



## Offshore Drilling has dug itself a deeper hole since Deepwater Horizon

### Ten years after Deepwater Horizon, offshore drilling creeps farther away from shore

By Justine Calma, [The Verge, April 20, 2020](#)

Ever since the first oil well was built in the Gulf of Mexico in 14 feet of water in 1938, technology advancements made it easier to move farther away from shore in pursuit of new oil reserves, at times without a plan for worst-case scenarios. Just one year before the Deepwater Horizon drilling rig became the site of the most devastating oil spill in American history, it succeeded in drilling what was the deepest oil and gas well ever at the time. The rig bored through more than 35,000 feet of ocean floor while working in waters more than 4,130 feet deep.

Explosions rocked the rig on the evening of April 20th, 2010, after the ultra-deepwater semisubmersible rig Deepwater Horizon had just completed drilling another exploratory well. That night's events killed 11 people, set loose 200 million gallons of oil that spewed out into the Gulf over the course of nearly three months, and harmed marine ecosystems and coastal economies for years.

Since then, offshore drilling operations continued to creep farther out into ultra-deep waters — where depths reach 1,500 meters (about 5,000 feet) or more. Today's drilling rigs can work at depths more than twice as deep as Deepwater Horizon. Between 2000 and 2009, just 15 percent of oil production from US waters in the Gulf of Mexico came from ultra-deep operations like Deepwater Horizon. That proportion grew to 52 percent by 2017, and it likely won't stop there.

**NOTE:** *In Guyana, the oil discoveries so far (2023) have occurred <150 miles offshore, in about 7,000 ft. of water and less than 20,000 ft. of ocean floor.*



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Drilling at new depths unlocks untapped oil reserves and has become easier with newer technologies. But those opportunities come with greater dangers and less margin for error, experts tell *The Verge*. “The lesson from Deepwater Horizon is [that] at the same time that the technology for extraction was progressing very rapidly — I mean it’s quite amazing actually what they’ve been able to do — the technology for safety lagged,” says Donald Boesch, president emeritus of the University of Maryland’s Center for Environmental Science.

Boesch was appointed by Barack Obama to the national oil spill commission that was put together to investigate the cause of the Deepwater Horizon disaster. He believes the US is marginally better prepared now than it was for the blowout in the Gulf of Mexico in 2010, but there are new scenarios that pose even bigger risks — especially when drilling at extreme depths.

## **Powerful forces**

The Gulf of Mexico produced a record-breaking 2 million barrels of oil a day last year. Sustaining that output will require even more exploration, drilling, and development in deeper waters, Tyler Priest, an oil and energy historian at the University of Iowa, tells *The Verge*. And the average rate of production for a Gulf



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of Mexico oil well increases with its depth.

“Nothing generates more free cash flow than a flowing deep water well,” he says. “You have to keep finding more and more oil as older fields deplete and get plugged and abandoned.”

With higher opportunities for profit come higher stakes. Drilling at deeper depths means working under greater pressure. There’s the crushing weight of the water. And there’s also greater pressure within the oil and gas pockets. Not only are rigs able to work at greater depths, but they’re also able to dig deeper than they ever have. The deeper they dig, the more pressure and resistance they face. The temperature of the trapped oil and gas is hotter the farther down and closer to the Earth’s mantle they dig, too. The equipment needs to be able to withstand temperatures that can reach up to 180 degrees Celsius at about 40,000 feet underground.

“You’re working against some very powerful forces,” Boesch tells The Verge. Gas that’s trapped along with the oil under the seafloor “is going to be wanting to expand very rapidly once the pressure is somewhat relieved [by drilling],” he explains.

The probability of a serious accident, fatality, injury, explosion, or fire being reported grows by 8.5 percent with every additional 100 feet of depth at which an offshore platform operates, an analysis of oil and gas production in the Gulf of Mexico from 1996 to 2010 found. That’s regardless of the platform’s age or quantity of fossil fuels produced.

The challenges posed by drilling in deeper water can also complicate measures to cope with any problems that occur. “When something does go wrong, like it did [with Deepwater Horizon], it makes it that much harder to control and clean up,” says Sierra Weaver, senior attorney with the nonprofit Southern Environmental Law Center. “We were really conducting experiments in the very deep ocean in terms of how you drill, how you control, and how you clean up oil,” she tells The Verge.

**When it comes to how “safe” the Gulf Coast is from a similar event today, “Who knows? You’re really only as safe as you are today,” Priest tells The Verge. “All it takes is some series of misfortunes.”**



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## In Deep Trouble

In the evening April 20th, 2010, a series of misfortunes began to unfold after the crew aboard Deepwater Horizon installed a cement seal to the Macondo exploration well 66 miles off the coast of Louisiana. The seal meant to hold back oil and gas failed and so did two valves that were supposed to prevent the flood of oil and gas from traveling up the pipe to the surface.

