* sank on 22 April 2010. The remains of the rig were located resting on the seafloor approximately 5,000 ft (1,500 m) deep at that location, and about 1,300 ft (400 m) (quarter of a mile) northwest of the well.<sup>[45][54][55]</sup>

The resultant oil spill continued until 15 July when it was closed by a cap. [56] Relief wells were used to permanently seal the well, which was declared "effectively dead" on 19 September 2010. [57]

# Aftermath [edit]

Further information: Deepwater Horizon litigation

Transocean received an early partial insurance settlement for total loss of the *Deepwater Horizon* of US \$401 million around 5 May 2010.<sup>[58]</sup> Financial analysts noted that the insurance recovery was likely to outweigh the value of the rig (although not necessarily its replacement value) and any liabilities – the latter estimated at up to US\$200 million.<sup>[59]</sup>

Litigation, ultimate roll call of damage, and the scope of final insurance recovery were all unknown as of June 2010, with analysts reporting that the aftermath was of unprecedented scale and complexity compared to previous disasters which themselves took many years to unfold and resolve. [60][61] A July 2010 analysis by the *Financial Times* on the aftermath cited legal sources as saying that "at some point the scale of the litigation becomes so large that it really is novel", that "the situation is likely to be complicated further because the variety of probable cases means it will be hard to aggregate them into so-called class actions" and that there was "no way to put this in historical context because we have never faced anything like this before". [62] As with the Exxon Valdez disaster, litigation was being discussed in terms of a 20-year timescale. [60]

In January 2013, Transocean agreed to pay US\$1.4 billion for violations of the US Clean Water Act. BP had earlier agreed to pay \$2.4 billion but faced additional penalties that could range from \$5 billion to \$20 billion. [63] In September 2014, Halliburton agreed to settle a large percentage of legal claims against them by paying \$1.1 billion into a trust by way of three installments over two years. [64] On 4 September 2014, U.S. District Judge Carl Barbier ruled BP was guilty of gross negligence and willful misconduct under the Clean Water Act (CWA). He described BP's actions as "reckless," while he said Transocean's and Halliburton's actions were "negligent." He apportioned 67% of the blame for the spill to BP, 30% to Transocean, and 3% to Halliburton. BP issued a statement strongly disagreeing with the finding, and saying the court's decision would be appealed. [65]

On 8 December 2014, The US Supreme Court rejected BP's legal challenge to a compensation deal over the 2010 Gulf of Mexico oil spill. The settlement agreement had no cap, but BP initially estimated that it would pay roughly \$7.8bn (£6.1bn) to compensate victims. [66]

# In popular culture [edit]

An eponymously named film which was released in the US on 30 September 2016 (directed by Peter Berg and starring Mark Wahlberg), showcased the events of the explosion.

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- . Ixtoc I oil spill
- . Ocean Ranger
- . Piper Alpha



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V·T·E     Deepwater Horizon oil spill       V·T·E     BP	[show]
V-T-E BP	[0011]
	[show]
V·T·E Shipwrecks and maritime incidents in 2010	[show]

Categories: 2001 ships | Collapsed oil platforms | Deepwater Horizon oil spill | Drilling rigs | Semi-submersibles Ships of the Marshall Islands | Ships built by Hyundai Heavy Industries Group | Transocean | Ships of BP

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