



BP Dives Deeper Offshore Into Mars-Like World

By David Wethe and Bradley Olson | Sep 17, 2014 4:01 PM PT | [36 Comments](#) [Email](#) [Print](#)

Save +



Facebook



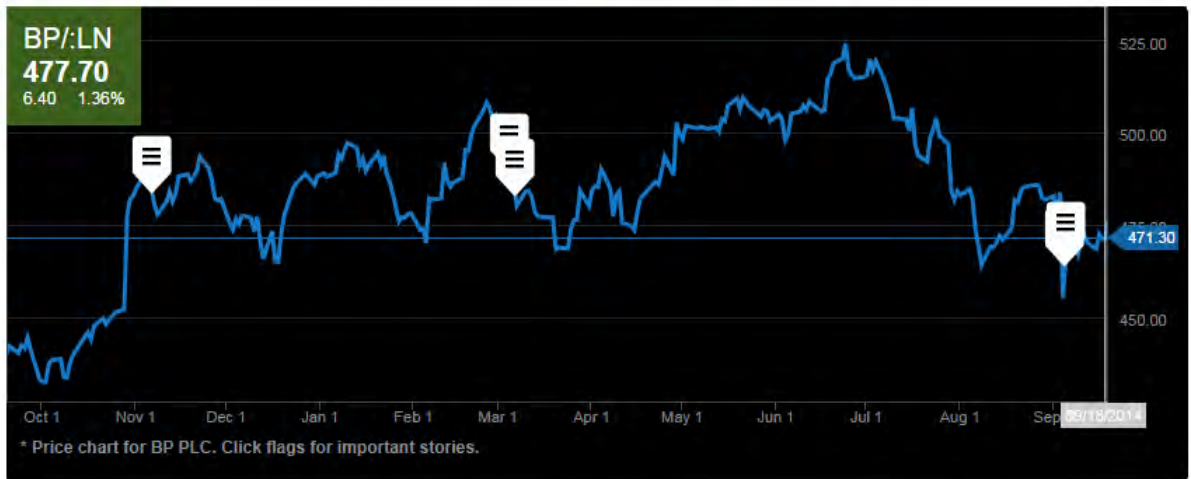
Twitter



Google+



LinkedIn



Even as it faces \$50 billion in potential liabilities from the worst U.S. offshore oil spill, **BP Plc (BP)** is leading the effort to extract crude from deep below the sea, a place as extreme and inhospitable as the surface of Mars.

BP, Chevron Corp. and **Royal Dutch Shell Plc (RDSA)** are among companies developing a new generation of oilfield technology to reach through more than seven miles of water and rock, where temperatures can reach 400 degrees Fahrenheit (200 degrees Celsius) and the pressure hits 20,000 pounds per square inch -- and to do it safely.

The conditions are more challenging than BP's Macondo well in the **Gulf of Mexico**, where a 2010 rig explosion killed 11 people and caused a spill that fouled hundreds of miles of coastline. The companies are seeking to tap into \$1 trillion in reserves offshore, where a major discovery can

produce more oil over its life than 1,000 of the shale wells that are driving an unprecedented energy boom in the U.S.

“What we’re doing in subsea has not been done anywhere else,” said **Matthew Franchek**, a mechanical engineering professor at the **University of Houston**. “The pioneers who blasted off to space could have said the same thing.”

BP may spend several billion dollars over this decade on an effort it’s calling Project 20K, devising tools and techniques to unlock offshore reservoirs so deep, and in rock so dense, that pressure within the well may reach 20,000 pounds per square inch. That’s comparable to inviting two elephants to sit on your chest. By comparison, the Macondo well **charted** pressures of 13,000 pounds per square inch.

‘More Hazardous’

The Macondo blowout should give pause to the industry as it moves into a new phase of drilling, said Bob Deans, a spokesman for the **Natural Resources Defense Council**.

“We had one of the most technologically advanced companies in the world experience a blowout in waters a mile deep that killed 11 people and took 87 days to plug,” Deans said. “Now we’re talking about going into more hazardous conditions that put our waters, our workers and our wildlife at risk.”

A federal judge assigned BP the bulk of the blame this month for the 2010 calamity, a reminder of how difficult deep-water drilling can be. Like space travel, where fatal accidents have occurred even after safety measures were strengthened, the inherent risks in oil exploration may thwart the best efforts of regulators and companies. BP’s mistakes at Macondo, and more than \$40 billion in costs that followed, have made the industry more mindful of the risks, and also, companies say, more careful.

