BP Relied on Cheaper Wells

Analysis Shows Oil Giant Used ‘Risky’ Design More Often Than Most Peers

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In recent years, oil giant BP PLC used a well design that has been called “risky” by Congressional investigators in more than one out of three of its deepwater wells in the Gulf of Mexico, significantly more often than most peers, a Wall Street Journal analysis of federal data shows.

The design was used on the well that exploded in the Gulf of Mexico on April 20, killing 11 workers and causing America’s worst offshore oil spill. The only other major well design, which is more expensive, includes more safeguards against a natural-gas blowout of the kind that de-

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See more details on the wells in an interactive map at WSJ.com/US
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A Journal analysis of records provided by the U.S. Minerals Management Service shows that BP used the less costly design—called "long string"—on 35% of its deepwater wells since July 2003, the earliest date the well-design data were available. Anadarko Petroleum Corp., a minority partner of BP's in the destroyed well, used it on 42% of its deepwater Gulf wells, though it says it doesn't do so in wells of the type drilled by BP.

Both companies used the design much more often, on average, than other major Gulf drillers. Out of 218 deepwater wells in the Gulf drilled since July 2003, 26% used long-string design. It derives its name from its use of a single, long "string" of pipe from the sea floor to the bottom of the well.

Other big drillers use long-string designs much less frequently than BP, according to the Journal's data analysis. Royal Dutch Shell PLC used long string designs on 8% of its wells and Chevron Corp. on 15%. Australian firm BHP Billiton PLC used long string on 4% of its wells.

The insight into BP's record comes amid fierce pressure on the oil giant and its partners, who share billions in liability in the accident. Anadarko blasted BP Friday in a statement by Chief Executive Jim Hackett, who said: "The mounting evidence clearly demonstrates that this tragedy was preventable and the direct result of BP's reckless decisions and actions."

A long-string design is cheaper because a single pipe runs the length of the well and can be installed in one step. But it also can create a dangerous pathway for natural gas to rise unchecked outside the pipe.

The alternative, known as liners, is seen as safer because it has more built-in places to prevent oil or gas from flowing up the well uncontrolled. "There are more barriers, and the barriers are easier to test," says Gene Beck, an engineer and professor at Texas A&M University.

Cheaper Choice

Congressional investigators have focused on BP's design of the well the Deepwater Horizon was drilling, which was cheaper and faster to install than other alternatives, but may have been riskier.

The Deepwater Horizon well

BP used a single piece of pipe, referred to as a "long string," that ran down the whole length of the well, providing gas a path to rise up the sides.

More expensive alternative

Two pipes provide an additional barrier to gas near the bottom of the well, but cost more to install.

Gas may have gotten through cement at the bottom of the well, which would have had an easy path to the top.

The seal blocks gas that gets past the first cement job.

Source: WSJ research Note: Diagram of the well's lining is vastly foreshortened to emphasize the well's layers.
A BP spokesman said long string is widely used and is a perfectly acceptable design, particularly in areas where other wells have been drilled and the geology is well understood. "There is nothing inherently unsafe about long strings," says BP spokesman Andrew Gowers. BP's chief executive, Tony Hayward, told a congressional panel Thursday that "the long string is not an unusual design in the Gulf of Mexico, as I understand it."

Long-string wells are made of a continuous length of steel, which makes the well sturdier over time—a point Mr. Hayward alluded to in his testimony, noting that the design decision had "to do with the long-term integrity of the well." The Minerals Management Service signed off on BP's long-string plan for the Horizon well, he added. "It was approved by the MMS," Mr. Hayward said.

Anadarko says it doesn't use long-string design for drilling exploration wells in unfamiliar areas. The company also says it only uses long strings in lower-pressure wells. The well BP was drilling with the Deepwater Horizon was an exploration well, and was well above normal pressure. As minority partner, Anadarko says it didn't have a role in deciding the BP well's design.

"It's not that long strings are unsafe, but they have to be under the right conditions," says Darrell Hollek, Anadarko's vice president of Gulf operations.

The other method, known as "liner tieback," is more complex and costlier. First, a section of pipe called a liner is placed at the bottom of the well and cemented into place, creating an extra barrier to prevent natural gas from rising to the surface. Typically, another pipe is connected to the liner to create a pipe to the surface.

Chevron's head of North American exploration and production, Gary Luquette, said Chevron typically avoids long-string design because it offers fewer layers of protection. "You can make choices early on to cut costs, slim down your project to make it economic today and have dire consequences down the road, or you can build in that reliability and philosophy of dependability up front and save yourself a lot of headaches in the future," Mr. Luquette said.

In an internal BP email released by a Congressional committee, a BP drilling engineer in Houston told colleagues that the long-string design "saves a good deal of time and money."

A letter to BP's CEO, Mr. Hayward, by two Democratic Congressmen ahead of his testimony to their committee on Thursday, said the choice of the long-string design for the Horizon well was one of five decisions BP made that posed a trade-off between cost and well safety.

Drilling experts say the long-string design can be riskier than liner-tieback, particularly for high-pressure wells. "It was a safe and accepted method, but it is not the most conservative method. The most conservative would be to assume that there is not a straight shot [for gas] up to the surface, that you cement everything in place," says Greg McCormack, director of the University of Texas at Austin Petroleum Extension Service.

According to an internal BP well-planning document seen by the Journal, the company expected the well being drilled by the Deepwater Horizon to be high-pressure at least as far back as January.

Well-control experts and congressional investigators agree that the well design, by itself, didn't doom the Deepwater Horizon. The design created a pathway for gas to flow up the well, potentially pressuring equipment near the floor of the Gulf. But the well would have been secure if the cement plug at the bottom of the hole had held.

Congressional investigators Monday criticized BP for using a long string on that well. "The decision," says a letter from Congressman Henry Waxman (D, Calif.) and Bart Stupak (D, Mich.), "appears to have been made to save time and reduce costs." Using a liner design would have cost an additional $7 million to $10 million, according to an internal BP estimate released by the congressmen.

The congressmen's letter noted that a long string creates only two barriers to prevent gas from flowing up the well: cement at the bottom of the well, and a large seal where the well reaches the sea floor. The liner-tieback design adds two more barriers: the cement around the liner and a mechanical seal that attaches the liner to the pipes.

Marvin Odum, president of Shell's U.S. operations, said Shell doesn't use a long string for high-risk wells. Shell said many of the times it used long strings in deepwater wells, either it hadn't encountered high pressures in the well, or the well was in an area where Shell had drilled and was comfortable with the conditions. "When it is a high-pressure, deepwater well, we only have one way of doing that way, and that is with a liner tieback. Period," he says.

Ben Casselman contributed to this report.