The crew then misread pressure tests that should have told them that the well wasn't properly sealed. They were caught off guard when drilling mud and natural gas began flowing out of the pipe and onto the rig. Once spotted, they tried to close the valves of a "blowout preventer," a device that should have stopped the uncontrolled release of oil and gas. That failed, too. Within eight minutes of the crew seeing the leak, the natural gas sparked a massive explosion and fires that would eventually bring down the rig.

When it sank, the rig ruptured the pipe that traveled between it and well below, which had been filled with drilling mud to counteract the pressure driving oil and gas upward from the Earth. Without that counter-pressure, oil flowed from the well into the Gulf for 87 days. Several attempts at stopping the leak failed, including trying to fit a containment dome over the well that eventually filled with frozen methane and nearly floated to the surface. Finally, on July 15th, a newly developed device — called a capping stack — was able to seal off the well.

## Deepwater Horizon exposed how unprepared the industry was

The failures at Deepwater Horizon exposed how unprepared the industry was to respond to such a catastrophic event. Today, capping stacks are kept onshore, ready to be deployed for another well blowout. They can weigh up to 100 tons and are built to withstand the high pressure coming from a blown-out well. The stack connects to the blowout preventer, adding additional valves that can be closed to slow and stop the flow of oil until the well can be permanently sealed.

"Now we're prepared for the last war, you know, if the scenario is exactly like before," says Steven Murawski, lead editor of the 2019 book **Scenarios and Responses to Future Deep Oil Spills**. "I don't think we're going to see another 87-day blowout like Deepwater Horizon," he tells *The Verge*.



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## The Next War

There are other, potentially worse scenarios that Murawski and Boesch worry about, like a pipe fracturing below the seafloor instead of in the water as it did during the Deepwater Horizon crisis. If there were to be a leak below the seafloor, the oil would dissipate into the rock formation surrounding it and escape wherever it can find cracks in the rock. “That would be a doomsday scenario because there’s no way you can shut it off,” says Murawski. You couldn’t simply plop a capping stack over a leaking pipe. The best option currently available would be to dig another well to relieve the pressure within the rock formation and redirect flow. This was done after Deepwater Horizon capsized — but drilling the well takes precious time as the damage of the leak grows with each minute. BP began drilling two relief wells in May, but oil continued to gush from the leak until the capping stack was added in July.

“There was obviously a gap in being able to deploy the resources to shut the well in during that incident,” says Erik Milito president of the National Ocean Industries Association, an industry group for offshore drilling and wind power. Since then, according to Milito, new safety equipment to prevent spills, more capacity to respond to problems, and greater government oversight has led to safer operations.

Others aren’t convinced. “The oil industry has been saying that for as long as they’ve been in existence. Before the Deepwater Horizon happened, that type of accident could never happen. And then after it happened, it was, ‘well this will never happen again.’ And that’s simply not the case,” Weaver says.

She and Boesch point to the Trump administration’s efforts to simultaneously ramp up US fossil fuel production, including a bid to open up more shores to offshore drilling that’s currently tied up in courts, while rolling back environmental protections. After Boesch’s oil spill commission made recommendations to prevent another Deepwater Horizon-like spill, the Obama administration introduced well control rules in 2016 that created new industry standards. Then, in May of last year, the Trump administration weakened those rules; changing about 20 percent of the original provisions deemed “unnecessary regulatory burdens.”

The COVID-19 pandemic has implications for offshore drilling, too, as oil prices



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and demand plummet amid a nearly global shutdown of business as usual. Boesch worries because he's seen what effect tightened purse strings had on BP's Deepwater Horizon operation. "They started to cut corners and make hasty decisions," he says. "That's my concern about how [the pandemic] plays into safety." BP was found guilty of "gross negligence" leading to the Deepwater Horizon disaster by a Louisiana federal court in 2014.

"The Deepwater Horizon accident forever changed BP," the company, which leased the rig, said in a statement. **The catastrophe cost BP \$65 billion.**

Even though offshore drilling is moving further into uncharted territory, 10 years after Deepwater Horizon, its effects still reach the shore. "That oil didn't know it was supposed to stay offshore, it came right to those communities," says Weaver. Oil from the spill eventually washed up along 1,300 miles of coastline reaching from Texas to Florida. Tens of thousands of animals perished in the aftermath. And even more people and wildlife were exposed to the lingering toxic effects of the spill. That still wasn't enough of a wake-up call for oil companies like BP to pull back. A decade later, the risks of deepwater oil exploration continue to loom just over the horizon.

## About the Author:

**Justine Calma** is a science reporter covering the environment, climate, and energy with a decade of experience. She is also the host of the Hell or High Water podcast.

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