Learning From Macondo

“We learn from every single well we drill,” said **David Eyton**, BP’s global chief of technology. “We sure as hell have learned a lot from Macondo. If anyone is going to make sure that those lessons learned are embedded in their practices and processes, I would suggest we are.”

The offshore push will require new subsea oilfield systems, stronger and more durable than ever before. They must function for decades under miles of water, operated by robots controlled remotely by humans at the surface.



Photographer: Derick E. Hingle/Bloomberg

Transocean Ltd.'s Development Driller III rig works to drill a primary relief well as... **Read More**

Google+



LinkedIn

The ultra-deep waters of the Gulf of Mexico are the province of a small number of industry players, including BP, Chevron and Shell, which is developing plans to produce oil at a 2010 discovery called Appomattox, a prospect about 7,000 feet (2,100 meters) below the sea surface.

These new exploration efforts are aided by advances in mapping petroleum buried beneath layers of rocklike salt that had previously blocked the industry's view, said **Marvin Odum**, director of Shell's Upstream Americas business. At Appomattox, Shell will have to create new equipment that can withstand temperatures as high as 400 degrees Fahrenheit.

Redesigning Screws

"The kinds of challenges we see now are not so much about water depth, but imaging and other things like pressures and temperatures," Odum said. "Most people can't really imagine what 300 to 400 degrees is really like."

BP has identified at least 200 different technologies that various companies must engineer to withstand the conditions encountered 30,000 feet into subsea rock. It means redesigning everything from small screws that hold machines together to the floating drillships that carry bigger, heavier equipment -- a task occupying Fairfield, Connecticut-based equipment maker General Electric Co. and Danish contractor Maersk Drilling A/S.

"We're talking about new materials," said Lorenzo Simonelli, chief executive officer at GE's Oil & Gas unit.

Helping lead design of a new generation of rig will keep Maersk Drilling at the forefront of the deepest offshore markets, Claus V. Hemmingsen, chief executive officer at Maersk Drilling, said in an e-mailed statement.

'Get It Right'

Critical safety equipment such as blowout preventers -- designed to clamp shut and seal off an oil pipe if pressures threaten an explosion -- are being made stouter and bigger, with thicker steel. The blowout preventer failed at BP's Macondo well, leaving a broken pipe at the seafloor spewing millions of barrels into the Gulf for more than 12 weeks.

In the ultra-deep there's no room for error, said Sean Shafer, manager of consulting at Quest Offshore, an industry adviser for oilfield equipment. "They don't have to just design and build it, they have to get it right," Shafer said.

Hazards continue even after the well is completed. New subsea oilfields will need new networks of valves and controls at the seafloor to control pressures and prevent surges through pipes that can

Google+



LinkedIn

explode out the top.

Even testing the new designs present challenges, as companies can't replicate the flowing conditions they'll face beneath 10,000 feet of water and then 30,000 feet of rock. That requires computer simulations to test different scenarios -- much like the space program does when preparing to send equipment into space, said Franchek, the engineering professor.

Changing Culture

Some think companies can do more to improve safety. The drilling industry "is driven by cost cutting and expediency too often," said David M. Pritchard, a petroleum engineer based in Houston who has consulted with oil and gas producers since the 1970s. "That's what has to change in our culture," Pritchard said Sept. 6, speaking at a conference in [New Orleans](#).

After Macondo, the industry was forced to adopt new, far-reaching safety measures, said Michael R. Bromwich, who was tapped by President [Barack Obama](#) to revamp the nation's coastal drilling regulations following the 2010 accident.

"The most affecting part of what happened were the deaths, the injuries, the reminder that offshore drilling operations were more risky than people in the industry had come to believe," Bromwich, now a private consultant, said in an interview. "Members of the industry had lost touch with how fragile these operations could be."

To contact the reporters on this story: David Wethe in Houston at dwethe@bloomberg.net; Bradley Olson in Houston at bradleyolson@bloomberg.net

To contact the editors responsible for this story: Susan Warren at susanwarren@bloomberg.net
Will Wade

Google+



LinkedIn



Facebook



Twitter



Google+



LinkedIn